A Research of Factors of Stopping the Hermann Grid

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Abstract. In the research we have 9 style of diagrams to stop Hermann Grid, rotate the square in ratio 10:10, rotate the square 10° in ratio 10:11, rotate the square 10° in ratio 10:12, right decline the square in ratio 10:10, right decline the square in ratio 10:11, right decline the square in ratio 10:12, down decline the square in ratio 10:10, down ecline the square in ratio 10:11, down decline the square in ratio 10:12. We used 'method ofConstant Stimuli' to get the value of absolute threshold. We had 16 subjects in the experiment, and all of them were graduate students from Graduate Institute of Industrial Design of National Kaohsiung First University of Science and Technology. In the research we area of squares'. When right declined the squares, the control factors were 'decreasing the area of squares' and 'direction of horizontal lines'. When rotated the squares, the control factors were 'direction of vertical lines' and 'direction of horizontal lines'. When down declined the squares, the control factors were 'decreasing the area of squares' and 'direction of vertical lines'. The effect of 'direction of horizontal lines' was much more then the effect of 'decreasing the area of squares' and 'direction of horizontal lines

Keywords: Hermann Grid, Vision Illusion, Absolute Thresholdo

1. Introduction -What is Hermann Grid

The range of application of Hermann grid and visual illusion is from Graphic Design to Media Design and Advertisement Design. AfterWorldWar Two there is a common view internationally that war is destroy for human. Then some designs become tools of colonization. Some designers encourage unnecessary consumption by confuse consumers. But designers should tell the truth to consumers, not should cheat consumers for consumption. It is the responsibility for designers to educate consumers correct perceptions of consumption. The Hermann grid illusion consists of smudges perceived at the intersections of a white grid presented on a black background. In 1960 the effect was first explained by a theory advanced by Baumgartner suggesting the illusory effect is due to differences in the discharge characteristics of retinal ganglion cells when their receptive fields fall along the intersections versus when they fall along non-intersecting regions of the grid. The dark smudges of Hermann Grid can be explained by reference to receptive fields and lateral inhibition.Dark smudges (patches, blobs) appear in the street crossings, except the ones which you are directly looking at.

Hermann's Grid is an example of lateral inhibition — a mechanism of our visual system. Light sensitive cells are arranged in rows on the retina and it is possible to stimulate just one cell, called Cell X, to send a signal to the brain. If, however, Cell X's neighbors are also stimulated, Cell X's signal won't be as strong. Stimulating the neighbors of any particular cell actually inhibits the strength of that cell's response. This means that the strength of any signal sent from the retina is dependent on the signals nearby. The places

where the white lines in Hermann's Grid intersect have white surroundings in four different directions so they appear darker than they actually are.

Kevin Berbaum, Chan Sup Chung(Berbaum K, Chung C S, 1981, p85 –89) mentioned the Hermann grid has been explained in terms of concentric receptive fields and also used to determine the size of centers and surrounds in perceptive fields in humans. A new figure, which is simply the outlines of the squares of the Hermann grid, shows that receptive fields having a range of excitatory and inhibitory sizes may be responsible for the Hermann illusion.

2. The research on Destroying Hermann Grid

János Geier, Lászlo Bernáth, Mariann Hudák, Lászlo Séra(Geier J, Bernáth L, Hudák M, Séra L, 2008,p 651 –665) conclude that the main cause of the Hermann grid illusion is the straightness of the edges of the grid lines, and we propose a theory which explains why the illusory spots occur in the original Hermann grid and why they disappear in curved grids. In 'Stopping the Hermann grid illusion by simple sine distortion', Geier J, Sera L, Bernath(2004) proposed the Baumgartner model predicts that the illusion is independent from the relative directions of the right-angled intersections. Some authors (Wolfe, 1984 Perception 13:33–40; for a review see Ninio and Stevens, 2000 Perception 29:1209–1217) show that the magnitude –not the existence–of the illusion depends on certain geometrical properties. They made some simple distortions to the Hermann Grid that makes the illusion disappear totally while the Hermann-grid character remains. The most effective of these was to replace the straight lines with sine curves leaving the intersections right-angled. The illusion is found to disappear at a surprisingly small sine amplitude (amplitude/period <1/10).

2.1. Absolute Threshold
Absolute threshold is the lowest intensity at which a stimulus can be detected.

2.2. Psychological Investigations of Perception Method of Constant Stimuli:
1. A number of stimulus intensities (5-10 typically) are selected beforehand by the researcher.
2. The stimuli are presented numerous times in random order and the subject reports whether he/she can detect them.
3. A graph is plotted showing percent of times detected as a function of stimulus intensity.
4. The point at which the stimulus was detected 50% of the time is deemed the absolute threshold.

3. Experiment design

In the research we use 'method ofConstant Stimuli' to get the value of absolute threshold. We will have three methods to destroy the Hermann Grid, rotating, right declining, and down declining the squares. And we will have three ratios of the width and the height of the squares 10:10, 10:11, and 10:12. In the every experiment we will decline or rotate the squares in Hermann Grid from 0° to 20°, every following drawing increase 2° than the former one. We used Microsoft Office Excel 2003 to make all the drawings for experiments. Every square in a grid with a height 53 pixels(6 points, almost 1.32cm) and a weight 53 pixels(39.75 points, almost 1.32cm). In the experiments of ratio 10:10 we have the squares with height 1.01cm and width 1.01cm. In the experiments of ratio 10:11 and 10:12 we fix the squares with height 1.01cm. We had nine experiments, and we divided the nine experiments in to three blocks. In the first and second blocks we had 5 subjects for every experiment; in the third block we had 6 subjects for every experiment. All of them were graduate students from Graduate Institute of Industrial Design of National Kaohsiung First University of Science and Technology. And the subjects did the experiment at the same time.

Methods / ratios	Rotating	right declining	down declining
10:10	Rotating 10:10	right declining 10:10	down declining 10:10
10:11	Rotating 10:11	right declining 10:11	down declining 10:11
10:12	Rotating 10:12	right declining 10:12	down declining 10:12

Table1. Methods and Ratio for Experiment

Type of squares	in ratio 10:10	in ratio 10:11	in ratio 10:12
Rotate the squares 10°			
Right decline the squares 10°			
Down decline the squares 10°			

Table2. Block 1 for Experiment
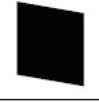
Type of squares	in ratio 10:10	in ratio 10:11	in ratio 10:12
Rotate the squares 10°			
Right decline the squares 10°			
Down decline the squares 10°			

Table3. Block 2 for Experiment

Type of squares	in ratio 10:10	in ratio 10:11	in ratio 10:12
Rotate the squares 10°			
Right decline the squares 10°			
Down decline the squares 10°			

Table4. Block 3 for Experiment

4. Experiment result

	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°
Rotate the squares in ratio 10:10	0	0	0	1	2	5	5	5	5	5	5
Right decline the squares in ratio 10:10	0	0	0	0	0	1	2	3	3	5	5
Down decline the squares in ratio 10:10	0	0	0	1	3	5	5	5	5	5	5

Table 5.Experiment result in ratio 10:10

	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°
Rotate the squares in ratio 10:11	0	0	0	0	0	0	5	5	5	5	5
Right decline the squares in ratio 10:11	0	0	0	0	0	0	0	0	1	1	3
Down decline the squares in ratio 10:11	0	0	0	0	1	1	4	5	5	5	5

Table 6.Experiment result in ratio 10:11

	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°
Rotate the squares in ratio 10:12	0	0	0	0	0	6	6	6	6	6	6
Right decline the squares in ratio 10:12	0	0	0	0	0	0	0	1	3	6	6
Down decline the squares in ratio 10:12	0	0	0	0	0	0	3	6	6	6	6

Table 7.Experiment result in ratio 10:12

	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°
Rotate the squares in ratio 10:10	0	0	0	1	2	5	5	5	5	5	5
Rotate the squares in ratio 10:11	0	0	0	2	0	2	10	10	10	10	10
Rotate the squares in ratio 10:12	0	0	0	0	2	3	3	5	5	5	5

Table 8.Experiment result in rotate the squares

	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°
Right decline the squares in ratio 10:10	0	0	0	0	0	0	0	6	6	6	6
Right decline the squares in ratio 10:11	0	0	0	0	0	0	0	0	5	6	6
Right decline the squares in ratio 10:12	0	0	0	0	0	0	0	1	3	6	6

Table 9.Experiment result in right decline the squares

	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°
Down decline the squares in ratio 10:10	0	0	0	0	4	4	5	5	5	5	5
Down decline the squares in ratio 10:11	0	0	0	0	1	1	4	5	5	5	5
Down decline the squares in ratio 10:12	0	0	0	0	0	4	5	5	5	5	5

Table 10.Experiment result in down decline the squares

5. Discuss

In "A Research of Upper Absolute Threshold of Hermann Grid", we stopped Hermann Grid by rotating and right declining the squares. When we right declined the squares, the area of squares will decrease; when we rotated the squares, the area of squares will keep constant. Before we think the smudges will disappear earlier when we declined the square. But the result was opposite to the assumption. Then we find another factor to stop Hermann Grid, the declining angle of horizontal line. In this research we get two more factors to stop Hermann Grid, the declining vertical angle of line and the ratio of width and height of the squares.

Style of squares	Control factors
Rotate the squares	'direction of vertical lines' and 'direction of horizontal lines'
Right decline the squares	'direction of vertical lines' and 'decreasing the area of squares'
Down decline the squares	'direction of horizontal lines' and 'decreasing the area of squares'

Table 11.Control factors of experiments

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Ssa inthe indian context – a supportive program me of inclusion for exceptional children.

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Abstract. Twenty first century has seen a radical shift in the understanding of disability, from earlier medical interpretations of seeing disability as a deficit within the individual to that of viewing it in the context of a Rehabilitation issue. The National Curriculum Framework for School Education, has recommended integrated schools for learners with special educational needs by making appropriate modifications in the content, presentation and transaction strategies, preparing teachers and developing friendly learning and evaluation procedures. The Sarva Siksha Abiyan Programme (SSA), has opened new vistas in enhancing physical, social, education and vocational integration of the disabled. It is an endeavour to provide quality education to all children in the 6-14 age group by 2010. The major focus of this study was to find out the present style of operation of SSA in the selected districts of Tamil Nadu and objectively find out (a) the involvement of the general schools in providing educational opportunities to Children With Disabilities (CWD's), (b) the collaboration between general class room teachers and specialists in serving CWD's, (c) find out the current strengths and limitations of the programme and to suggest modifications to improve the implementation of the programme. The evaluation exercise was planned and executed in the selected 15 districts of Tamil Nadu using a structured open ended questionnaire and a multiple audience interview schedule. The results were consolidated statistically treated and the findings and conclusions would be elaborated in the full paper.

1. INTRODUCTION :

Twenty first century has seen a radical shift in the understanding of disability, from earlier medical interpretations of seeing disability as a deficit within the individual to that of viewing it in the context of a Rehabilitation issue.

The National Curriculum Framework for School Education has recommended integrated schools for learners with special educational needs by making appropriate modifications in the content, presentation and transaction strategies, preparing teachers and developing friendly learning and evaluation procedures. The Sarva Siksha Abiyan Programme (SSA), has opened new vistas in enhancing physical, social, education and vocational integration of the disabled.

2. SIGNIFICANCE OF THE STUDY :

Sarva Shiksha Abhiyan is an endeavour to provide quality education to all children in the 6-14 age group by 2010. The objectives of SSA mainly focus on increasing access, enrollment and retention of all children as well as improving the quality of education. The need of the hour is to find out whether all the CWSN's are included. The major focus is to find out if all children have completed five years of primary schooling by 2007. The evaluation of the Sarva Shiksha Abhiyan - Inclusive Education (SSA-IED) scheme was undertaken to analyze the quality of elementary education with emphasis on education for life and bridge all gender and social category gaps at primary stage and at elementary education level. The findings of this evaluation will bring to light the functioning of the SSA project in the selected districts and the nature of services provided to the beneficiaries and to identify the aspects for further improvement.

3. OBJECTIVES OF THE STUDY :

The study objectively aimed

- To rate the involvement of the general schools in providing educational opportunities to Children With Disabilities (CWD's)
- To find out the extent of collaboration between general class room teachers and specialists in serving CWD's and finally
- To find out the current strengths and limitations of inclusive education.
- To suggest modifications to improve the implementation of the SSA Programme.

4. METHODOLOGY :

The evaluation exercise of the progress of the SSA-IED in the selected 15 districts of Tamil Nadu was planned and executed using a descriptive method. Interviews were conducted with multiple audience including the special educators, parents, special children and other supportive personnel involved in the programme. Multiple audience interview schedule and structured open ended questionnaire were used to obtain information on the chosen parameters of the study namely support services, training programmes conducted and evaluation mechanism. The results were analysed, statistically treated and the summative findings are discussed.

5. FINDINGS :

The evaluation study to ascertain the status of the implementation of SSA in the selective 15 districts of Tamil Nadu was rated on a 4 point scale. The 4 broad parameters chosen for study for the multiple audience interview rating was

a)   The involvement of the general schools in providing educational opportunities   to CWDs.

b)   The collaboration between the General Classroom Teachers and Specialists in

Serving CWDs

c)   The extent of help IE has provided to CWD

d)   The extent of help IE has provided to non-disabled Children.

(i)   Findings of Multiple Audience Interview Schedule

The general schools are vital and instrumental in enhancing educational opportunities for CWD. The rating revealed that 14 % of the school were V.Good and 61% of the regular schools were Good in providing educational opportunities like conducting periodic assessment, individual curriculum planning, provision of supportive teaching / learning materials and providing additional inputs and training in the Block Resource Centre. However 5% of schools were poorly involved in the exercise of providing educational opportunities to CWD.

The specialists and General Class Room Teachers collaboration envisages better learning and progress of CWDs. This parameter when rated revealed that 10% and 62% of general class room teachers and specialists had V. Good and good collaboration. They worked together in planning effective educational programs, provision of supportive services and collectively contributed their best for the overall improvement of the child, irrespective of their disability. However the respondents rating revealed that the percentage of collaboration was satisfactory in 27% of the schools. The responses revealed that lack of adequate knowledge and paucity of time was the major constraints acting as barriers in collaboration between them.

Inclusive education is undoubtedly a boon to CWD. This mainstream system of education has helped children with disabilities in abroad range of aspects including assessment, educational and medical intervention, and provision of supportive services. An overwhelming percentage of 59% of the respondents have acknowledged that it has certainly helped CWD's and have paved way for creating a society without exclusion.

To the question of IE help to non-disabled children revealed that 52% of the respondents feel that it is good that this system of education has enhanced the opportunity of the non-disabled to be effective peer tutors for their differently abled brethren. The non-disabled children have gained to have better understanding of the strengths and weaknesses of the disabled and it has also maximized opportunities for better socialisation between them.

(ii)   Findings of Current Strengths of Inclusive Education

The untiring work of the Special Educators amounts to be the greatest strength of SSA (90%) and the support services provided to CWD's which accounts to be 80%. The infrastructure facilities contribute to 60% of the success of the programme. The collaborative support and involvement of the NGO accounts to 70% and the parental attitude and involvement is found to be 50%.

6. LIMITATIONS OF THE PRESENT INCLUSIVE EDUCATION

The evaluation of the progression of SSA-IED also brought to focus the set backs and limitations encountered in the programme. A clear analysis of the limitations revealed that CWD's, their parents, the supportive personnel in the programme namely the teachers and therapists and the Administrators faced problems and difficulties.

The limitations encountered by CWD's revealed that 80-100% of them faced shortcomings in travelling to receive supportive services, lack of fool proof assessment insufficient resource materials, and absence of barrier free environment. Seventy percent expressed the provision of poor quality devices, which had minimal utility. Especially 30-50% of the children did not get scholarships and summatively mentally retarded and low vision children did not get adequate supportive services.

The special teachers and therapists were especially incapacitated with more time spent on travelling. An average of less than 50% of the parents did not co-operate and they expressed dissatisfaction that no regular home based services were provided. 80-100% of the administrators expressed limitations that they faced dearth in the number of special teachers and therapists. 30-40% of them expressed that funds were not sanctioned on time and that parents cooperation was lacking in some blocks. They also expressed the need for better co-ordination between government officials.

7. SUGGESTED MODIFICATIONS AND IMPLICATIONS TO IMPROVE THE IMPLEMENTATION PROCESS OF SSA PROGRAMME

The various modifications suggested in the current status of the SSA IED scheme are discussed under the above four areas namely Children with disabilities, Teachers and Therapists, parents and administrators. With regard to modifications needed for CWD's 80-100% felt the need for establishment of cluster level resource rooms and mid-day meal provision. The essential modification suggested was to improve the provision of pre-vocational and vocational skills and establish vocational training centre for persons with disability (14-18 years).

The modifications suggested at the level of teachers and therapists accounts to about 80%, where there is a significant need for increasing the number of special educators and physiotherapists in every block. There was

also a felt need for cross disability training for special educators,. Orientation to special educators on life skill and vocational training and the days of training for special teachers should be considered as On Duty was also expressed. Provision of two wheelers for special teachers is also suggested in the modification.

Modifications needed for parents was found to be 50% which could be focused on organizing more parental training awareness programmes especially for parents of children with multiple and severe disabilities. Bus pass can be issued for the parents of children with all disabilities. Counselling centres could also be established to provide supportive help to parents to overcome problems of rejection and stress.

The other recommendations were funds to be allotted earlier, government order for exam rule relaxation for CWDs. The aspect of barrier free environment should be implemented in all schools. Special educators, therapists - physio and speech therapists can also be appointed according to the number of blocks and children with disabilities. Role of the District Disability Rehabilitation Officer must also be involved with continuous follow-up and evaluation of the SSA programme. At the level of the SSA Co-ordinator, one more qualified personnel to be appointed to coordinate the services of the Inclusive education programme.

8. CONCLUSION

The services towards persons with disabilities have gone through a catastrophe of changes and the new millennium has witnessed a constant endeavour globally to promote a better quality of life for them. The light of the Governments growing stress to help disabled persons and to bring them to mainstream, the SSA programme has been a major milestone to foster education and empowerment of the differently abled. The scheme of SSA advocated since 2000 has set a new trends in rehabilitating the disabled with the collective action of the Government, NGO, Community and other committed personnel.

This evaluation effort has objectively helped to assess the progress of the child, Non-Governmental Organisations, special teachers and also ensure the usage of the given atmosphere, equipment and resources and also to study the involvement of the officials, community and other functionaries who collectively work in the programme. This exercise has helped in studying the existing picture and also enabled in suggesting changes for the future. This approach is certainly believed that the SSA programme becomes more need based, user friendly and ensures that the needy are not deprived of essential services. The programme of SSA is undoubtedly believed to create a society without exclusion and pave way for more economic and social independence and enable the differently abled to live and pursue their lives with dignity.

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A programme on early identification and intervention of developmentally delayed and at-risk infants – A critical analysis

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Abstract. Young children are constantly learning from the environment and the people around them. From the minute children emerge from the womb they are gaining knowledge. The early years can provide the basis for a long healthy life span. What we do early in life lays the foundation for all round development in the areas of physical, mental, emotional and social. Child development research has established that the rate of human learning and development is most rapid in the preschool years. But a remarkable delay in development is noticed in children who are at risk for disability. Early stimulation and intervention helps such children with developmental delay to attain their potential.Early Intervention is the introduction of planned programming deliberately timed and arranged in order to alter the anticipated or projected course of development. Early intervention applies to children of school age or younger who are discovered to have or be at risk of developing a handicapping condition or other special need that may affect their development. Early intervention can be remedial or preventive in nature. For children with disabilities it is crucial that intervention begins at an early age and this is because the central nervous system is most susceptible to change during the first five years of life, adequate methods of therapy and training help to change handicapping conditions and these include physiotherapy, measures of stimulation or training and home visits (Viswanathan and Kolli, 2001). Hence, this study on the Early Identification and Intervention of Developmentally delayed and at-risk infants was undertaken with the following objectives: to identify and follow-up developmentally delayed and at-risks infants in hospitals and homes, to study their socio demographic profile of their families, to find out the beliefs and practices in child rearing, to monitor their health status and developmental milestones and to identify feeding practices, immunization and common health problems. The present study is a survey coupled with indepth case profile analysis of the 83 developmentally delayed and at-risk infants who were identified and provided need-based intervention. The findings as per the objectives of the study and the suggestions for improvement are elaborated in the full paper.

1. Introduction

Young children are constantly learning from the environment and the people around them. From the minute children emerge from the womb they are gaining knowledge. The early years can provide the basis for a long healthy life span. What we do early in life lays the foundation for all round development in the areas of physical, mental, emotional and social. Child development research has established that the rate of human learning and development is most rapid in the preschool years. But

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a remarkable delay in development is noticed in children who are at risk for disability. Early stimulation and intervention helps such children with developmental delay to attain their potential.

According to Persha and Rao (2003), identifying the delay and disability and learning as much as possible about disability is the first step in helping these children with developmental challenges. The discovery of disability occurs at birth or shortly after birth due to the babies being premature, problems with labour, or the presence of obvious impairments not detected by prenatal screening efforts. There is an increased awareness of the early years as a crucial period for promotion of physical, mental, and psychological growth and for preventing disability (Simeonsson,1982).

There are three primary reasons for intervening early with an exceptional child: to enhance the child's development, to provide support and assistance to the family, and to maximize the child's and family's benefit to society (Sawhney,2003). The parents and family have to work with the children from birth to five years to make a constant difference in this young child's life

In the past 25 years, there have been remarkable advances in the field of early intervention that have gradually produced an effective system of services to families and corresponding communities. This was a major change for the enhancement of early intervention programs and was a stepping-stone for many more changes to come.

Early Intervention is the introduction of planned programming deliberately timed and arranged in order to alter the anticipated or projected course of development. Early intervention applies to children of school age or younger who are discovered to have or be at risk of developing a handicapping condition or other special need that may affect their development. Early intervention can be remedial or preventive in nature. For children with disabilities it is crucial that intervention begins at an early age and this is because the central nervous system is most susceptible to change during the first five years of life, adequate methods of therapy and training help to change handicapping conditions and these include physiotherapy, measures of stimulation or training and home visits (Viswanathan and Kolli, 2001). Hence, this study on the Early Identification and Intervention of Developmentally delayed and at-risk infants was undertaken with the following objectives:

- ❖ To identify and follow-up developmentally delayed and at-risks infants in hospitals and homes.
- ❖ To study their socio demographic profile of their families.
- ❖ To find out the beliefs and practices in child rearing.
- ❖ To monitor their health status and developmental milestones.
- ❖ To identify feeding practices, immunization and common health problems.

2. NEED FOR THE STUDY

India is the second most populous country in the world with a present population of over 1000 million. Children below five years form approximately 15 percent of the total population. The National Sample Survey (2001)states that 564 out of 1,00,000 population below 5 years has one or other disability. Poverty rate is high with 35 percent living below poverty line. All these prevailing conditions hike the need for services for prevention of disability or handicaps.

Early intervention to at-risk and developmentally delayed children is in its infancy stages in a large country like India. There is dearth of expertise. The awareness in general population and parents is very poor. The available services are too few to be considered existing. In such an existing plight it is very important to gain knowledge in the field, improve and increase the available services and their accessibility to the needy population. Support services need to be designed in such a way that full inclusion and participation of children with disabilities is possible. Hence, this study was undertaken to gather information in relation to the objectives of the study and understand the issues and concerns of the developmentally delayed and at-risk infants in the Indian context.

3. METHODOLOGY

The methodology adopted for the present study included the following :

4. UNIVERSE AND SAMPLE SELECTION

The universe of the study was confined to the Trichy District encompassing 12 villages covered by 3 Primary Health Centres (PHC). A one year follow-up study revealed 83 developmentally delayed and at-risk infants and their parents who served as respondents for the study.

The present study is a survey coupled with indepth case profile analysis of the 83 developmentally delayed and at-risk infants who were identified and provided need-based intervention.

5. TOOL

The data for the study was collected using the following tools
- Index Cards
- Referral Proforma
- Home Visit Register
- Supervision of Home Visits
- Case Register
- Individual Case Files
- Immunization Registers
- Developmental Assessment Register

An Index Card system is maintained for all screened cases of infants referred by the doctors of the 3 PHCs. Proforma for Selection of Infants referred for Early Intervention is based on the following conditions :

a) Biological criteria:
- Hypoxic Ischemic Encephalopathy (HIE);
- Jaundice at birth-bilirubin above 20 in terms of infants;
- Low birth weight below 1.5 kg;
- Birth trauma;

b) Location : The family should be within the choosen area for the study.

c) Willingness: Willingness of the mother to accept intervention.

A Home Visit Register is filled in on a bi-weekly basis. The Register indicates

how many visits were done by each Home Visitor on the days allotted for the purpose.

Each Home Visitor covered 4-5 home visits per turn and therefore weekly, 20-30 families were visited in the selected geographical locale of the study.

Supervision of Home Visits :

The Supervisors accompanied the Home Visitors and visited those families, in case of
- any developmental lag in an infant;
- any serious illness or impediment in the infant;
- refusal for early intervention and therefore at the visit, they specially ascertained reasons for refusal and attempted convincing the Mother and family for co-operation.

A detailed Case Register was maintained of each case admitted in Early Intervention programme. It included the following data :
- Parent's full name, age and address;
- Name of the Infant, sex and date of birth;
- Place of birth and which hospital;
- Parents' educational background and occupation;
- Socio-economic status;
- Diagnosis and birth weight;

- Ante-natal care and Immunization;
- Nature of delivery, duration of stay by the Infant in the Special Care Nursery;
- Family composition, consanguinity, birth order of children and the infant;
- Family Planning measures, if any.

The collected data was classified and analysed.

Maintenance of case files for each infant :
- Proforma – an intake form which gives details of ante-natal and neo-natal history, nature of delivery, baby's reflexes at birth, and a rating of Hypoxic Ischemic Encephalopathy;
- Case History Record with details as recorded in the Register as well as noting when the major Developmental milestones were attained;
- Home Visit report for each home visit made weekly - verbal and written.
- Maintaining Well Baby Cards which record each baby's weight and immunization schedule on visit to the Well Baby Clinic.
- Maintaining an Immunization Register which includes recording of BCG, OPT /DT, Polio & Measles vaccines given to each infant.

Maintaining a Developmental Assessment Register based on the Gessell Developmental Scale and the testing report enabled the Supervisors to monitor the switch-over from weekly to bi-weekly and even monthly home visits for those babies who were thriving well and developing normally. It also enabled them to monitor those babies with Developmental Delays.

A diary of weekly medicines given free to the Infants and Mothers was also kept.

As a direct result of monitoring, it was easy
(a) to detect handicaps as early as three months in some of the babies;
(b) and to supervise the regularity of the Home Training programme.

6. RESULTS AND DISCUSSION

The study brought to light that a total of 83 developmentally delayed and at-risk children were identified and selected for intervention. The demographic profile revealed the following:

- Some of the selected Infants-at-risk had families 'living in inaccessible or distant localities, where no health intervention measures were available and the babies' chances of survival were tenuous. Illiterate mothers were sometimes unable to give proper addresses with house numbers or land marks. The addresses they gave were vague and difficult to locate.
- Families lived in very difficult conditions. A large majority of the families lived in ramshackle old homes or in small one-room and kitchen tenements. Most of the living quarters were dark and poorly ventilated.
- Because of ignorance, negligence and poverty, many families could not provide
- Adequate diet to mothers and children. Very few of the children had toys or play things.
- The majority of the fathers were under-employed or were daily wage-earners. Families where mothers were deserted by their husbands, had tremendous odds to face in raising the family. These babies were the ones who were not thriving well. Despite this, only a few families had taken measures to supplement the family income.
- Very few of our mothers could note records, although the majority of them retained Well Baby Cards. A large number of our mothers were below 25 years and some appeared as young as 18-20 because mainly no birth record was kept by the family. While some mothers were regular in follow-up and attendance at Well Baby Clinics when called; others, despite an offer of bus fare, either avoided coming or refused to go to the nearby Primary Health Centres and Government Dispensaries in their localities.
- With families having 3-5 children, the mother's plight in raising the family was indeed difficult. Doubting the Supervisors to be staff of Family Planning Service, the mothers while in the Hospitals, did not give the correct number of children they had.
- Some of the age old practices which cause harm to babies or mothers required a lot of persistent follow-up from Home Visitors. Like rubbing chilli powder on the caesarian incision of mothers; Branding the babies' stomach, chest and forehead for lessening pain and reducing convulsions.

Very restricted and limited diet of mothers, who have delivered their babies, devoid of greens, vegetables, pulses, fruits and milk. A large majority of our mothers were weak or anaemic.

- Most of the older members of the family and some of the young mothers had doubts and undue fears about giving polio vaccine to their babies. Their fear was based on "reports", heard of children contacting polio- on being immunized. There were resistance on the part of mothers to start with simple semi-solid food at the 4th/5th month of their babies. Some mothers used a paste of several medical herbs and leaves and tied it on the head of the baby for treating diarrhoea. Some mothers made the babies wear a sacred thread to improve the baby's health. As far as possible, religious practices were not interfered with, but parents were requested to take treatment for diarrhoea and other illnesses. Branding and the use of other applications on wounds was prevented.

7. POSITIVE EXPERIENCES

Despite these problems, the Home Visitors reported encouraging interaction with the families they worked with. Stressful living conditions and poverty apart, it was found that mothers had the tenacity and were enthusiastic about the programme. With the introduction of weighing scales and measuring tapes being taken to homes, mothers felt reassured of babies' weight gain. While some mothers took for granted the baby's development without early stimulation measures, others felt that stimulation, vitamins, immunization and weighing the infants were all measures which helped improve their babies. Mothers felt reassured on receiving Iron-folate tablets for overcoming their deficiencies. Though families are becoming unitary, joint families are still a reality and play a supportive role.

HEALTH STATUS

Regarding the Health status the following congenital abnormalities were detected. They were 5 infants with Cleft palate, 2 with Hydrocephalus, 3 with Microcephaly and 7 with Down Syndrome.

HIE AND JAUNDICE

On screening 2389 infants, 61 fulfilled the referral criteria for Hypoxic Ischemic Encephalopathy and 28 were afflicted with infantile jaundice.

LOW BIRTH WEIGHT

Estimate of low birth weight i.e. a birth weight less than 2.500 gm range from 20-30% and this coincides with the prevailing Indian statistics.

BIRTH TRAUMA

Birth Trauma was not found to be a significant factor provoking disability. In a negligible percentage of cases trauma was attributed because of instrumental birth, hypoxia and other perinatal hazards during delivery.

DEVELOPMENTAL QUOTIENT

Only 6.83% of the infants had definite developmental delays, which is a low figure for a high-risk group of this kind. Another 6.10% had a borderline delay.

NEURO DEVELOPMENTAL PROBLEMS

The Neuro-developmental problems detected were 5.2% multiple handicaps, 3.8% cerebral palsy with developmental delay, 8.6% mentally retarded, 4.2 hearing problems, 2.9 visual problems, 5.8% Autism spectrum disorder.

CONSANGUINITY AND DEVELOPMENTAL QUOTIENT

There was an increase in developmental delay in infants from families with consanguineous marriages. There is an increased occurrence of consanguineous marriages in the local population with both cousin marriages and uncle niece marriages.

SOCIO-ECONOMIC STATUS AND DEVELOPMENTAL QUOTIENT

Development of the infant was measured according to socio-economic status. Differences were seen in two areas –

- In terms of severe retardation, no difference was seen between the different groups according to socio-economic status.
- When mildly retarded infants were studied, there was a difference. There were more mildly retarded infants in the socio-economic group IV, i.e. the lowest group, despite the intervention programme.

FEEDING PRACTICES

The findings regarding feeding practices revealed that in the very low birth weight group70.3% of infants were solely breast fed, 16.5% received mixed feeds and only 13.2% received solely artificial feeds.

HEALTH PRACTICES

The immunization pattern revealed that all infants admitted in hospitals and PHCs in the neonatal period received BCG immunization (100%) coverage. It is heartening to note that although common childhood infections have been noted, not a single case of Koch's (tuberculosis) was found in any project infant. 82% had 3 D.P.T. injections.

In the population, there were several reasons cited by families for not immunizing the child. In certain homes, older siblings had not been immunized and had not contracted any disease. This was cited as proof that immunization was not really required. There were also 'reports' of some families having had complications following immunization, though mothers often could not give specific details. Frequent minor infections were also used as reasons for putting off immunization. In some families, immunization was accepted only after a great deal of persuasion by the Home Visitors.

MEASLES

Immunization against measles was inadequate at 52% and was marginally better than the Family Welfare figures (46%).

HEALTH PROBLEMS

Mothers of developmentally delayed and at-risk infants reported that diarrhea and common cold with fever were the common childhood ailments, aches and pains, eye andear infections, skin disorders fits and other exanthematous fevers were reported as phenomenal.

SIGNIFICANT HIGHLIGHTS

The study has served to highlight several important features.

- A hospital cum home-based programme with a good inclusion follow-up ensures towards holistic development.
- Early identification and intervention in terms of infant survival, morbidity patterns, immunization and feeding methods.
- Developmental testing has shown that children with poor outcomes had
    - More severe degrees of HIE
    - Lower birth weight
    - Were more frequently born of consanguineous marriages
    - Came from poor socio-economic groups with more illiteracy among parents and lesser antenatal care.

Majority of infants show a normal development, although they were selected from high-risk categories, both in terms of biological factors and socio-economic disadvantage;

- Those infants with cerebral palsy, visual or hearing defects have been referred for centre-based evaluation and therapy within the first 6 months of life have shown significant programme
- Children with global developmental delays, and provided need based intervention and have shown sustained improvement on repeat assessment;
- Referring Pediatricians have become convinced of the efficacy of the programme and are enthusiastic to accept an infant stimulation model;

- Families however, need occasional motivators like Oral Rehydration Therapy and vitamins to ensure a good quality of life for their infants and children.
- Sensitization and community awareness programme regarding disability and its related aspects is imperative.

8. CONCLUSION

This study brings to focus the need, importance and effectiveness of various early intervention approaches that are applicable to children with disabilities. Results reveal that there is positive impact in the acquisition of milestone and skill development of children with disabilities below six years thus by bringing a ray of hope not only in the lives of children but also in their families. The collaborative effort of the family along with the health care personnel and their supportive systems would enlighten the lives of children with disabilities and ensure a quality life for them.

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Depression and Socioeconomic Outcomes of Adolescents

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Abstract. Whether there is direct relationship between depression and adverse outcomes of adolescents in school and labor market is unclear due to simultaneity and unobserved heterogeneity problems. Using panel data from the National Longitudinal Survey of Youth 1997, this study applies deviations GMM method to estimate the correlation of depression and socioeconomic outcomes among adolescents. It finds that depression may result in more weeks out of labor force and fewer weekly work hours. In reverse, being out of labor force has feedback effects on depression. While no significant effects from depression on educational attainments, more years of schooling reduce depression and dropping out of high school increases depression.

Keywords: adolescents, depression, socioeconomic outcomes, deviations GMM.

1. Introduction

Depression is a mental health disorder that causes functioning impairment in school, work, family and social life [1]. The onset of mental disorders among population of industrial countries is between adolescence and young adulthood [2]. Data from the National Health and Nutrition Examination Survey shows that about 4.3 percent of the population aged from 12 to 17 in the United States was suffering from depression during 2005 and 2006 [1].

There is emerging evidence to suggest that young people who have depressive tendencies are at risk for adverse outcomes in school and in labor market. Major depression during early adolescence is associated with school failure and lower possibility of entering a university [3]. It is estimated that depression reduces 0.16 to 0.5 years of schooling and college enrollment rate by 2.7 to 7.2 percentage points among high school graduates in the United States [4]. Particularly for women, early onset of depression reduces the possibility of graduating from college. The lower educational attainment associated with early-onset depression substantially lower the annual earnings [5]. The prior depression is positively associated to higher probability of being unemployment later in life [6].

The influence between depression and adverse socioeconomic outcomes may flow in reverse direction. Early school failure results in poor mental health in the transition from adolescence to adulthood [2]. Adverse employment changes from adequate employment to inadequate employment or to unemployment result in similar and significant increases in depression, even after controlling for prior depression and other potential mediators. Both unemployed and inadequately employed people are more depressive than those in adequate employment [6].

At the same time, the correlation between depression and socioeconomic status is confused by other factors. The effects of the confounding factors on depression might lead to the conclusion that depression doesn't have direct effects on later outcomes. After controlling for gender, parental changes, childhood sexual abuse, IQ score, deviant peer affiliation and mother' education, the association between adolescent depression and later outcomes become insignificant [3].

The evidence about the direct relationship between depression and socioeconomic outcomes among adolescents is limited. It is worthwhile to disentangle the effects from depression to socioeconomic outcomes and the effects from the later to the former, when controlling for other observed and unobserved factors.

2. Contribution to Literature

Even though the available evidence indicates a link between depression and some life outcomes, there are several limitations in existing research. One is data limitation. Only a few surveys collect information for depression. The datasets with depression information generally are cross-sectional, unrepresentative samples

for the population, or including limited socioeconomic information. The studies using cross-sectional data to examine the depression-education link are subjected to the problems of reverse causality [4]. The second limitation is that many studies only examine the effects from depression to socioeconomic outcomes and are unable to figure out the reverse effects. This problem partially comes from the limitation of datasets that many longitudinal surveys irregularly collect depression information and sometimes they use different questionaries regarding to depression in different survey rounds. Therefore, it is impossible to catch the evolution of depression along with the socioeconomic status changes. Third limitation is insufficient consideration for endogeneity problems. With longitudinal dataset, some studies using the early depression to predict the later life outcomes completely ignore unobserved fixed effects or only control for specific fixed effects [3, 4, 6].

This study establishes a systematic framework to explain the pathways of impacts between depression and socioeconomic statuses among adolescents. It catches the development of depression and its contemporaneous effects on socioeconomic outcomes and vice versa. The depression and socioeconomic outcomes are endogenous because of either omitted variables, measurement error, or simultaneity. Without making many restrictive assumptions about sources of endogeneity, this study uses newly-developed techniques to isolate useful information and figure out the impacts of variables of interest.

3. Depression Mood and Socioeconomic Outcomes of Adolescents

Adolescent depression has been assessed and classified in three approaches: depressive mood, depressive syndromes, and clinical depression. Depressive moods are sadness, unhappiness or blue feelings that may occur during the periods with failure of an important task or loss of important relationships [7]. The presence of depressive mood is the single most powerful indicator to differentiate clinically referred and non-referred youth and there is a clear continuity from adolescent depression to later depression [3, 7]. High frequency of depression mood is associated with low socioeconomic attainments among adolescents. Adolescents in the National Longitudinal Survey of Youth 97 (NLSY97) have been reporting their mental health conditions every two years since 2000. They are grouped by how frequent they experience depressive mood. Youth in the highest quartile of depression have probability to drop out of high school nearly 7 percent higher than those in the lowest quartile. Among the high school dropouts, those in the highest quartile of depression are twice more likely to be out of labor force and have been staying out of labor force nearly 8 weeks more than those in the lowest quartile. Reciprocally, adolescents in different employment statuses show different level of depression. Around 12.5 percent of high school dropouts who are out of labor force report they feel depressed most or all of the time, while only 3.4 percent of employed high school dropouts did so. These studies indicate that the relationship between depression and socioeconomic attainments in adolescence and its continuing consequences during the transition to adulthood deserve further attention.

4. Samples and Variables

The NLSY97 contains information of a cross-sectional sample of representative youth and a supplementary sample of Black and Hispanic youth who were between the age of 12 and 16 by the time of the first survey round in 1997. The survey is designed to document the transition of these youth from school to work and from adolescence into adulthood. This dataset has several advantages that make it valuable for addressing the research questions. First, the youth questionnaires continuously include consistent questions on mental health. Second, it collects extensive information on youth' educational attainments and work experiences over time. Third, the survey provides other socioeconomic information of youth.

Measures of depression mood. Starting from the fourth wave, youth were asked how often they feel the following ways during last month: very nervous, calm and peaceful, downhearted and blue, happy, or so down in the dumps that nothing could cheer them up. They can choose answers from "none of the time" to "all of the time", corresponding to scales from 1 to 4. The higher scale means that the respondents more frequently have such feelings. They were repeatedly asked the same set of questions every two years. A single variable measuring depression is constructed from the answers of the questions in each wave. The Cronbach's alpha for the reliability of this measure is all over 0.75, which meets the general minimal threshold of reliability accepted in social science research [8]. The measures of depression mood are derived from the principal component analysis method. The higher score of this measure means the higher depression mood frequency.

Educational attainments and labor market outcomes. Educational attainments examined here are years of education and the incidence indicating whether an adolescent is a high school dropout. A set of arrays in every survey round provides weekly information about employer jobs held by a youth at age 14 and above

and self-employed jobs held at age 18 and above. Therefore, a respondent can be identified whether he or she is employed, unemployed or out of labor force during each week of a year. The aggregate weeks that a youth is out of labor force during that year can be calculated from the available information. The weekly work hour is the hours that an adolescent works per week in the primary job.

5. Econometric Methodology

Reduced-form model (1) is developed for four socioeconomic outcomes for a given individual i in year t: $Y_{it} = (ed_{it}, ho, ol_{it}, wk_{it})$ where ed_{it} is years of education, ho_{it} is a dummy indicating high school dropout, ol_{it} is weeks of being out of labor force, wk_{it} is weekly work hours. These outcomes are affected by depression level de_{it} and other factors. Time dummy variables that reflect the common shocks during each year are included in the model. The parameter vector A in the models captures the contemporaneous effects of depression on socioeconomic outcomes.

$$Y_{it} = Ade_{it} + Bx_{it} + \varepsilon_{it} \tag{1}$$

In reverse, the socioeconomic outcomes might have feedback effects on depression. The model (2) explicitly models the effects of socioeconomic outcomes and common shock on depression mood without controlling for other factors because it is assumed that depression is largely set by unobserved shocks.

$$de_{it} = \alpha Y_{it} + u_{it} \tag{2}$$

GMM estimators make few assumptions about the underlying data-generating process and use complicated computing techniques to isolate useful information [9]. In general, the deviations GMM estimators here will take into account the potentially correlated unobserved factors among depression and socioeconomic outcomes. This method uses the second lags of the endogenous regressors as the instruments for orthogonal deviations equations and the first differences of the first lags of the endogenous regressors as the instruments for levels equations.

6. Empirical Models

The results for the effects of depression on educational attainments and socioeconomic outcomes are presented in Table1. The insignificant coefficients of depression in the model for years of education and high school dropout suggest that depression might not have significant effects on educational attainments of adolescents. The models for socioeconomic outcomes show that depression significantly increases the weeks of being out of labor force and reduce the weekly work hours among adolescents. Since the overall standard deviation of depression measure is 1, the coefficients of depression mean that a standard deviation change of depression increase the weeks out of labor force by 6.99 weeks and reduce the weekly work hours by 6.62 hours. Given the means for these two socioeconomic outcomes respectively are 12.5 weeks and 30.6 hours, a standard deviation change of depression have substantial impacts on labor market outcomes of adolescents. In all the models, the Arellano-Bond test for AR (2) in the first difference show that that the second lag is not correlated with the current error terms, which make it a valid instrument.

Table1 Models for Educational Attainment and Socioeconomic Outcomes

Variable	Years of education	High school dropout	Out of labor force	Weekly work hours
Depression	0.0386	0.0278	6.99*	-6.62**
Marital status	0.378	-0.187***	4.38	-3.34*
Number of children	-0.812***	0.128***	0.411	0.502
Family income	0.0315*	-0.00344*	-0.312**	-0.0226
Constant	10.7***	0.429***	24.7***	33.4***
P-value for Ar(2) test	0.836	0.854	0.267	0.618

* $p<0.05$; ** $p<0.01$; *** $p<0.001$

Table 2 presents results for models estimating impacts of socioeconomic outcomes on depression. The estimates imply significant effects of educational attainments on depression. For example, more years of schooling reduce depression. Being a high school dropout increases depression. Given the standard deviation of depression is 1, the incidence of dropping out of high school could increase depression score by 20% of the standard deviation. Also staying longer out of the labor force will slightly increase depression. In all the models, the Arellano-Bond test for AR (2) in the first difference show that that the second lag is not correlated with the current error terms, which make it a valid instrument.

Table2 Models for Depression

Variable	Depression	Depression	Depression	Depression
Year of education	-.0236***			

High school dropout		0.275*		
Out of labor force			0.00543*	
Weekly work hours				-0.00948
Constant	0.259***	-0.0381	-0.0955*	0.237
P-value for Ar (2) test	0.107	0.137	0.113	0.547

* p<0.05; ** p<0.01; *** p<0.001

7. Conclusion

Some studies detect that there is a link between depression and socioeconomic outcomes. But the evidence for the relationship is weak and still scarce due to the technique and dataset limitation. The NLSY97 has been following the 1980-1984 birth cohort since 1997. Starting from 2000, it repeatedly collects information about mental health of this birth cohort every two years. This study uses four waves from NLSY97 to examine the correlation between depression and socioeconomic outcomes of adolescents. A new technique, deviations GMM estimator, is adopted to improve the consistency and efficiency of estimation. Without making many restrictive assumptions, this method allows controlling for unobserved heterogeneity and dealing with endogeneity through instruments. With panel data, deviations GMM use lags of endogenous variables as instruments in the orthogonal-deviations-transformed equation and difference of lags as instruments for the levels equation.

The empirical models in this study suggests that depression increases the weeks out of labor force and reduce the weekly work hours of adolescents. Besides, more years of schooling reduce the levels of depression and dropping out of high school increase depression. Being out of labor market longer is associated with higher level of depression. It seems mutual influence exist between depression and the status of being out of labor market.

This study is a preliminary application of GMM estimator to analyze relationship between depression and some socioeconomic outcomes among adolescents. While the results are not conclusive, it might be policy relevant at least in two ways. First, it suggests that depressive symptom may be a factor that affects the participation and performance of adolescents in labor market. Early intervention in this mental health problem might have benefits for life outcomes. Second, adverse labor market outcomes, such as being out of labor market, seem to have feedback effects on depression. Policies that increase the employment opportunities for adolescents might improve mental health of disadvantaged adolescents.

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The Design of Experiments for Hypothesis Testing: ESP as Informatics Model Extension

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Abstract. This paper presents cross-disciplinary research between psychological evidence on human abilities and informatics needs to update current models in computer science to support alternative methods for computation and communication. In [6] we have already proposed hypothesis introducing concept of human information model (HIM) as cooperative system including ESP abilities. Here we design experiments for proposed hypothesis testing. Experiments are designed as modification of classical psychological experiments (e.g. *Ganzfled*) in effort to overcome pitfalls between psychological and informatics requirements.

Keywords: informatics walls, human information model, extrasensory perceptions, hypothesis testing

1. Introduction

Computing industry has passed parallel hardware revolution and beside proposed parallel challenge in hardware and software design, even toady we can observe certain limitations, walls we are facing [1]. These walls are mostly consequences of physical limitations of silicon chip design (concerning size, overheating, unsustainable power consumption), theoretical limitations (non-algorithmable tasks, NP-hard or NP-complete problems) restricted by model of Turing machine [10] and open human-computer interaction (HCI) issues that implicate from differences, gulfs between classical computer design and human cognition ability [9]. These walls, limitations are the main motivation for alternative approaches, efforts (compute and communicate) in computer/information science. Well known representatives of alternative approaches are quantum and DNA computation but due to its "*own*" restrictions it cannot be widely used in practise [12]. In our research we consider human information potential as another alternative approach how to make computation and communication. In more detail we understand human cognitive functions as special cases of "*computation and communication*" not strictly limited to physical brain activity (see proposed information hypothesis [6] and below).

In recent biological studies, Sheldrake [15] has conducted experiments with animals and human subjects and has found statistically significant results that support *unexplainable* abilities like telepathy or precognition. In consequence also psychological experiments were conducted to investigate such phenomena and some of them were replicated several times [4]. Extrasensory perceptions (ESP) experiments conducted independently by Radin [11] and Walach, Schmidt [13] have also confirmed statistically significant evidence supporting phenomena like telepathy, precognition or clairvoyance. Moreover recent medical studies based on near-death experiences (NDE) studies [5] pointed out the critical review of classical paradigm: observing metabolic brain activity in response to specific thinking process does not necessarily implies the role of brain neurons as origin of thinking process and can be consequence (mediator) of unexplainable non-neuronal activity. Described studies have evoked broad discussions in biological, medical and psychological publications [16] and turned research focus more into inner human scope. In order to follow this research we

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are investigating *unexplainable* human information capabilities as alternative approach for information processing (computation and communication), see motivation above. In other words we are forwarding a research question: *How we can benefit from these human abilities in computer/information science*?

In [6] we have already proposed information hypothesis which assumes human information model (HIM) as cooperative system operating with abilities like telepathy or precognition and assumes to study these abilities as alternative services in information science. On the other hand there is a classical assumption, zero hypotheses, which assumes that *human does not have any extraordinary information abilities; hence informatics models based on human information ability cannot include any ESP properties*. Therefore here we designed presented experiments to investigate the possibility of extraordinary human information capabilities and its impact for information science. In other words main goal of this paper is to present experiments that were designed to test proposed information hypothesis [6] to support or reject it. Experimental testing and its evaluation will also serve us for proposed HIM correct formal design and revision. Presented experiments are designed as modification of classical parapsychological experiments (e.g. *Ganzfled*), to eliminate gaps between psychological and informatics requirements, see section 3.1 for details.

2. Related Work and Critical Review

In introduction chapter we have briefly described motivation for alternative approaches in information science and noted our research interest in alternative approach inspired by human information abilities (for purpose of informatics human information ability modelling). In informatics, there exist many models, systems inspired by nature/human (neural networks, fuzzy systems, evolutionary design, genetic programming). But some of these models are old-fashioned today (e.g. informatics neural networks concept assuming each neuron as simple switch) and do not reflect latest observations from physics, medical science, psychology. By looking at present scientific medical and psychology publications we can observe knowledge which is worth to include to current informatics models. For example Miller [7] extends informatics model of neural networks by "*seven programs*" reflecting liveness neural properties or Hameroff [2] had introduced neural model extension by quantum properties – Orch-OR model. Here we suggest extending classical informatics model by psychological evidence on human capabilities - human extrasensory perception (ESP), see [6] HIM concept.

Scientific focus on medical and psychological evidence supporting ESP phenomena had arisen mostly at the end of 70s. Biologist Sheldrake was one of the first initiators who proposed *hypothesis of morphic fields/resonance* that led to explanation of parapsychological phenomena and increased demands of ESP experimental testing. In his recent paper on '*telephone telepathy*' [15] Sheldrake and Smart reported highly significant hit rates that cannot be explained by conventional theories (from 271 trials conducted 45% of guesses were correct - 25% expected by chance). This was increased to 61% in case of familiar caller and decreased to 20% in case of unfamiliar caller. In next similar study on telephone telepathy Lobach [4] have found the emotional relation between participants and subjects undertaking telephone calls as positively correlated with correct guessing. On the other hand another subsequent study conducted by Schmidt and Walach [14] was unsuccessful to replicate positive findings of Sheldrake [15]. Schmidt had noted that one of possible reasons may be '*unnatural*' conditions provided by authors (e.g. experiment's room, supportive recording devices, etc.). In contrast Sheldrake and Smart findings were conducted in familiar conditions - subject's homes separated several miles apart.

Motivated by previous research recently the study on "*Virtual Reality Immersive system*" was designed and implemented with aim to overcome pitfalls evident in previous studies which could be manipulated by participants to produce an effect [8]. Although this study had promising perspective in combining information technologies initiatives and classical parapsychological methodology; it did not find support for the psi hypothesis. Suggestions for this outcome are discussed in [8]. In contrast classical psi experiments like *Ganzfeld* studies had led significant outcomes [3], [11]. In virtual reality experiments [8] researchers were pushing forward efforts to minimize external variables and to eliminate possible manipulations by participants. But from our perspective these efforts were replaced by artificial feeling which led to unnatural subject's state. Hence we suggest subject feeling naturally (as Schmidt also noted), being comfortable and relaxed. Thus we believe the main pitfalls of virtual reality experiment [8] was in absence of relaxation time,

replacement of real feeling by virtual feeling (in virtual reality participant can be aware of artificial objects). Therefore we suggest subject to feel like in reality he/she is familiar with, presented form of information should be natural too (e.g. real world images instead of 3D rendered artificial objects) and also to minimize subject's unfamiliar-artificial devices e.g. wearing of virtual helmet and gloves can put subject to uncomfortable position and can be affected by stress, being afraid, unnatural situation. Further suggestions and comments to ESP testing are described in chapter 3 together with our experiments design.

3. The Study: Designing Experiments

As noted above general similar ESP experiments were previously conducted by [13], [11], [15] for purpose of biology/parapsychology investigation but not yet tested for specific technical purposes e.g. information science (informatics model design). To overcome differences between classical psychological experiments testing [11] and informatics needs (reliability, integrity, isolation, repeatability) and to learn from "*insignificant*" virtual reality testing [8], here we modify classical parapsychological experiments (e.g. "*Ganzfeld*" in case of telepathy) by conditional changes, see 3.1 section below.

In proposed experiments information is represented/encoded by diverse instances (this naturally arises from informatics needs where form of information may differ). Hence here we focus on instances that are easily to read/decode directly by human like objects, images, text plain, sounds, voices etc. (*presentment content*). According to its informatics purpose experiments are categorized into category of *information prediction, information retrieving* or *information sharing*, see below for details. All these categories/tasks are relevant in informatics and hence we are also interested whether these classical informatics tasks can be replaced or extended by tested human information abilities (have significant influence on informatics human modelling).

3.1. General conditions

As main informatics requirements in information processing are isolation, integrity, repeatability and reliability, we need to minimise external variables and additionally to support each informatics requirement in experiment design. Thus we suggest following general conditions to be set in each experiment.

- First set of conditions deals with minimization of environmental variables: temperature, humidity, lighting and time zone. Subjects are assumed to be tested at the same environmental conditions. Experimental rooms are assumed to be Audio/Video isolated.
- Second set of conditions are related to subject's diversity (sex, occupation, religion, age, education and race). In experiments the same amount of man and woman should be participated and people with different age, race occupation, education, religion as well (to cover the diversity of population).
- Third set of conditions deals with support of natural feeling to minimise psychic factors like being stressed, being nervous, afraid of experiment procedure, unnatural feeling. We suggest minimising of artificial devices (e.g. virtual reality gloves), execution of relaxation time after each presenting form, presenting real world content – subjects are familiar with.
- Fourth type of condition deals with repeatability: each session in each experiment (e.g. pair of sender and receiver) is being repeated at least two times for mutual comparison.
- Fifth condition set stands for reliability requirement: multiple subject activities (e.g. EEG and skin conductance) are assumed being recorded to produce independent outputs for further comparison. Experiments are also assumed as double-blind (neither the subject nor the researcher knows which individuals are in present experiment). For production of quality-random generation/selection *Quantum random bit generator service* is presumed [16].

3.2. Information sharing

To verify, test the possibility of information sharing among people (telepathy, mind – mind interaction) we design this experiment.

Description: set of volunteers is randomly divided into two groups (senders and receivers). Each sender and receiver is placed in separate Audio/Video isolated rooms to eliminate any possibility of communication. Sender is accompanied with light stereoscopic video glasses and earphones (to hear *presentment content* and

to eliminate, external stimuli inside the room). Sender is receiving randomly selected instance of *presentment content* on his glasses or earphones. Receiver's eyes are covered by translucent eye fold to eliminate external visual stimuli inside the room but to see ambient red light produced upper receiver position. Receiver is asked to keeps eyes open. Receiver is also receiving white noise in earphones to evoke (together with light stimulation) near-dream state. At the beginning of experiment, sender is asked to focus on *presented content* and to *transmit* this content to receiver. Receiver is informed about these experimental factors too.

Recording activity: EEG, skin conductance, pulse, temperature.

Goal: observing correlations between sender and receiver recorded files (especially focus on EEG record), examine repeatability and reliability.

3.3. Information prediction

This experiment can be examined together with previously described information sharing experiment. Its goal is to investigate the possibility of information prediction by human (precognition). It is based on previous experiment description but not conducted in pairs.

Description: set of volunteers (predictors) are participating in this experiment. Each predictor is placed in Audio/Video isolated room to eliminate any possibility of communication. Predictor is accompanied with light stereoscopic video glasses and earphones. When predictor presses the button then after 5 sec paused interval then *presentment content* is randomly selected and displayed on his glasses or produced to earphones. Contents are interleaved with *blank* intervals. After passing of 10 sec paused interval whole procedure is repeated, see figure 3.1 for details. At the beginning of experiment predictor is asked to focus on each *blank* interval and try to *predict* next incoming *presentment content*.
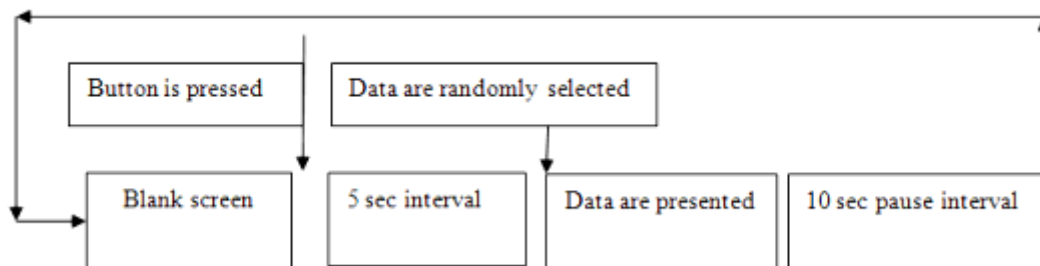
Fig. 3.1: design of prediction experiment, predictor activates each content cycle by pressing the button

Recording activity: EEG, skin conductance, pulse, temperature.

Goal: observing correlations in predictor recorded files between the "*empty*" characteristic curve, before selection and *presentment content* characteristic curve, after selection (especially focus on EEG record), examine repeatability and reliability.

3.4. Information retrieving

To verify, test the possibility of information retrieving by person about certain matter (clairvoyance, mind – environment interaction) we design this experiment.

Description: set of volunteers (retrievers) are participating in this experiment. Each retriever is seated in Audio/Video isolated room to eliminate any possibility of communication. Retriever is accompanied with light stereoscopic video glasses and earphones to eliminate external stimuli inside the room. Retriever is receiving overview of set of several *presentment contents* on his glasses or earphones in parallel. At certain moment one specific *presentment content* in randomly selected without retriever notification. Then (after 5 sec interval) retriever is asked to mark the *presentment content* he/she supposes that is currently being selected. At the beginning of experiment, retriever is asked to focus on each selection and try to *guess as* best as possible.

Recording activity: EEG, skin conductance, pulse (complementary only, not primary focus here).

Goal: observing correlations between randomly selected images and retrievers hits, examine repeatability and reliability.

4. Conclusion and On-Going Work

In this contribution we have presented cross-disciplinary research between psychological evidence on human abilities and informatics demands to update current models in computer science. Main aim was to propose experiments design as subsequent verification to recently proposed informatics hypothesis [6] assuming to model human information ability as cooperative system considering the ESP symptoms. In on-going work it is essential to focus on proper experiments implementation, execution and further evaluation. Here we are interested especially in statistically significant results (correlations). Experiment's implementation is currently being arranged with kind assistance of *"Universitats Klinikum Freiburg"* (Department of Environmental Health Sciences) and *"Institut für Grenzgebiete der Psychologie und Psychohygiene"* (IGPP, Institute for Frontier Areas of Psychology and Mental Health) in Freiburg. As final product of this research is designing human information model (HIM) for purposes in informatics, in future research it is also actual to reflect back observed experiments results on HIM. This model needs further specification as present HIM concept [6] is assumed as cooperative system of multiple levels including neural networks as mediator and non-physical level (ESP symptoms) as fundamental level.

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The Development and Validation of Learning Motivation Inventory Through Using the ARCS Model

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Abstract. The purpose of this study was to use the ARCS model as a basis to develop and validate the learning motivation inventory (LMI) that could systemically measure students' motivation toward technical and vocational courses. Results from four independent and diverse studies demonstrate the suitability of the LMI as a tool for assessing technical and vocational students' disposition toward motivation. Exploratory factor analysis and confirmatory factor analysis with oblique rotation method indicated four theoretically meaningful dimensions: Attention, Relevance, Confidence and Satisfaction. Finally, criterion-related validity with the motivation subscale of MSLQ and IMMS questionnaires had confirmed the reliability and validity of LMI.

Keywords: ARCS Model, Learning Motivation, Technical and Vocational students

1. Introduction

Higher education is in a period of crisis (Surry & Land, 2000). Decreased birth-rate, increased numbers of higher education institutions, increased dropout rate, and decreased retention, are only the most glaring of many problems that most universities encounter in Taiwan. Faced with this growing crisis, many universities have begun to search for strategies to help students improve their motivation for learning.

There are numbers of studies on the factors that affect students' success and the majority of these studies focus on students' motivation and learning strategies (Keller, 1987; Eklöf, 2006). A review of learning motivation studies revealed that motivation is concerned with a variety of concepts, such as self-efficacy, self-regulated learning, task orientation, and expectancy-value (Eklöf, 2006;Keller, 1987). These studies mainly highlighted the diversity of motivation. The number of studies demonstrates the current interest on this topic in the field of higher education.

Although there are many questionnaires used to measure students' motivation, for instance, the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich, Smith, Garcia, and McKeachie (1993) which has been widely used in the motivation and the determination of learning strategies for secondary school, high school and college students or the adult learner in various companies(Karadeniz, Büyüköztürk, Akgün, Çakmak, & Demirel, 2008), these questionnaires merely have focused on understanding students' general learning motivation rather than systemically viewing motivation as a whole concept. Therefore, it is important to connect motivation with teaching strategies and instructional materials

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to systematically develop a LMI for the assessment of students' learning motivation and improvement of instructional design.

Traditionally, most motivational models have focused on the cognitive domain but have neglected the affective domain (Shellnut, Knowlton, & Savage, 1999). In order to improve this drawback, starting with a theoretical basis for including motivation in instructional design, Keller (1979) was the first researcher to provide instructional design to promote students learning motivation through using the ARCS model (Shellnut, Knowlton, & Savage, 1999). In addition, numerous reports and studies have described and confirmed the clinical validity of this model (Visser & Keller, 1990).

In fact, Keller (1987) developed three questionnaires based on the ARCS model in order to precisely measure motivation. These three questionnaires are Instructional Materials Motivational Survey (IMMS), Course Interest Survey (CIS), and Motivational Delivery Checklist (MDC) respectively. However, the IMMS had been empirically validated in its reliability (α＝.81~.96), but the validity had not been precisely validated (Naime-Diefenbach, 1991). Moreover, the CIS was developed to evaluate a specific course, not for general instructional strategies (Bohlin, Milheim, & Viechnicki, 1990). In addition, the MDC was a 47-item ARCS-based instrument for evaluating the motivational characteristics of an instructor's classroom delivery (Ruth, 1997), and this checklist was evaluated by the teacher him/herself; therefore, its reliability and validity was uncertain and subjective. For these reasons, the aim of this study is to develop and validate the LMI through using the ARCS model, which can systemically combine instructional material, strategies and motivation. Specifically, the purposes of the present study were threefold: (a) to confirm the factor structure of ARCS model with a group of technical and vocational students, (b) to confirm the LMI's validity through using exploratory factor analysis and confirmatory factor analysis, (c) to provide evidence of the criterion validity of LMI by demonstrating its relation between IMMS and motivation subscale of the MSLQ.

2. Method

2.1. Participants and General Overview of the Inventory Development Procedure

Over a period of 1 year, four independent studies produced data that were used to develop the LMI. These four independent studies can be divided into two stages. Study one and study two belong to the first stage; Study three and study four belong to the second stage. The pilot testing of the LMI was implemented in the first stage. Initially, a 53 items pool of possible items was generated according to the theoretical rationale described above and through reviewing relevant previous researches measuring student motivation (e.g., Visser & Keller, 1990). A preliminary version of the LMI was administered to two undergraduates. The purpose of this preliminary test was to check that the items were unambiguous and that the completion of the LMI was not time consuming. Next, we invited five experts from the field of psychology of education to examine the learning motivation inventory's content validity. The general consensus was that the LMI appropriately captured the contents theoretically which are expected to be present in motivation outcomes.

The sample of study one consisted of 98 males (38.0％) and 165 females (62.0％) from college students in Southern Taiwan. All students were participants in general education courses; thus, the students were a combination of freshmen, sophomores, juniors and seniors. After the initial pilot investigation, the researchers revised some inappropriate items; therefore, a second pilot investigation was conducted. The sample of study two consisted of 275 males (59.7％) and 186 females (40.3％). The students were asked to rate the agreement of the items using a five-point Likert-type scale ranging from *strongly agree (5) to strongly disagree (1)*.

In accordance with the revision made through study one and study two, study three used confirmatory factor analysis to confirm whether the learning motivation inventory's theoretical framework fits with the ARCS model or not. The sample of study three consisted of 738 males (65.4％) and 391 females (34.6％) from college students in Southern Taiwan. In study four, we used criterion-related validity to examine correlation between learning motivation inventory and motivation subscale of MSLQ, IMMS questionnaires. Thus, in order to implement the criterion-related validity respectively, we set up two visions of the questionnaire, the first version was a composite of LSI and IMMS questionnaires (total 60 items), and the

second version was composed of LSI and the motivation subscale of MSLQ questionnaires (total 55 items). The sample size for the first and the second version was 560 and 569 participants respectively.

2.2. Data Analysis

Step 1: Exploratory factor analysis

To begin with, we used exploratory factor analysis to examine the factors underlying the data. We used computer software for the factor procedure and specified principle axis factoring as the extraction method because principle axis extraction investigates the underlying dimensions of instrument data, which is consistent with the aims of factor analysis in instrument development, whereas principle component extraction minimizes the number of factors generated while maximizing the amount of the variance accounted for (Dalgety, Coll, & Jones, 2003). The number of factors to be retained was determined on the basis of several criteria, including the examination of the resulting scree plot, the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO), and factor interpretability. The Kaiser–Meyer–Olkin Measure of Sampling Adequacy (KMO) was employed to ensure the appropriateness of the data for factor analysis, with factor analysis carried out on data with KMO values >0.7. The number of factors chosen for rotation was based on scree plot analysis, while ensuring all factors had an eignvalue >1. The factors were then rotated through using the oblique rotation method because the results of Naime-Diefenbach (1991) showed a correlation between attention and confidence. Therefore we chose the oblique rotation method to be our rotation method which allowed the factors to be correlated (Costello & Osborne, 2005). On the basis of both the pattern coefficients and structure coefficients, we preselected appropriate items for the next step.

Step 2：Confirmatory factor analysis

The purpose of confirmatory factor analysis was to confirm the factors determined in the previous step. The sample was composed of 1,129 technical and vocational college students in order to examine whether or not this inventory is suitable for college students. Specifically, for each item, we examined the extent of the model by using the combination of several fit indexes (e.g., the comparative fit index [CFI], the root mean square error of approximation [RMSEA], normed fit index [NFI], the goodness-of-fit index [GFI], the adjusted GFI [AGFI], the Tucker-Lewis index [TLI], and the root mean square residual [RMR]). CFI value in the .95 range and RMR value below .05 indicate excellent model fit. RMSEA value below .05 indicates good fit, and those below .08 indicate reasonable fit (Hu & Bentler, 1999).

Step 3：Analyses to determine the inventory properties

In this step, we use Cronbach's coefficient alpha to estimate the scores on the resulting scales for the factors determined in the previous steps. In addition, criterion-related validity was used to examine the correlation between LMI and motivation subscale of MSLQ, IMMS questionnaires.

3. Results

Messick (1989) identified three types of validity that need to be addressed in developing a questionnaire. These were content validity, construct validity and criterion-related validity. We used our four independent studies and used existing questionnaires to design the LMI items. Content validity was verified by two college students and five educational psychologists. Construct validity was verified by factor analysis. The motivation subscale of MSLQ and IMMS questionnaires were used to assess the criterion-related validity of the LMI inventory. We respectively addressed the exploratory factor analysis, confirmatory factor analysis and criterion-related validity as following:

Exploratory Factor Analysis

The overarching goals for Study one and two were to evaluate the internal consistency and exploratory factor analysis of LMI. We selected 263 and 461 respondents for the two studies respectively. Exploratory factor analysis was carried out. Because the LMI was organized by the ARCS motivation model, we followed this model and extracted 4 factors. The factors were then rotated using the oblique rotation method. In study one, there are 40 items, including eight items in attention subscale, ten items in relevance subscale, eleven items in confidence subscale and eleven items in satisfaction. The internal consistent alpha was .89, .89, .90, and .92 for each subscale, and the total inventory's internal consistent alpha was .97,

indicating that the LMI had reasonable reliability. In addition, the KMO was .96, indicating the data was appropriate for factor analysis. As for validity, the four factors accounted for about 64.2% of the total variance, this percentage of variance appeared to be acceptable. According to reliability and validity, we deleted and revised some items which were not appropriate; the remaining items were 30.

In study two, we used the remaining items of study one to conduct the second times exploratory factors analysis. The LMI consisted of 30 items, including seven items in attention subscale, seven items in relevance subscale, seven items in confidence subscale and nine items in satisfaction. The internal consistent alpha was .92, .92, .90, and .91 for each subscale, and the total inventory's internal consistent alpha was .97, indicating that the LMI had high reliability. The total variance was 65.7%. Next, according to the reliability and validity, we deleted and revised some items which were not appropriate; the remaining items were 24, each subscale has six items. The communalities ranged from .51 to .77.

Confirmatory Factor Analysis

As Thompson (2004) indicated, CFA is most appropriate for assessing factor structures that are supported by theory and empirical studies. The factor structure of the LMI was examined in Study three through the use of CFA. Using AMOS 6.0, the CFA was conducted to test the construct validity of scores obtained from the 24-item scale. The four dimensions were considered as factors: Attention, Relevance, Confidence and Satisfaction. The chi-square statistic obtained for this analysis was 1751.5 (df=246, n=1,129, p<.000). Due to the considerable sample size in study three, the statistical significance of the chi-square statistic was not surprising.

In addition to the observation of chi-square values, NFI, GFI, AGFI, TLI, CFI, RMSEA, and RMR were simultaneously examined to evaluate model fit. In general, the first-order baseline model of this research was moderate: NFI=.91, GFI=.88, AGFI=.85, TLI=.91, CFI=.92, RMSEA=.07 and RMR=.05. These fit indices showed that there was a fair fit of these data.

Reliability Estimates

The internal consistency of scores on the four factors was estimated by the Cronbach's coefficient alpha. The alpha coefficients obtained in this study were quite high for these four factors: α=.92 for attention subscale, α=.89 for relevance subscale, α= .92 for confidence subscale, and α=.88 for satisfaction subscale. And the total inventory's internal consistent alpha was .96, indicating that the LMI had reasonable reliability. As for item-total correlations, they ranged from .55 to .86 for attention subscale, .39 to .66 for relevance subscale, .54 to .72 for confidence subscale, and .37 to .66 for satisfaction subscale, which implied that all items in the inventory contributed to the consistency of scores. Furthermore, the reliability of the four subscales was established by examining the individual item reliability, composite reliability and average variance extracted (Hair, Anderson, Tatham & Black, 1998). Generally, the individual reliability (the square of factor loading) above 0.5, composite reliability above 0.8 and average variance extracted scores above 0.5 are considered acceptable (Hair et al., 1998). As Table 1 showed, except three items of λ^2 scores derived from attention, relevance and satisfaction subscales, others indices of examining reliability showed acceptable levels. Hence, these results supported the reliability of LMI.

Table 1
Reliability of LMI subscales

Subscale	λ^2(square of factor loading)	Composite Reliability	Average Variance Extracted
Attention	.60,**.47**,.62,.82,.81,.60	.92	.65
Relevance	**.43**,.56,.63,.54,.64,.62	.88	.55
Confidence	.60,.72,.63,.60,.69,.63	.89	.58
Satisfaction	.46,.65,**.38**,.50,.60,.70	.90	.62

Note. n=1,129

Criterion- Related Validity

The correlations between the LMI and the IMMS was *r*= .87, p<.01. As for the motivation subscale of the MSLQ, its correlation between LMI was *r*=.84, p<.01. As indicated by the zero-order correlations, the LMI had a strong relationship between IMMS and the motivation subscale of MSLQ. This finding supports that the LMI not only includes the concept of teaching material, but also the content of intrinsic and extrinsic motivation. Just as we expected, the LMI views motivation as a whole concept, not merely a single construct.

4. Conclusion

The LMI developed in this study may enable researchers and teachers to identify learning motivation in technical and vocational college students. In addition, the results of CFA in LMI also confirmed that the ARCS model was a distinct but related concept. Finally, because the fit indices of RMSEA and χ^2 are in fair acceptance, further research could be done with more samples or with different populations in order to increase the suitability of the model.

5. Acknowledgements

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Diagnostic Efficiency of BDI in a Clinical Setting: Comparison among Depression, Anxiety, and Psychosis Patients

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Abstract. The BDI total mean score and the mean scores of the three factors (Negative Attitude, Performance Difficulty, and Somatic Element) are significantly different among the Depression, Anxiety, and Psychosis group. Especially, the BDI total mean score on the Depression group is significantly higher than other two clinical groups. Within the BDI three factors, Negative Attitude is the most important predictor in distinguishing the Depression group from both the Anxiety and Psychosis group.

Keywords: BDI, Depression, Anxiety, Psychosis

1. Introduction

It has been addressed that there are some advantages of self-report scales in that they are economical and can be administered to many subjects at the same time. Moreover, they make it easy to quantify symptoms and assess them objectively. The Beck Depression Inventory (BDI: Beck et al., 1961; Beck et al., 1979) is one of the most widely used self-report scales, measuring the severity of depression in psychiatry. This instrument is one of the 10 most utilized instruments in the clinical practice of American psychologists (Watkins et al, 1995). Although the BDI seems to be used commonly in research and clinical settings, studies about diagnostic efficiency of the BDI are rare. In Korea, the BDI was not only introduced and translated into Korean, but also standardized and studied with respect to the reliability and validity (Hahn et al., 1986). The BDI has a high reliability and coefficient alpha, and construct validity has been established, as well. It is also able to differentiate depressed from non-depressed patients (Beck, 1967; Endler, Rutherford, & Denisoff, 1999; Lee & Song, 1991; Shek, 1990).

Through some factor analytic studies, there were reports regarding a three-factor model: Negative Attitude, Performance Difficulty, and Somatic Element (Byrne & Baron, 1993; Byrne, Baron, & Balev, 1998). In Korea, Cho and Kim (2002) investigated a fitness of six models, including a simple factor model, an independent two-factor model (Shek, 1990), a three-factor model (Lee & Song, 1991), each associated correlation model (Lee & Song, 1991; Shek, 1990), and a hierarchical three-factor model (Byrne & Baron, 1993; Byrne, Baron, & Balev, 1998). As a result, a hierarchical three-factor model was the most appropriate and useful model to describe the Korean version of the BDI and this was proved in both clinical populations and college students (Cho & Kim, 2002).

According to studies of the BDI total mean score on clinical groups, Shin et al (2000) identified significant differences with the BDI total mean score among Major Depressive Disorder, Dysthymic disorder, and control group. There were significant differences in the BDI total mean score, depending on the presence of depressive symptoms in Anxiety and Psychosis group (Baynes, et al., 2000; Bowen, Clark & Baetz, 2004). In some studies comparing the BDI total mean score on psychiatric patients, Henje Blom et al (2009) reported the BDI total mean score on clinical groups (Depressive disorder, Anxiety disorder (Generalized Anxiety Disorder, Social Phobia, Specific Phobia, Panic Disorder, Separation Anxiety, and Post-Traumatic Stress Disorder)) was 25.10, while the BDI total mean score on a control group was 9.85. That is, there was a significant difference of the BDI total mean score between the clinical groups and the

control group. There was also a difference of the BDI total mean score between the Depression and Anxiety group, 24.1 and 15.5, respectively (Henje Blom et al., 2009). Park, Seo and Lee (1997) found that the BDI total mean score was 15.20 (10.20) for Schizophrenia patients, 21.52 (10.49) for Depression patients, and 19.51(10.17) for Alcohol dependence patients, and the Depression patients had significantly higher scores than the Schizophrenia patients. In the study of Ryu and Park (2006), the BDI total mean scores of Depression and Schizophrenia group were significantly higher than a control group and the Depression group had a higher BDI total mean score than the Schizophrenia group.

Although the BDI has been used to detect depressive symptoms in the psychiatric populations in many previous studies, few studies have been conducted to compare the BDI total mean score among clinical groups. There have been no attempts to evaluate the mean scores of the BDI factors according to clinical groups and which factors have relevance in the Depression, Anxiety, and Psychosis patients. Therefore, the aim of the present study was test whether the clinical groups have significant differences in the BDI total mean score and the mean scores of the factors. Furthermore, we examined which factors were the important predictors in distinguishing between the clinical groups. It might be useful to understand the different aspects of depression as well as the degree of depression in the different clinical groups.

2. Methods

2.1. Subjects

The sample was composed of 160 psychiatric inpatients and outpatients, who had visited Hallym University Sacred Heart Hospital from Jan, 2008 to Aug, 2009. All patients were diagnosed by experienced psychiatrists according to DSM-IV criteria, or clinical psychologists, depending on the result of the psychological evaluation. There were 55 Depressive disorder (Major Depressive Disorder and Depressive Disorder NOS), 50 Anxiety disorder (Panic Disorder, Social Phobia, Obsessive-Compulsive Disorder, Posttraumatic Stress Disorder (PTSD), and Generalized Anxiety Disorder (GAD)), and 55 Psychosis patients (Schizophrenia, Schizophreniform, and Psychotic Disorder NOS). However, patients with comorbid other Axis I or Axis II disorders and brain damage were excluded in this study.

2.2. Assessments

The Beck Depression Inventory (BDI) was developed to assess a type and degree of depression, based on symptoms of depression. The questionnaire contains 21 items about emotional, cognitive, motivational, physiological, and other symptoms. Each Item consists of four statements, describing increasing intensities of symptoms of depression. The items are rated on a scale from 0 to 3, reflecting how participants have felt over the past week. Possible score range from 0 to 48 and higher scores reflect more severe depressive symptomotology. In this study, Korean translated version was used (Lee and Song, 1991) and its Cronbach's coefficient alpha was .82.

2.3. Analysis

In order to examine the mean differences of the BDI total score and the scores of three factors among three clinical groups, One-way ANOVA and Scheffs' post-hoc test were performed. Also, a series of Logistic regression analyses was administered for detecting the most influential factors in distinguishing between the clinical groups. Analyses were done in WIN SPSS 15.0.

3. Results

3.1. Demographic Characteristic

Table 1 represents the demographic characteristics of the samples in this study. There were no significant group differences in terms of age, sex ratio, and educational level.

Table 1. Demographic Characteristics of the Depression, Psychosis, and Anxiety patients

	Depression (N= 55)	Anxiety (N= 50)	Psychosis (N= 55)
	M(SD)	M(SD)	M(SD)

Age	38.96(14.60)	33.34(14.24)	32.29(12.45)
Sex ratio: % female	51%	56%	60%
Educational level	11.56(3.42)	12.60(2.28)	12.60(2.79)

3.2. Comparison of the BDI total score and the scores of three factors among clinical groups

Table 2 presents the results of analyses of variance and Scheffs' post hoc tests with the BDI total mean score and the mean scores of the three factors. The BDI total mean score of the Depression group was 27.44(12.11). It was also identified the mean score of 12.85(6.28), 9.36(4.15), and 5.27(3.11) on the factor 1 (Negative Attitude), factor 2 (Performance Difficulty), and factor 3 (Somatic Element), respectively in the Depressive patients. The BDI total mean score for the Anxiety group was 19.64(11.85). The mean scores of the factor 1 (Negative Attitude), factor 2 (Performance Difficulty), and factor 3(Somatic Element) were 8.81(6.26), 7.66(4.16), and 3.60(2.66) respectively in the Anxiety patients. The BDI total mean score for the Psychosis group was 16.87(12.61). The mean score of the factor 1(Negative Attitude) was 8.15(7.12), and the mean scores of factor 2(Performance Difficulty) and factor 3(Somatic Element) were 6.11(4.48) and 2.62(2.54), respectively in the Psychosis patients.

Statistically significant differences were observed in the BDI total mean score among the Depression, Anxiety, and Psychosis group (F=11.02, $p < .001$). The BDI total mean score with the Depression group was higher than other two clinical groups. Moreover, the Depression group was on severe level of depression, whereas the Anxiety and Psychosis group were in a stage of mild depression.

When comparing differences on the mean scores of the three factors on the BDI, the mean scores of all three factors (Negative Attitude, Performance Difficulty, and Somatic Element) were significantly different among three clinical groups (F=9.17, $p < .001$ / F=7.97, $p < .01$ / F=12.69, $p < .001$, respectively). The Scheffs' post hoc test revealed that the mean scores of factor 1 (Negative Attitude) and factor 3 (Somatic Element) were significantly higher on the Depression group than other two clinical groups and the mean score for factor 2 (Performance Difficulty) showed only significant difference between the Depression and Psychosis group.

Table 2. Results of the analyses of variance(ANOVA) and Scheffs' post hoc tests for the total mean score and the mean scores of the three factors on the BDI

	Depression (N= 55)	Anxiety (N= 50)	Psychosis (N= 55)		
	M(SD)	M(SD)	M(SD)	F	
BDI- Total	27.44(12.11)	19.64(11.85)	16.87(12.61)	11.02***	D〉P,A
BDI- Negative Attitude	12.85(6.28)	8.18(6.26)	8.15(7.12)	9.17***	D〉P,A
BDI- Performance Difficulty	9.36(4.15)	7.66(4.16)	6.11(4.48)	7.97**	D〉P
BDI- Somatic Element	5.27(3.11)	3.60(2.66)	2.62(2.54)	12.69***	D〉P,A

***$p < .001$, **$p < .01$ / D: Depression / P: Psychosis / A: Anxiety

A series of logistic regression analyses was conducted to identify the important factors associated with depressive symptoms within the BDI three factors: 1) the Depression and Anxiety group and 2) the Depression and Psychosis group. Table 3 presents the results of analyses of logistic regression with the scores of the three factors on the BDI. Negative Attitude was proved to be the most important predictor in distinguishing the Depression group from both the Anxiety and Psychosis group (β= -.122, β = -.105, $p < .01$, respectively).

Table 3. Results of the analyses of a stepwise logistic regression for the mean scores of the three factors on the BDI

Step/Factors					Odds Ratio	CL(95%)	
	χ²(df)	Wald	βᵃ	SE		Lower	Upper
The Depression and the Anxiety group							
Step 1 Negative Attitude	13.905(1)***	11.520	-.122**	.036	.885	.825	.950

The Depression and the Psychosis group

Step 1 Negative Attitude	15.704(8)*	11.090	-.105**	.031	.901	.847	.958

CL: Confidence interval. **p ⟨.01, *p ⟨.05

ᵃWald, β and odds ratio are the measurements from the last step, (-)β presents the Depression group.

4. Discussion

In this study, we compared the BDI total mean score and the mean scores of the three factors among the Depression, Anxiety, and Psychosis patients.

It was useful to utilize the BDI total mean score and the scores of the three factors for detecting depressive symptoms in psychiatric patients. The BDI total mean score had statistically significant differences among three clinical groups (F=11.02, p ⟨.001) and the BDI total mean score on the Depression group was higher than other two clinical groups in post hoc test. In the review of previous literatures, there were significant differences on the BDI total mean score between the clinical groups and the control group (Henje Blom, E., et al., 2009; Ryu and Park, 2006). Even within the clinical groups, the Depression group had the much higher BDI total mean score than the Anxiety or Psychosis group (Park, Seo, & Lee, 1997; Ryu and Park, 2006).

In addition, the mean scores of all three factors (Negative attitude, Performance difficulty, and Somatic element) on the BDI were significantly different according to the Depression, Anxiety, and Psychosis group (F=9.17, p ⟨.001 / F=7.97, p ⟨.01 / F=12.69, p ⟨.001, respectively). As a result of the Scheffs' post hoc test, the Depression group showed the higher mean scores than other two clinical groups in Negative Attitude and Somatic Element and the mean score of Performance Difficulty was much higher in the Depression group than in the Psychosis group. Beck (1967, 1979) suggested that depression might result from a tendency to interpret everyday events in a negative way. The result of this study also identified that Depression patients tended to have more negative attitudes about their situations than other two clinical groups. According to Abramson et al (1978), depressive people became depressed when they made an attribution that they had no control over the stress in their lives. In other words, the depressive people tended to perceive that situations they experienced were internal, in that the individual attributed negative events to personal failings, stable, in that even after a particular negative event passed, the belief that additional bad things would be last was continued, and global, in that the attribution extent crossed a variety of issues. Some evidence indicated that these pessimistic styles of attributing negative events resulted in hopelessness and desperation to depressive people. Moreover, depressed patients experienced the performance difficulties more often than non-depressed patients; they had cognitive difficulties (such as impairments of concentration, judgment, and ability to perform a task) and disturbed behaviors (such as social withdrawal and interpersonal relationship problems) (Kwon, 1994). Even in this study, the Depression group had the highest difficulties in performing various functions among the Depression, Anxiety, and Psychosis group. In addition, the Depression group suffered from more performance difficulties than Psychosis patients did. Lastly, it has been pointed out that the depressed patients complained about disturbed physical functions (such as altered sleeping pattern, significant changes in appetite and weight, or notable loss of energy) (DSM-Ⅳ, 1994). We also found that somatic complaints accompanied by depression occurred more frequently in the Depression group than in other two clinical groups.

As a result of the analyses of logistic regression, Negative Attitude was the most important predictor in distinguishing the Depression group from both the Anxiety and Psychosis group (β= -.122, β = -.105, p ⟨.01, respectively). As noted in previous literatures, Negative Attitude, a tendency to interpret everyday events in a negative way, was one of the core features of the Depressed patients as compared to the Anxiety and Psychosis patients.

Several limitations to the present study exist. First, the use of a sample of psychiatric patients treated by only one hospital may have limited generalizability. Second, since some factors, such as cognitive functions and insight, were not considered, it was possible for them to impact the results of this study.

Although some research has been done to compare the BDI total mean score between groups and test factor structures of the BDI, no study has analyzed whether the scores of the factors on the BDI are

3

significantly different among clinical groups. According to this study, the BDI total mean score appears to detect the differences of the severity of depressive symptom in the Depression, Anxiety, and Psychosis group. Moreover, the scores of the three factors on the BDI are highly efficient to understand the specific factors associated with depression so that it might be useful as basic data for treatment of depression in the clinical populations.

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Empirical Understanding of and Perceived Ability in Statistical Concepts: A Rasch Measurement Approach

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Abstract. This study investigates students' conceptual knowledge and understanding of basic statistical concepts and compares it against statistical competence, which is associated with discrete statistical knowledge and basic interpretive skills. It particularly examines the correspondence between students' perceived ability and their empirical understanding of the concepts. Two instruments were developed: a 20-item test to measure students' empirical understanding of basic statistical concepts and a questionnaire with matching items to measure their perceived ability of these concepts. For a direct comparison of the two, students' responses to the test and questionnaire items were jointly analyzed using Rasch measurement. Results of the analysis show that conceptual understanding of basic statistical concepts is more difficult to attain than statistical competence. The results also suggest that students more often than not overestimated their understanding of basic statistical concepts, particularly those requiring conceptual understanding of the concepts.

Keywords: Conceptual understanding; Statistical competence; Basic statistical concepts; Rasch measurement

1. Introduction

In a number of studies, students in statistics courses were found to describe rather than justify their statistical solutions [1] and fail to establish a conceptual base for their solution strategies [2]. Although students may be able to answer some test items correctly or perform calculations correctly, they may still misunderstand basic ideas and concepts in statistics. This may be explained by the lack of conceptual understanding of what is being constructed or how statistical concepts are interrelated. For example, [3] and [4] found in their studies that although students may be able to calculate basic statistics, a sound understanding of what was being constructed or how statistical concepts are interrelated is rare. References [5] and [6] similarly, found that students who receive top grades in a class may not understand and remember the basic ideas of statistics.

The lack of conceptual knowledge and understanding of statistical concepts is particularly seen in relation to basic statistical concepts such as reasoning about distributions and graphical representations of distributions [7]-[9], understanding concepts related to statistical variation such as measures of variability [10]-[11], and sampling distributions [12]-[14]. This state of affairs is unfortunate given that statistical reasoning is crucial in dealing with the prevalence of statistical data in the media and other sources of information that pervades our daily life. This study, therefore, seeks to investigate students' conceptual knowledge and understanding of basic statistical concepts and compare it against statistical competence, which is associated with discrete knowledge and basic interpretive skills. This study also aims at examining the correspondence between students' empirical understanding and their perceived ability in these basic

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statistical concepts. As conceptual knowledge and understanding has been reported to be overestimated by students, it would be of interest to investigate where this is most apparent. It is hoped that the results of this study would provide insight to the development of students' conceptual knowledge and understanding that underlies statistical reasoning and thinking.

2. Method

2.1. Participants

In this preliminary study, purposive sampling was used. Several introductory statistics courses conducted at public tertiary institutions were identified and the instructors contacted at the onset of this study. However, only two instructors from two institutions agreed to involve their students in the study. Subsequently, a total of 115 students from these two institutions made up the sample for this study.

2.2. Data Collection Instruments

A 20-item test was developed to measure students' statistical competence and conceptual knowledge and understanding of the basic statistical concepts. The concepts tested focused on types of data, graphical representations of distributions, measures of sampling distribution, and measures of variability. These topics were selected for the following reasons:

(1) Studies have shown that students have difficulty with reasoning about distributions and graphical representations of distributions [7]-[8], understanding concepts related to statistical variation such as measures of variability [10]-[11], and sampling distributions [12]-[13].

(2) Proficiency in statistics is always related to a specific topic. Thus, assessment should not be focused on general competencies, but should be focused on students' knowledge of specific topics and try to gauge their understanding of the subject matter [15].

The questionnaire to measure students' perceived ability was developed alongside the test to allow for comparisons between the two (see Appendix 2). Each item has a 5-point Likert-type response format ranging from (1) Strongly Disagree to (5) Strongly Agree.

2.3. Method of Data Analysis

The data was analyzed using WINSTEPS, version 3.64.2. In the initial analysis, responses to the test items and the statements in the questionnaire were analyzed separately. A joint analysis was then conducted where the responses to the statements on the questionnaire were collapsed into a dichotomy to complement the response scale of the test. This was done to allow for a more direct comparison between empirical understanding and perceived ability. In the analysis, the following were also examined: (i) the validity of items and student responses, (ii) the capacity in which the items were able to define a continuum of increasing intensity, (iii) reliability, (iv) unidimensionality, and (iv) construct definition.

3. Results

3.1. Item and Person Distributions

Fig. 1 indicates the distribution of items from the test as well as the self-report questionnaire. As expected, items on the questionnaire which were self-reported clustered towards the bottom of the logit scale whereas the test items are more evenly distributed along it. This indicates that the participants had largely overestimated their actual ability. The most difficult item on the test is Item 17. Two items – Item 1 and Item 2 – were the easiest on the test and are clustered together with the self-report (perceived ability) items.

Person distribution is better matched to the items that tested their actual ability compared to items that measured their perceived ability. This indicates that the participants had overestimated their actual ability. Persons are also largely clustered at the middle of the scale (between -1 logit and +2 logits) where most of the items are located. This suggests that the items are not functioning well enough to clearly separate persons into differing levels of ability. Please put a frame to this figure. Pls reduce the space at the end of the figure.

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         PERSONS MAP OF ITEMS
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                 |   Q17
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      .     T|  Q5
                 |  Q18
          #  |
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      .       |
  2              +  Q13      Q14
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                 |
          #  S|
          #  |
      .#  |  Q16
          #  |  Q20
     ######  |S
          #  |  Q15      Q4       Q9
     #######  |
  1    ####  +  Q7
       ##  M|  Q8
     #####  |  Q11      Q19      Q6
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      .##  |  Q3
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      .       |  SA17
      .       |  SA13     SA16
          T|  Q2       SA19     SA20
      .#  |  Q1       SA15     SA18
 -1              +  SA3
                 |  SA1
                 |  SA11     SA4      SA9
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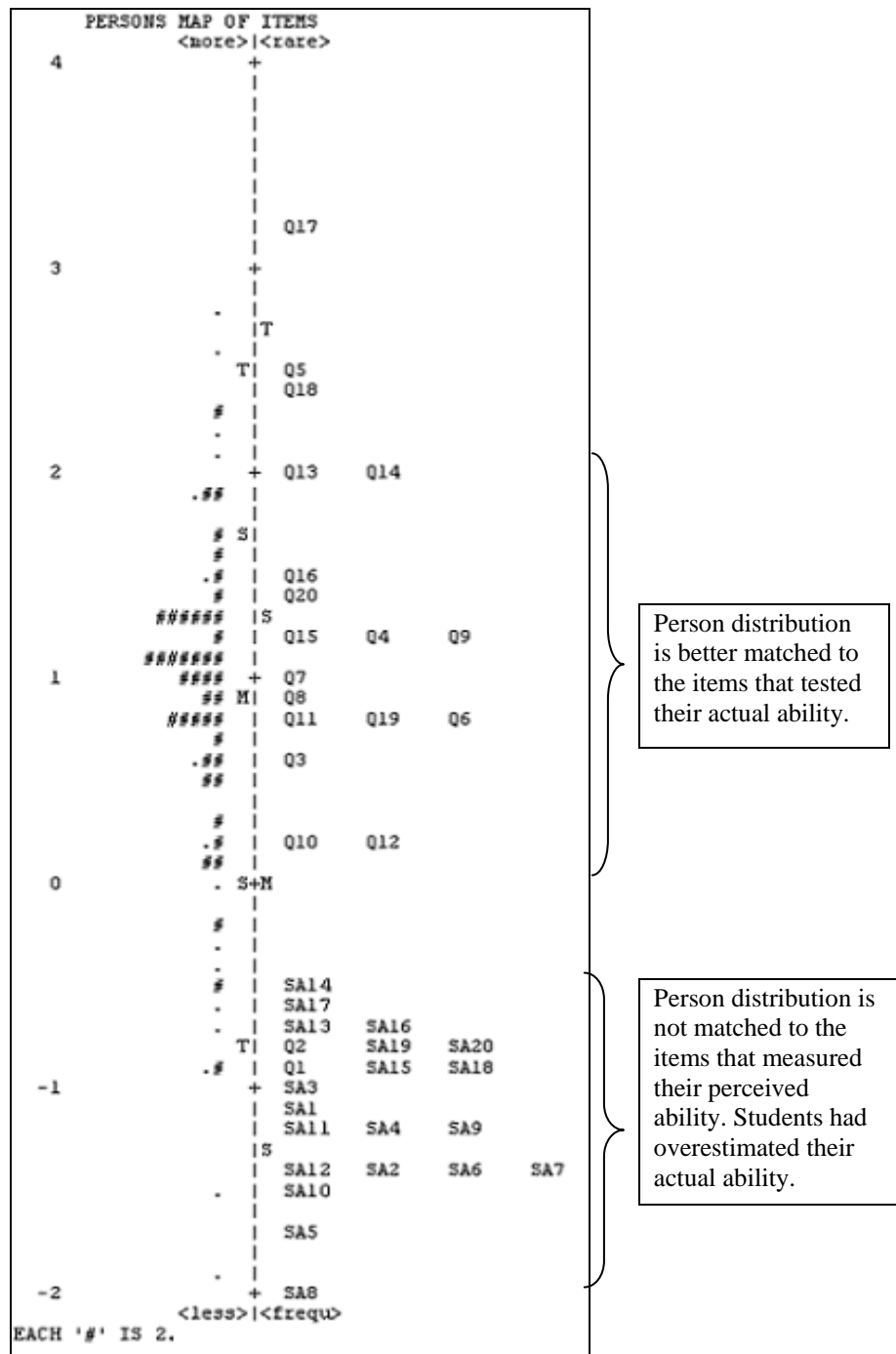
Fig. 1 Hierarchy of relationship

Person distribution is better matched to the items that tested their actual ability.

Person distribution is not matched to the items that measured their perceived ability. Students had overestimated their actual ability.

3.2. Reliability

The reliability of item difficulty estimates is high (.96). The item separation index of 4.66 indicates that the items can be separated into 4 difficulty strata. As item reliability indicates the ability of the test to reproduce the hierarchy of items along the measured variable [16]-[17], a reliability coefficient of .96 suggests that this order of item hierarchy will be replicated with a high degree of probability if the items were given to other comparable cohorts. With regard to person measures, the reliability coefficient is considerably lower at 0.71. This is attributed to the considerable misfitting responses in the data. Responses to the statements in the questionnaire, on the other hand, showed greater consistency and this showed in a higher reliability coefficient for the questionnaire data.

3.3. Hierarchy of Items

Table 1. Hierarchy of items based on 'perceived ability'   Table 2. Hierarchy of items based on performance on test

SA8	-2.00	SU	DISTRIBUTION-GRAPHIC PRESENTATION
SA5	-1.71	SC	DATA-GRAPHIC PRESENTATION
SA10	-1.54	SU	MEASURES OF CENTRE
SA6	-1.45	SC	DISTRIBUTION-GRAPHIC PRESENTATION
SA12	-1.44	SC	MEASURES OF CENTRE
SA7	-1.40	SU	DISTRIBUTION-GRAPHIC PRESENTATION
SA2	-1.38	SC	DATA
SA11	-1.18	SU	MEASURES OF CENTRE
SA9	-1.18	SU	DISTRIBUTION-GRAPHIC PRESENTATION
SA4	-1.16	SC	DATA
SA1	-1.06	SC	DATA
SA3	-1.00	SC	DATA
SA15	-0.89	SU	MEASURES OF SPREAD
SA18	-0.89	SU	MEASURES OF SPREAD
SA20	-0.82	SU	MEASURES OF SPREAD
SA19	-0.80	SU	MEASURES OF SPREAD
SA13	-0.72	SU	MEASURES OF CENTRE
SA16	-0.67	SU	MEASURES OF SPREAD
SA17	-0.61	SU	MEASURES OF SPREAD
SA14	-0.46	SU	MEASURES OF SPREAD

Q1	-0.90	SC	DATA
Q2	-0.76	SC	DATA
Q12	0.20	SC	MEASURES OF CENTRE
Q10	0.20	SU	MEASURES OF CENTRE
Q3	0.61	SC	DATA
Q6	0.79	SC	DISTRIBUTION-GRAPHIC PRESENTATION
Q19	0.79	SU	MEASURES OF SPREAD
Q11	0.83	SU	MEASURES OF CENTRE
Q8	0.92	SU	DISTRIBUTION-GRAPHIC PRESENTATION
Q7	1.01	SU	DISTRIBUTION-GRAPHIC PRESENTATION
Q4	1.18	SC	DATA
Q15	1.22	SU	MEASURES OF SPREAD
Q9	1.22	SU	DISTRIBUTION-GRAPHIC PRESENTATION
Q20	1.45	SU	MEASURES OF SPREAD
Q16	1.49	SU	MEASURES OF SPREAD
Q14	1.99	SU	MEASURES OF SPREAD
Q13	2.04	SU	MEASURES OF CENTRE
Q18	2.40	SU	MEASURES OF SPREAD
Q5	2.46	SC	DATA-GRAPHIC PRESENTATION
Q17	3.21	SU	MEASURES OF SPREAD

Tables 1 and Table 2 present the hierarchy of items based on their difficulty estimates for both the test data and the questionnaire data. From the tables, it is evident that participants have somewhat accurately estimated the relative difficulty of measures of spread and measures of centre. However, they underestimated their knowledge about types of data (with the exception of ordinal data), and overestimated their knowledge of graphic presentation of distribution. Students' inability to accurately gauge their understanding of basic statistical concepts is also depicted in the multiple Item Characteristic Curves (ICCs). Table 3 display the respective items that measure the ability and understanding of students on Types of Data.

Table 3. Perceived Ability and Empirical Understanding (Types of Data)

Students' perceived ability to understand concepts	Students' objective understanding of concepts
SA1: I am able to identify the various types of numerical data	**Q1.** Which of the following is a numerical data? A. number of questions answered correctly B. test type (motivational or threatening) C. whether a particular question was correct or not correct D. whether the letter the instructor wrote was favorable or unfavorable
SA2: I am able to identify the various types of categorical data.	**Q2.** Which of the following is a categorical data? A. number of questions answered correctly B. test type (motivational or threatening) C. the number of tests distributed D. the number of students in each group
SA3: I am able to identify the various types of ordinal data.	**Q3.** Which of the following is an ordinal data? A. the rank of the students scores in the class B. test type (motivational or threatening) C. whether a particular question was correct or incorrect D. the number of students in each group

The curves in Fig. 2 illustrate how students had underestimated their understanding of numerical and categorical data, and overestimated their understanding of ordinal data. The difference is clearly depicted in the curves where large discrepancies in perceived ability and empirical understanding are evident between SA3 and Q3.
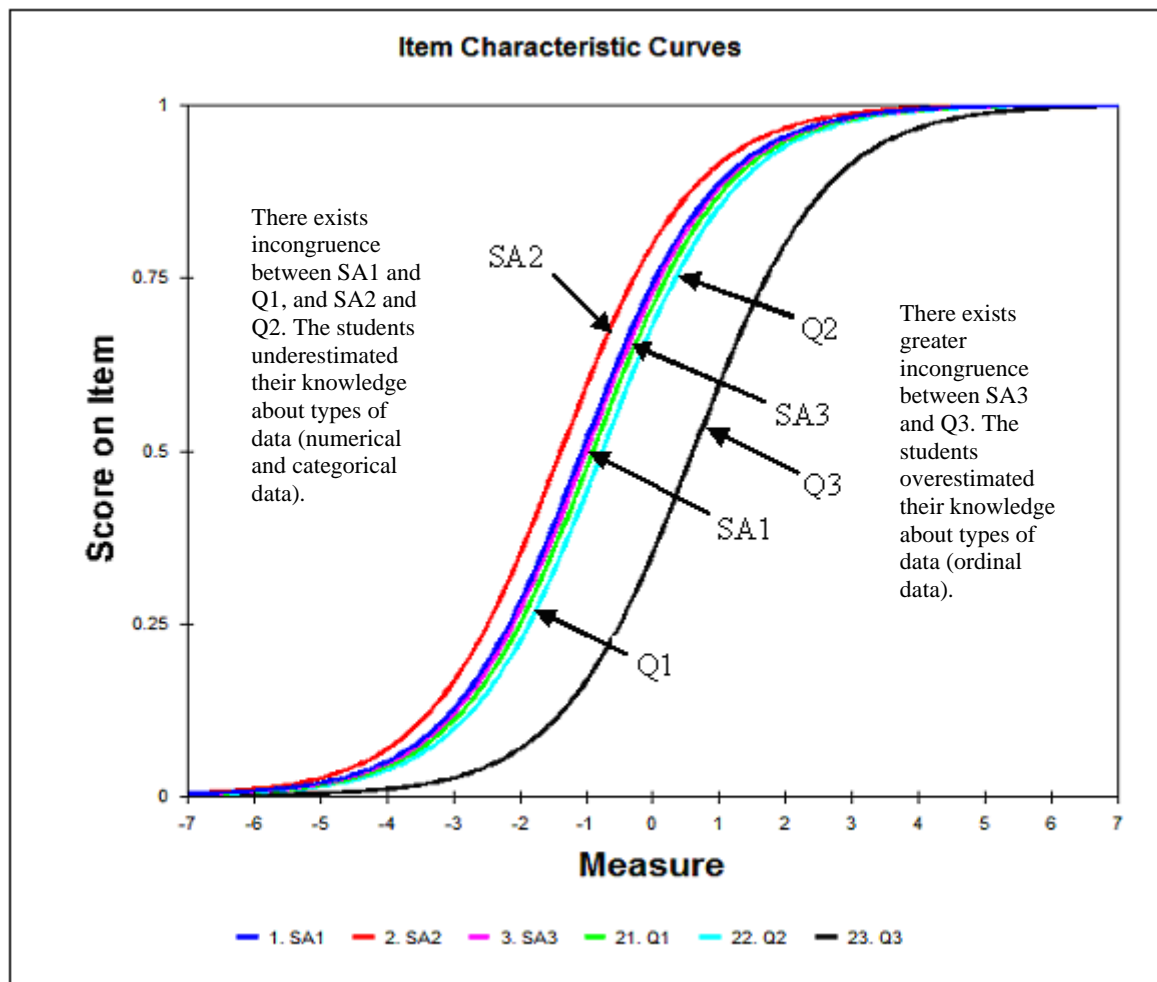
4

Item Characteristic Curves

There exists incongruence between SA1 and Q1, and SA2 and Q2. The students underestimated their knowledge about types of data (numerical and categorical data).

There exists greater incongruence between SA3 and Q3. The students overestimated their knowledge about types of data (ordinal data).

SA2
Q2
SA3
Q3
SA1
Q1

— 1. SA1 — 2. SA2 — 3. SA3 — 21. Q1 — 22. Q2 — 23. Q3

Fig. 2 Incongruence between perceived ability and empirical understanding

4. Conclusion

The results indicate that congruence between empirical understanding and perceived ability was not evident. The difference in student performance on items measuring conceptual understanding and statistical competence was also considerable. These initial results suggest that students substantially overestimated their conceptual knowledge and understanding of the basic statistical concepts. In terms of instrument refinement several actions will have to be taken. Some of the existing items will have to be reviewed to explain unexpected performance. More items will have to be written and the construct definition of the instruments reviewed to provide a much more accurate and valid measurement of the intended construct.

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An Interpretive Exploration on Emotional Self-Regulation among Malaysian Academicians

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Abstract. This interpretive study explored how scholars in the higher learning institutions in Malaysia self-regulate their emotions in coping with frustrations due of lack of working environment support. In-line with the government's aspiration to transform Malaysian into a leading international education hub, the Ministry of Higher Education introduced seven key performance indicators for the academicians. This resulted in the emergence of a new academic excellence norm which focused on the scholarship. In the adaption process of the academic excellence norm, academicians encountered lack of working environment support which resulted in the feeling of frustrations. This study employed qualitative approach and grounded theory as the overarching methodology in collecting and analyzing data in a case site. Data was gathered through semi-structured interviews and a total of 24 professors were interviewed over the period of nine months. Findings discovered that academicians self-regulated their emotions through motivating own self, staying focus to achieve personal target, evaluating own self, distinguishing self needs and accepting others' differences in coping with the lack of working environment support.

Keywords: Emotional Self-Regulation, Grounded Theory, Malaysian Academicians, Interpretive Research.

1. Introduction

Institutions of higher learning have long been connected with the production of knowledge. The creation and dissemination of knowledge had long been the social role of institutions of higher learning [1]. In the knowledge era, higher learning institutions expanded their scope of activities in the creation and dissemination of knowledge to include teaching in preparing students to become life-long learners, research to expand human knowledge and creativity and service to universities, local, national and international community [2].

The government of Malaysia developed the National Mission, a development framework for fifteen years, which focus the efforts on nation's global competitiveness, human capital development, national integration, ethnic relations, distribution of income and wealth and the quality of life. The second thrust of the National Mission is to nurture "first class mentality" human capital, which undertakes comprehensive improvement of the country's education system. The Malaysian Ministry of Higher Education (MOHE) in responding to the government agenda produced a National Higher Education Strategic Plan concentrating on transformation of Malaysian higher learning into an excellent international learning hub. MOHE has outlined the performance indicators for the academicians, known as the 7Ps requirements: teaching, research, publication, writing, public service, consultancy, and management. The introduction of the key performance indicators resulted in the new academic norm, which is characterized by the proliferation of academic demands, transition in work practice and increase needs for social solidarity.

Emotional intelligence is the key determinant to professional success [3]. Academicians are no different, successful academicians are those who can embrace the continuosly shifting emotional dimensions in coping with the pressures of academic life [4].

The purpose of this study are:

1. To describe how successful Malaysian academicians self-regulate their emotions in coping with the new academic norm.
2. To construct a theoretical model of emotional self-regulation among the Malaysian academicians.

2. Literature Review

Emotional self-regulation is also known by the term emotional regulation. It refers to one's ability to regulate emotions to suit proper place, time or situation. It involves initiating, stopping or adjusting internal emotions, thoughts, physiological reactions and behavioral reactions. Self-regulation of behavior generally refers to conscious cognitive monitoring of actions and steps that are required to achieve one's goal, or to gain the desired result from the environment [5]. Research on self-regulation in adults showed that negative emotional experience can lead to poor attention, poor engagement and impulsivity, and more negative effect, whereas positive emotional experience can increase levels of sustained attention, engagement, and persistence [6].

Emotional regulation suggests that an individual should possess an objective self-awareness [7]. When one focuses attention on the self, this will initiate an automatic comparison process where the self is viewed against relevant standard [8]. If the self and standards are perceived as not at par, the individual will generally try to reduce the discrepancy by working putting efforts to meet the targeted standard. However, in some situation, the reaction is to avoid the standard altogether [9], make up some excuses to protect the self, or change the standard so that instead it is tailored to suit the self [10].

Therefore, self-regulation in the workplace can be the deliberate adjustment of one's physical, mental, and emotional state to fit the circumstances of the moment or to meet the demands of work. In reaction to work demand one may put in more hours to meet datelines, attend courses to improve oneself, or seek resources to complete tasks. Another way of reacting to frustrations at work may be to positively think about the situation, ignore the source of stress, or use medications / drugs to manage the physiological arousal. Those who succumb to the tension may well be affected by psychosomatic illness such as persistent headaches, heart problems or gastric problems.

3. Methodology

This paper reported part of a larger research project exploring internalized knowledge among the Malaysian academicians. However, this paper only discusses one of the dimensions of knowledge internalized based on the actions of the academicians. The paradigm of this study is interpretivist, it assumes that reality at relative and subjective meaning of the reality is constructed and reconstructed through human and social interaction process [11]. Epistemologically, this paradigm assumes that scientific knowledge is obtained through understanding of human and social interactions. An interpretivist researcher aims to understand a phenomenon through meanings that people assign to them. As the nature of this study is exploratory and the concept of emotional self-regulation is not well understood, Grounded Theory (GT) approach is selected as the research strategy. GT provides the rigor in the data collection and analysis process [12]. The other strength in applying GT is that the theory is generated from data collected in the area of interest [13], thus it is a theory constructed from reality. In this study, GT is used as the overarching methodology which drives data collection and data analysis activities within a case site.

3.1.   Case Site and Selection of Participants

The case site is one of the premier public institutions of higher learning in Malaysia, with three satellite campuses, fourteen branch campuses and eight city campuses. It has 25 faculties and offered over 200 academic programs spreading over science and technology, social science, humanities and business management. Participants are selected using purposeful and theoretical sampling techniques. The participants are selected among the professors because they are recognized experts and scholars in the highest rank within academic environment. To ensure that a broad spectrum of professors is represented, the selection of participants includes different clusters of academic programs and experiences in teaching, research and services are considered to ensure that the success of understanding the process of emotional self-regulation among the Malaysian academicians.

3.2. Data Collection and Analysis

Data are collected during a period of 9 months. Semi-structured in-depth interviews are conducted which lasted between 50 to 90 minutes, in private and mutually agreed location and time. Participants are asked to elaborate on how the recently introduced key performance indicators affected them. Among the issues discussed during the interviews are the actions taken to overcome or handle situations arises and the underlying reasons for their actions. Interview protocol is developed to ensure consistencies throughout data collection. Interviews are tape-recorded to ensure all the details were captured. The validation process is done immediately after the interviews ended. Theoretical sampling guides the process of selecting participants and directs the data collection process. A total of 24 participants are interviewed, comprising of 5 females and 19 males. In terms of their academic discipline, there are 5 participants from the medical school, 4 participants are from the engineering disciplines, and another 15 are from business management, arts, pharmacy, sciences and others.

All interviews are transcribed verbatim after each interview by the researcher. Data is analyzed based on the GT method of analysis where three levels of coding are performed, namely the open coding, axial coding and selective coding. Paradigm modeling, an analytical tool is used to identify the key themes and cluster them into broad themes which eventually summarizing and categorizing the emerging strategy in a structured form of causal condition →phenomenon →context →intervening condition→ action strategies → consequences. During the whole analysis, the qualitative analysis computer software, QSR NVivo 2.0, is used to organize the vast amount of data and to support the coding process. In the open coding phase, NVivo labeled the concepts with code words using the free nodes. Later as more concepts are generated, certain concepts are grouped together under a higher order concept, leading to the discovery of categories. The context of the incidences becomes the property in the grouping of the concepts. Constant comparative method, a major feature of grounded theory is applied in comparing the context of the new concept generated with the other existing ones for new categories. In this process, NVivo assisted in organizing the concepts into trees. Each tree node represents the categories. Categories are named according to the academic institution context to establish relevant meanings to guide me.

4. Findings

After conducting 24 interviews, 149 codes are obtained. However in determining the coding reliability, whereby an independent expert was consulted, 7 codes are dropped and Kappa value is calculated. Kappa is the measure classically used for summarizing agreement beyond chance, had a value of 0.91, which signified high agreement in the coding with the expert, as Kappa has a value ranging from 0 to 1, where 0 represents no agreement beyond chance and 1 as perfect agreement. 26 categories emerge from the open coding process.

4.1. Causal Condition, Phenomenon, Context and Intervening Conditions

The introduction of the key performance indicators which served as a benchmark of excellent academician, in a way of another forced the academicians to strive for academic excellence. Experience related by participants R09 reflected they efforts in adapting to the new academic norm: "The introduction of 7Ps increases the academic demands of an academician....Now lecturers cannot run away from research, consultancy, and contributions to the profession, university…and all we have to do is strategized." The causal condition of academic excellence norm resulted in the feeling of frustrations among the academicians in their process of adapting. Participant R020 experience reflected the feeling of frustration: "I am already in research.. the culture is not there…I did it all alone… borrow equipments from friends from other institutions until I got award, on my own capacity, no support from university." A similar experience related by participant R011: "…there are many constraints, yes…you really tried to excel but there are regulations, rules and other settings which do not support your effort." In summary, the feeling of frustrations derived from lack of support which ranges from lack of equipment to lack of social supports, and also lack of working environment support.

The context related to the causal conditions (academic excellence norms) is the lack of support from the working environment for their scholarly work. The lack of support varies from lack of resources (monetary and equipment) to lack of support (personal and professional).

Besides context, there are intervening conditions which affects the action strategies taken by the academicians. Two intervening conditions emerge from the data, the institutional culture and institutional settings.

4.2.   Strategies for Adapting to Academic Excellence Norm and Its Consequences

In the presence of context and intervening conditions, academicians strategized by self-regulating their emotions. Five emotional self-regulation strategies are motivating own self, staying focus to achieve personal target, evaluating own self, accepting others' differences, and distinguishing self needs. Among the ways participant motivates own self is by emulating a successful person, setting goals for personal achievement, internalizes childhood hardship, focusing on the contributions that can made from intellectual work, and intellectual curiosity.

The second strategy is staying focus to achieve personal target. As an academician in a public institution of higher learning, participants acknowledge that they are expected to do administrative job and involve in community services, apart from teaching and performing other scholarly work. They also realized that sometimes the non-academic tasks distract them. In order for them to stay focus on achieving their personal goals; they resort to adjusting their working habits, employing urgency, doubling efforts by working on weekends and holidays, and balancing emotions in handling pressure.

The third strategy is to evaluate own self in order to be self-regulated. Participants practice doing a daily self-reflection to check on the accomplishment of the day, believes in planning and having priority list, evaluate own work critically by not pointing to others but own-selves when not performing, set priorities based on own strengths and weaknesses, and having a standard of rigor as a mechanism to evaluate one self. Distinguishing self needs is the fourth strategy in regulating emotion. Participants distinguished their self needs from others by setting priorities based on their passion and needs rather than to fulfill others' expectation. Some participants admit that whilst the current scenarios emphasizes more on other academic activities, they focus more on teaching as teaching is their passion. On the other hand, other participants distinguish their self needs by contributing in any way possible, by volunteering beyond the work requirement, by being honest in evaluating peers and by pursuing professional qualification to be different from others.

Self-regulating also involves accepting others' differences. Participants acknowledge their ideas and make decision through consensus. Participant R01 stresses the importance of a good communication, "in my case, once I clearly explained the whole situation, the options….amazing they are ok."

The strategies used by the participants assist them in their effort to attenuate the effects of the academic excellence norm, which is frustration. However, there are other intended or unintended consequences associated with the adaptation success. Among the consequences are adaptation, self-fulfillment, and academic achievement. The theoretical model is developed to summarize the findings as in Figure 1.

5. Conclusion

The present findings provide understanding of emotional self-regulation among the academicians in frustrating situation. Academicians self-regulate their emotions in acting befitting the image of an excellent academician. It is discovered that the academicians' emotional self-regulation correspond to their goals and values. The actions that they perform are guided by their values and norms and also the intended results and effects. The research contributes to the practical aspects in providing understanding of emotional self-regulation among academicians. The identified emotional self-regulation provides insights into the practical abilities associated to the success of an academician. The insights assist in promoting effectiveness of an academician, accelerating the knowledge acquisition and facilitating the transition from novice to expert academician.
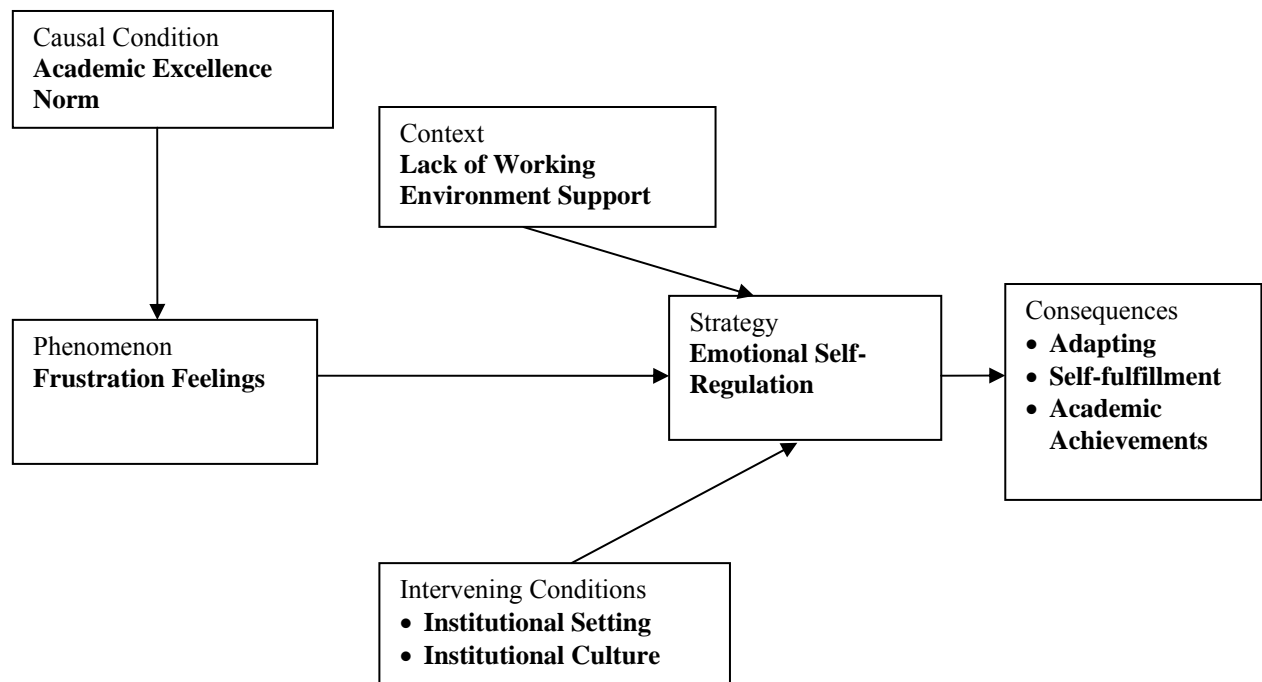
Figure 1: Theoretical Model of Emotional Self-Regulation Among Malaysian Academicians

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Training Mothers in Elaborative Conversational Style as an Event Unfolds

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Abstract. This intervention assessed the effect of maternal training in elaborative Conversational Style. We designed this study to examine whether similar effects on mothers conversational style could be obtained by training Iranian mothers. Forty preschoolers (mean age = 55.1 months) were pretested and grouped as having high or low language skills. Children in each group were then randomly assigned to either training or no training conditions. Trained mothers were instructed to use 4 particular conversational techniques to improve children's understanding during events: *Wh-* questions, associations, follow-ins, and positive evaluations. Mother-child dyad were observed while they engaging in a specially constructed camping activity. trained mothers did use *Wh-* questions, and positive evaluations more than untrained mothers, but There were no differences in mothers' overall use of associations, follow-ins. Indeed Trained mothers were more elaborative in their reminiscing than untrained mothers. Results are discussed with respect to theory and practice in cultural aspect.

Keywords: conversational styles, elaborative, culture.

1. Introduction

One of the most important assumptions in child psychology is that parent – child interactions specifically parent – child conversations are fundamental in developmental process and outcome (Fivush, Haden, & Reese, 2006). Research show that the way in which parents discuss everyday experiences with their young children has significant implications for the acquisition of cognitive and socio-emotional skills (Fivush, Haden, & Reese, 2006). For instance, the way in which mothers and their children reminisce influences how the children come to understand, remember, and report their experiences, and may also influence their language and literacy skills, developing attachment relationships, and understanding of self, other, and mind (Wareham, 2006; Fivush, Haden,& Reese, 2006; wang,2008; Newcombe & Reese, 2004). Studies examining parent – child conversations style have asked parents, typically mothers, to reminisce about one-time events. Researchers have revealed a continuum of parental conversational style from less elaborative to highly elaborative (Fivush & Fromhoff, 1988; Reese, Haden, & Fivush, 1993). Highly elaborative mothers elicit relatively long and detailed conversations and tend to accept, follow in, and expand upon their children's responses more often. In addition they ask a greater number of open-ended "wh" questions; these kinds of questions have been found to be a critical maternal structural variable for children's memory (Reese, Haden, & Fivush, 1993). In contrast, low-elaborative mothers provide less information for their children and overall engage their children in shorter discussions. Furthermore they also tend to ask their children closed questions, and either repeat their utterance (Fivush & Fromhoff, 1988; McCabe & Peterson, 1991; Reese, Haden, & Fivush, 1993). These conversational styles affect children's subsequent

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personal event memories, such that children of high elaborative mothers report more information, both concurrently and longitudinally, with mothers and with experimenters, than children of low elaborative mothers (e.g., Peterson et al.,1991; Hudson, 1993; Boland and Haden, 2003; Reese et al., 1993; Newcombe and Reese, 2007). Previous research demonstrating associations between parents' elaborative conversational styles and children's narrative and memory skill are causal, and that elements of the elaborative style can be identified and taught to parents (Peterson & McCabe, 1999; Boland and Haden, 2003; Newcombe and Reese, 2007;Wareham, 2007). In addition cross cultural research shows that Asian mothers are less elaborative compared western mothers (Wang, 2008). Cultural differences in patterns of parent-child discourse clearly illustrate the importance of examine effect of teaching elaborative style in different culture. We designed this study to examine whether similar effects on mothers conversational style could be obtained by training Iranian mothers.

2. Method
2.1. Participants
Forty mothers and their children (22girls, 18boys) from preschools in Isfahan, Iran, participated in this study. Children's ages ranged from 44 to 64 months (M=55.1). Sixteen of the forty dyads were excluded from main analyses because of scheduling difficulties or missing data.

2.2.Procedure
This Procedure adapted from Haden and Boland (2003) consisted of four stages: children's language pretests, maternal training and memory event pretests, mother–child play, and children's event memory Post tests.

Language pretest. All mothers informed about research via day care center. Volunteers participated in a session that the researcher described the aim of study and got informed consent. Next language skill pretesting was conducted at the children's day care center. Language skills were measured using the WPPCI-R vocabulary subtest (Wechsler Preschool and primary scale of intelligence-Revised; Wechsler, 1967). Children were classified as having high language or low language skill based on median split on the WPPCI-R vocabulary subtest scores (M =12.3, SD =2.6, median =13). Dyads within each group were matched as closely as possible on the basis of child gender, maternal education then randomly assigned to the training or no-training group.

Maternal training and event memory pretest. During training session, mothers watched video describing the elaborative conversational Style. At the same time children participated in memory assessments was intended to yield a baseline measure of the children's skills for remembering past events (memory assessment of control group conducted before mother-child play). The interviewer examined the children's memory for two novel events (e.g., going to a party, park or market) that had been nominated by their mothers. Researcher used a memory interview that was adapted from Haden and Boland (2003). The interviewer first asked open-ended questions (e.g., "What do you remember about ground ma party?) And then moved on to two yes/no questions about aspects of the event that the mothers suggested (e.g., "Did you eat ice cream?") After each yes/no question, the children were again prompted with a general probe (e.g., "What else can you remember about that?") so as to give them the chance to recall additional information about the event. After that mothers were led through a training pamphlet by the experimenter. They then practiced the interaction style with their child, were given feedback.

Training Video and Pamphlet. The training video included clips of separate samples demonstrating each of the targeted conversational techniques as a female play with a child. Sub-titles drew attention to the four conversational techniques. Training video was approximately 12 minutes long. The pamphlet included training key elements, high elaborative conversations examples, and

practice. Pamphlet was given to mothers to keep. Techniques derived from Haden and Boland (2003) included :

1. *Wh-* questions that ask the child to provide information, such as when,
Where, why, what, who, or how (e.g., "Why grass became yellow?").
2. *Associations* that involve making connections between what is happening
In the here and now of the event and what a child might already know or
Have experience with (e.g., child wear a hat and the mother
Asks, "do remember who bought it for you?").
3. *Follow-ins* that encourage discussion of aspects of an event that the child is
Talking about or is showing interest in (e.g., child says, "I want eat this bread" to which the mother responds, "really, how you bake it?").
4. *Positive evaluations* that directly praise the child's verbal and nonverbal
Behaviors (e.g., "that was great cooking").

Mother–child play: The next visit included mother-child engaging in a specially constructed novel camping event. Based on procedures adapted from Haden et al. (2001), the "camping" activity consisted of three parts. Dyads at first loading up backpacks with various play food items (e.g., chicken, apple) to take on their trip then they walked to a pond where there was a rod used to catch some fish. After fishing, they moved to a campsite where there was a carpet, in addition to an oven, glasses and spot that could be used for preparing and eating the food. This event thus involved a set of components or features that were provided to each family. The key manipulation in this study involved the instructions given to the mothers prior to the camping event. It is important to note that neither the trained nor the untrained mothers knew about that event just before the experience. Prior of play the mothers in the training group were asked to name and describes elaborative conversational techniques then instructed try to use them as they play with their children. Mothers in the no training group were simply instructed immediately prior to the activity to talk with their children as they naturally would when experiencing an event with them. The mother-child interaction were videotaped recorded as they play that lasted for approximately 20 min.

Event memory assessments. the experimenter interviewed children about the camping event following delay intervals of 1 day and 3 weeks. Researcher used a standardized memory interview that was adapted from Haden et al.(2001).The hierarchically organized interview began with general open-ended questions (e.g., "What did you do on that camping adventure you had with your mom?"),was followed by more specific open-ended questions (e.g., "What kind of food did you pack up?), and finally by yes/no type probes (e.g., "Was there a spot?"). The specific and yes/no probes requested information from the children that were not provided by the children in response to earlier general questions. furthermore, to estimate the accuracy of the children's responding, several yes/no questions were asked, event-consistent features that had not been provided to the family (e.g., "Was there a egg?" when no egg had been provided).

 Coding

Mother-nominated events. The children's recall of mother-nominated events was coded for the number of event elaborations. Following Reese et al.'s (1993) definition, an *event Elaboration* was described as any clause which introduced an event for discussion, moved the Conversation to a new aspect of the event, or added information about a Particular aspect. For example, "We eat ice cream" was coded as one event elaboration, and "dad didn't play , but mom did" was coded as two event elaborations. To provide an average score across the two events discussed, a mean frequency of event elaborations per event was computed (see Reese et al., 1993). Interrater agreement, based on 25% of the audio records of this task, ranged from 80% to 100% for event elaborations, averaging overall 89.5%.

Engagement in the camping event. Mothers' utterances during camping event were coded To determine the effectiveness of the training procedure, the same scheme as Boland and Haden(2003) was used. The coding categories were mutually exclusive; Mothers' *Wh-* questions were intended to

extract information about the event in general (e.g., "What should we do now?") or a specific component feature of the activity (e.g., "What is this?"). Associations included any maternal comment or question that invited the child to relate a feature of this situation to his or her prior knowledge or past experiences (e.g., "Where else have you seen carpet like this?"; "this rod is look like yours"). Follow-ins included any maternal comment or question that followed directly from the children's nonverbal or verbal behaviors during the event (e.g., child says that he catch the fish Mother responds, "how you catch it?"). Positive evaluations confirmed the child's previous utterances or behaviors, or positively evaluated the event or aspects of the event (e.g., "that was great fishing!"; "We are having wonderful camping!").Interrater agreement was established by having two observers separately code from the videotapes 25% of the camping events. Percentage agreement between each coder overall ranged from100% to 53.8%, averaging 96.2% for open-ended questions,98% for associations,72.7% for follow-ins, 100%for evaluations.

3. Result

3.1.Preliminary Analyses

We conducted one-way training condition ANOVAs on children gender, maternal education, children language and memory pretest. Analyses of these data indicated that children of trained mothers

did not differ from the children of mothers in the no training group in their language scores, age, their mothers' years of education or their memory pretest scores (all p>.25).

3.2.Changes in Maternal conversational style

Our first goal was to conduct a manipulation check to determine whether the trained mothers differed from mothers in the control group in their use several specific conversational techniques when talking with their children about an event as it was unfolding .as table1 display mothers who had received training used more *Wh-* questions, $F=3.9$, $p <.05$ and evaluations ,$F = 4.9$, $p <.03$, when talking with their children than did untrained mothers but There were no differences in mothers' overall use of associations, $F =1.2$, $p <.28$.; follow-ins, $F=.36$, $p <.55$.

Table .1: Mean Number of Conversational Techniques Used by Mothers

	training	no training	F(1)	significance
Wh-questions	17.50(10.42)	10.57(6.67)	3.95	.05
associations	2.50(2.46)	1.42(2.27)	1.20	.28
follow-ins	62.60(32.20)	54.14(34.85)	.36	.55
evaluations	25.10(23.42)	10.07(8.53)	4.92	.03

Note. Standard deviations are in parentheses.

Changes in Children's Memory as a Function of Maternal Training

A second question concerned with the role of maternal training in children's memory reports about the camping activity. Because of missing memory data we couldn't explore this effect.

4. Discussion

We trained mothers to use elaborative conversational techniques for enhancing children's understanding and memory. We control effect of children language skill via matching two groups regarding the essential role of language in memory for personally experienced events (e.g.,Burt, 2008).The selection of these techniques was based on theoretical perspective regarding the encoding of events, as well as by previous research in this area (Peterson et al., 1999; Boland et al., 2003; Reese and

Newcombe, 2007; Wareham., 2007).Trained mothers use more two of the Conversational techniques emphasized in the training program: *Wh-* questions, and positive evaluations than untrained mothers. But training procedure didn't affect they use of, associations, follow-ins. There is several possible explanations. At first because of missing data we can't explore effectiveness of training. Another possible reason comes from cultural effect. Asian mothers are low elaborative than western mothers (wang, 2008), for this reason it is harder to train them. Especially techniques like associations, follow-ins which needs many practice to become of behavioral repertories. Our success in training mothers to use *Wh-* questions, and positive evaluations techniques associated with an elaborative conversational style is consistent with previous work in which mothers were trained to use *Wh-* questions, and evaluations when reminiscing about past experiences with their children (Peterson et al., 1999; Boland et al., 2003; Reese and Newcombe., 2007;wareham; 2007). memory pretest and post test was conducted to assess affect of maternal training on children event memory.Unfortunately we last data on computer and could not conduct further analysis.

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Sample Size Determination for Paired and Unpaired Study Designs of Screening Tests

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Abstract. Screening is defined as the presumptive identification of unrecognized disease or defect by the application of tests, examinations or other procedures, which can be applied rapidly. For the assessment of the accuracy of screening test, it must be compared with the standard test having high sensitivity and frequent usage at clinic. As directed to the goal of this comparison, answer to the question about if a screening test is superior to standard test or non-inferior is obtained from relative sensitivity and relative specificity together with the confidence intervals of them, which are relative accuracies. The aim of this study is to calculate sample size for paired and unpaired study designs, which are used to compare a screening test with standard test and to illustrate these calculations with an application. There are various types of study designs used to compare two tests. In this study, paired and unpaired study designs are considered. Being directed to determining the accuracy of screening test, sample sizes to be taken for these designs are different. The application directed to this objective was undertaken on total 200 individuals, 100 of them are patients detected as HBsAg (+) and 100 are healthy detected as HBsAg (-) by Micro Eliza method. Latex Agglutination Test and Acon Cassette test were applied to the blood samples taken from individuals and test results were ordered for paired and unpaired study designs. After this pilot study it was anticipated that performance of Acon Cassette Test is lower than Latex Agglutination Test and consequently "non-inferiority" study must be designed to compare these two tests. Sample sizes, which must be taken for evaluating "non-inferiority" hypothesis that are used to compare tests, was calculated for paired and unpaired study designs.

Key Words: sample size, study design, sensitivity, specificity, relative accuracy.

1. Introduction

Nowadays various screening tests are being used in protective health care, public health practices, intending to determine the disease at an early stage while individual has no symptom. Survival time of individual may be prolonged and efficiency of treatment may be increased by means of early diagnosis (2). Diagnostic tests that confirm absence or presence of disease might not discriminate the true disease status with %100 accuracy. Generally tests with %100 accuracy are risky, expensive or time consuming for patient. Therefore it is convenient once to apply the screening test to population and then apply diagnostic test to patients whose tests results are positive.

Technologic advances give rise to new tests for detecting disease in many fields. Before a new disease-screening test is approved for public use, its accuracy should be shown to be better than or at least not inferior to an existing test. Accuracy studies are constructed to standardize this aim. In accuracy studies sample size that must be taken to demonstrate the screening test would determine more case than existing test is very important. If the sample size is less than required, estimates that will be derived from the study are quietly affected. There is some criterion to calculate the sample size for this purpose. Among these criterion, sensitivity and specificity of screening and existing test are most important. Generally it is expected that screening tests have high sensitivity, because the aim of screening test is to determine the real disease status.

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There are some studies intended to use relative sensitivity, relative false positive rate and their confidence interval to calculate sample size that is very important and must be taken to demonstrate the screening test would determine more case than existing test. Relative sensitivity and relative false positive rate are criterions that can be calculated for different study designs. These criterions affect sample size in accuracy studies. Probability of both screening test and existing test gives positive test result and threshold value indicates the "superiority" and "non-inferiority" notion when hypothesis are set at a phase of study design effective on sample size.

Paired and unpaired study designs are used to compare two or more tests at cohort studies. Required sample sizes for both of these designs are different.

2. Basic Study Designs

Studies designed to compare two tests can have both applied to each individual or can have each individual allocated one of the tests. We denominate this data as paired test data and as unpaired test data respectively. Pairing is often desirable because it can reduce variability in making comparisons between tests by eliminating between-subject variance. If one or both tests are invasive or inconvenient, an unpaired design may be necessary (1).

2.1. Sample Size Calculation for a Paired Design

Consider the comparison of a screening test (test A) with an existing test (test B) using a paired study design where each subject receives both tests. Data from such a study are represented in Table 1, where D is a dichotomous variable indicating true disease status and Y is a binary indicator of screening test result using the notation of Table 1. (3).

Table 1. Paired study design data.

	D=1					**D=0**		
	Test A					Test A		
	$Y_A=0$	$Y_A=1$				$Y_A=0$	$Y_A=1$	
Test B $\quad Y_B=0$	d	b	$n^-_D(B)$		Test B $\quad Y_B=0$	h	f	$n^-_{\bar D}(B)$
$\qquad\quad Y_B=1$	c	a	$n^+_D(B)$		$\qquad\quad Y_B=1$	g	e	$n^+_{\bar D}(B)$
	$n^-_D(A)$	$n^+_D(A)$	n_D			$n^-_{\bar D}(A)$	$n^+_{\bar D}(A)$	$n_{\bar D}$

Disease:	D=1	Test result positive:	Y=1
Non-disease:	D=0	Test result negative:	Y=0

$rTPR_{A:B}$ and $rFPR_{A:B}$ can be estimated as below.

$$rTPR_{A:B} = \frac{TPR_A}{TPR_B} = \frac{a+b}{a+c} \quad (1) \qquad\qquad rFPR_{A:B} = \frac{FPR_A}{FPR_B} = \frac{e+f}{e+g} \quad (2)$$

Accuracy studies often classified as superiority studies or as non-inferiority studies. If the null and alternative hypotheses relating to the TPR are

$$H_0 : rTPR_{A:B} \leq 1 \qquad H_1 : rTPR_{A:B} = \delta^T_1 \quad (3)$$

then the study is considered as a superiority study. A non-inferiority study on the TPR dimension would use as the null and alternative hypotheses

$$H_0 : rTPR_{A:B} \leq \delta^T_0 \qquad H_1 : rTPR_{A:B} > \delta^T_0 \quad (4)$$

where δ^T_0 is some value close to but less than one.

Tests may be compared with regards to their FPRs. Smaller FPR are more desirable, the null and alternative hypotheses for superiority and non-inferiority of FPRs are respectively,

$$H_0 : \text{rFPR}_{A:B} \geq 1 \qquad H_1 : \text{rFPR}_{A:B} = \delta_1^F \quad (5)$$

$$H_0 : \text{rFPR}_{A:B} \geq \delta_0^F \qquad H_1 : \text{rFPR}_{A:B} < \delta_0^F \quad (6)$$

where δ_0^F is some value close to but greater than one.

In a paired study to test hypotheses (3),(4) and (5),(6) the numbers of diseased and non-diseased subjects required are

$$n_D = \left(\frac{Z^{(1-\beta*)} + Z^{(1-\alpha*)}}{\log\left(\delta_1^T \big/ \delta_0^T \right)} \right)^2 \left(\frac{(\delta_1^T + 1)\text{TPR}_B - 2\text{TPPR}}{\delta_1^T \times \text{TPR}_B^2} \right) \quad (7)$$

where TPPR=P_a=P(Y_A=1,Y_B=1 | D=1), and

$$n_{\overline{D}} = \left(\frac{Z^{(1-\beta*)} + Z^{(1-\alpha*)}}{\log\left(\delta_1^F \big/ \delta_0^F \right)} \right)^2 \left(\frac{(\delta_1^F + 1)\text{FPR}_B - 2\text{FPPR}}{\delta_1^F \times \text{FPR}_B^2} \right) \quad (8)$$

where FPPR=P_a=P(Y_A=1,Y_B=1 | D=0), respectively. Here $\alpha^* = 1 - (1-\alpha)^{1/2}$ and $\beta^* = 1 - (1-\beta)^{1/2}$ (1, 3).

In practice pilot data on the probability TPPR may not be available or the correlation between test results within an individual may be unknown. So values used for sample size calculations may be highly speculative. Calculations can be done for ranges of values (9) and (10) (1, 3).

$$\left(1 + \delta_1^F \right) \text{TPR}_B - 1 \leq \text{TPPR} \leq \text{TPR}_B \quad (9)$$

$$\left(1 + \delta_1^F \right) \text{FPR}_B - 1 \leq \text{FPPR} \leq \text{FPR}_B \quad (10)$$

2.2. Illustration with Hepatitis-B Screening

Hepatitis B is a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death. Eliza is the gold standard; Latex Agglutination Test (LAT) is the standard test and Acon Cassette Test (ACT) the screening test to detect HBsAg. We were interested in comparing the accuracy of LAT and ACT when Eliza is the gold standard. The application directed to this objective was undertaken on total 200 individuals, 100 of them are patients detected as HBsAg (+) and 100 are healthy detected as HBsAg (-) by Micro Eliza method. Using paired and unpaired study designs, Latex Agglutination Test and Acon Cassette test was applied to the blood samples taken from individuals. Performance values of LAT and ACT derived from pilot study are given below.

Table 2. Performance values of LAT and ACT.

	TPR	TNR	FPR	FNR	PPV	NPV
LAT	0.93	0.99	0.01	0.07	0.99	0.93
ACT	0.87	0.92	0.08	0.13	0.91	0.88

Performance values of ACT are less than LAT so from this data we decided that hypotheses must be dependent on non-inferiority study.

For sample size calculations rTPF, rFPF and threshold value must be determined. We hope that ACT has minimum 0.80 TPR and maximum 0.10 FPR. In other words if ACT has minimum 0.80 TPR and maximum 0.01 FPR we can say that ACT is non-inferior than LAT. For these assumptions required threshold values for rTPF and rFPF are below:

$$\delta_0{}^T = \frac{0.80}{0.93} = 0.86 \leq 1 \qquad\qquad \delta_0^F = \frac{0.10}{0.01} = 10 \geq 1$$

So hypothesis set up to calculate sample size for TPF and FPF are as following respectively.

$$H_0 : rTPF_{A:B} \leq 0.86 \quad H_1 : rTPF_{A:B} > 0.86 \qquad\qquad H_0 : rFPF_{A:B} \geq 10 \quad H_1 : rFPF_{A:B} < 10$$

To be conservative we use the lower limit TPPR=0.7949. However, we use the upper limit 0.01 for FPPR, because lower limit is negative. To have power $1-\beta=0.90$ at significant level $\alpha=0.05$ we calculate

$$n_D = \left(\frac{1.95 + 1.63}{\log\left(0.93 / 0.86\right)} \right)^2 \left(\frac{(0.93+1)0.93 - 2 \times 0.7949}{0.93 \times 0.93^2} \right) \cong 534$$

$$n_{\overline{D}} = \left(\frac{1.95 + 1.63}{\log\left(8 / 10\right)} \right)^2 \left(\frac{(8+1)0.01 - 2 \times 0.01}{8 \times 0.01^2} \right) \cong 22522$$

2.3. Sample Size Calculation for an Unpaired Design

Some studies interest in where subjects are tested with only one of the tests. Again, we are interested in designing superiority and non-inferiority studies for rTPR and rFPR, and for illustration we focus here on rTPR. We apply the same techniques used in paired designs to the unpaired design.

Table 3. Unpaired study design data.

	D=1					D=0		
	Y=0	Y=1				Y=0	Y=1	
A Testi	$n^-_D(A)$	$n^+_D(A)$	$n_D(A)$		A Testi	$n^-_{\overline{D}}(A)$	$n^+_{\overline{D}}(A)$	$n_{\overline{D}}(A)$
B Testi	$n^-_D(B)$	$n^+_D(B)$	$n_D(B)$		B Testi	$n^-_{\overline{D}}(B)$	$n^+_{\overline{D}}(B)$	$n_{\overline{D}}(B)$

In an unpaired study to test superiority and non-inferiority hypotheses the numbers of diseased subjects required are

$$n_D = \left(\frac{Z^{(1-\beta^*)} + Z^{(1-\alpha^*)}}{\log\left(\delta_1^T / \delta_0^T\right)} \right)^2 \left(\frac{1 + \delta_1^T - 2 \times \delta_1^T \times TPR_B}{\delta_1^T \times TPR_B} \right) \qquad (11)$$

For illustration, consider the hepatitis screening setting discussed in Section 3.1, where interest is in testing whether the TPR of ACT is non-inferior to the TPR of LAT and whether FPR of ACT is non-inferior to LAT. To have power $1-\beta=0.90$ at significant level $\alpha=0.05$ we calculate $n_D = 968$. Hence, this design requires 484 diseased subjects tested with ACT and 484 diseased subjects tested with LAT, for a total of 968 subjects.

Same calculations based on PPV and NPV could be carried out

3. Discussion

Required sample size for a paired study undertaken to evaluate the relative accuracy of two tests is less than unpaired study. Therefore at a phase of a study design, which of paired and unpaired design will be used must be stated carefully. TPPF and threshold values taken in sample size calculations are very effective on results. Hence hypothesis must be carefully constituted.

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The Use Of Intraclass Correlation Coefficient In Different Experimental Designs

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Abstract: Reliability is defined as the repeatability of measurements or the consistency of repeated measures. The most common type of reliability in medical research is the inter-rater reliability. The main purpose of inter-rater reliability studies is to evaluate the agreement between multiple measurements from the same subject. When the measurements are continuous, intraclass correlation coefficient (ICC) is used to evaluate the inter-rater reliability. There are different formulas for calculating the ICC which depend on the purpose of the study, the design of the study and type of measurements taken. If there is a systematic variability due to raters only, the one way model should be used. If there is also another systematic variability due to subjects, two way models should be used. The selection of raters have an impact on these models, if the effect of raters is random, the models are named as "random effect models", whereas the effect of raters is fixed, those are called as "mixed effect models". After the selection of model, the other important distinctions are to determine whether the measurements used are single or average of two or more measurements taken by different raters and whether the ICC measures the correlation using consistency or absolute agreement definition. Although ICCs are commonly used in medical studies, it is not known which ICC is appropriate for which experimental design. In this paper, the distinctions between different ICCs will be introduced in detail.

Keywords: Intraclass correlation coefficient, ICC, Reliability

1. Introduction

Reliability is defined as the repeatability of measurements or the consistency of repeated measures. The most common type of reliability in medical studies is the intra/inter-rater reliability, which is especially important in questionnaire/scale development in social and educational sciences. One of the ways of calculating reliability is using ICC. Although ICCs are commonly used in studies, it is not known which ICC is appropriate for which experimental design. Therefore the aim of this study was to introduce the distinctions between different ICCs.

2. Method

The most common type of reliability in medical studies is the intra/inter-rater reliability. The main purpose of these studies is to evaluate the agreement between multiple measurements. These multiple measurements can be repeated measurements of the same rater or the measurements of two or more different raters. When the measurements are continuous, ICC should be used to evaluate the intra-rater reliability in the first case and the inter-rater reliability in the second case.

ICC is used for measuring the relation of two variables that share both their metric and variance. The relationship between IQ's of twins, weights of the littermates and rater's ratings should be evaluated by ICC.

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In all situations to be considered, the structure of the data is as n cases or rows, which are the objects being measured, and k variables or columns, which denote the repeated measurements of the same rater (Table 1) or the measurements of two or more raters (Table 2).

Table 1: A Convenient Data Matrix Used in Calculating ICC for Repeated Measurements of the Same Rater

Objects	Measurements			
	1	2	…	k
1	X_{11}	X_{12}		X_{1k}
2	X_{21}	X_{22}		X_{2k}
…				
n	X_{n1}	X_{n2}		X_{nk}

Table 2: A Convenient Data Matrix Used in Calculating ICC for Measurements of Different Raters

Objects	Raters			
	1	2	…	k
1	X_{11}	X_{12}		X_{1k}
2	X_{21}	X_{22}		X_{2k}
…				
n	X_{n1}	X_{n2}		X_{nk}

ICC assesses the reliability by comparing the variability of different ratings of the same subject to the total variation across all ratings and all subjects, so it is defined as the proportion of two variances. ICC estimates are based on mean squares obtained by applying the analysis of variance (ANOVA) models to the data. The theoretical formula for the ICC is defined as:

$$ICC = \frac{\sigma_b^2}{\sigma_b^2 + \sigma_w^2}$$

where σ_w^2 is the pooled variance within subjects and the σ_b^2 is the variance of the trait between subjects.

There are different ICCs depending on the purpose of the study, the design of the study and type of measurements taken.

2.1. Random Versus Fixed Effects

The first decision that must be made in order to select an appropriate ICC is whether the data are to be treated via a one way or two-way ANOVA model. In all situations there are two systematic source of variation: the difference among objects and the difference among measurements/raters. While the effect of objects are considered as random in all cases, that of measurements/raters can be random or fixed.

In technical terms, a factor is random when its levels are selected from a larger population, it is fixed when its levels are dictated by the research question. In practical terms, subjects constitute a random factor, for example, because the particular subjects selected for any study are always replaceable by others from the same population. In contrast, changing the levels of a variable with fixed effects substantially alters the research question.

Calculating ICC in one way models, the effect of measurement/rater is treated as random, thus the model used is called as "one way random effects model". In two way models, according to the effect of measurement/rater being treated as random or fixed, the models are named as "two way random effects model" and "two way mixed effects model", respectively.

2.2. One Way Versus Two Way Models

One Way Random Effects Model

In this model, k ratings for each of the n persons have been reproduced by a subset of j>k raters where the effects of the objects and the measurements/raters are treated as random.

<u>Example</u>

	MR Centers	
Patient	**1. Measurement**	**2. Measurement**
1	Ankara University	Hacettepe University
2	Uludağ University	Dicle University
…	…	…
6	İstanbul University	Akdeniz University

Two Way Random Effects Model

In this model, k raters rate all n persons where the raters are selected from a larger population.
<u>Example:</u>

		Raters	
Patient	**Rater1**	**Rater2**	**Rater3**
1	9	2	5
2	6	1	3
…	…	…	…
6	7	1	2

Two Way Mixed Effects Model
In this model, k raters rate all n persons where the effect of raters is fixed.

<u>Example:</u>

Patient	Professor	Associate Professor	Specialist
1	9	2	5
2	6	1	3
…	…	…	…
6	7	1	2

2.3. Single versus Average

There are different ICCs whether the reliability is to be calculated on a single measurement or by taking the average of two or more measurements. Suppose that a dentist wants to measure the cavity between teeth. If the takes only one section from each tooth and use these measurements for calculating ICC, the "single" option should be selected. If he takes three sections (apical, middle, corneal) for each tooth and use the average of these measurements, the "average" option should be selected. Because of combining multiple ratings generally produces ore reliable measurements, the ICC calculated from the average option is higher than the ICC calculated from the single option

2.4. Consistency versus Absolute Agreement

There are different ICCs whether the agreement is to be defined in terms of consistency or absolute agreement. The difference between consistency and absolute agreement measures is defined in terms of how systematic variability due to raters or measurements is treated. If that variability is considered irrelevant, it is not included in the denominator of the estimated ICCs and the measures of consistency are produced. If systematic differences among levels of ratings are considered relevant, rater variability contributes to the denominator of the ICC estimates and measures of absolute agreement are produced.

Type of ICC	Description
ICC(1,1)	1. Each subject is assessed by a different set of randomly selected raters. 2. The reliability is calculated from a single measurement.
ICC(1,k)	1. Each subject is assessed by a different set of randomly selected raters. 2. The reliability is calculated by taking an average of k raters' measurements.
$ICC(2,1)_C$	1. Each subject is measured by each rater, and raters are considered representative of a larger population of similar raters. 2. The reliability is calculated from a single measurement 3. ICC is defined in terms of consistency.
$ICC(2,1)_A$	1. Each subject is measured by each rater, and raters are considered representative of a larger population of similar raters. 2. The reliability is calculated from a single measurement 3. ICC is defined in terms of absolute agreement.
$ICC(2,k)_C$	1. Each subject is measured by each rater, and raters are considered representative of a larger population of similar raters. 2. The reliability is calculated by taking an average of k raters' measurements. 3. ICC is defined in terms of consistency.
$ICC(2,k)_A$	1. Each subject is measured by each rater, and raters are considered representative of a larger population of similar raters. 2. The reliability is calculated by taking an average of k raters' measurements. 3. ICC is defined in terms of absolute agreement.
$ICC(3,1)_C$	1. Each subject is measured by each rater, and raters are the only raters of interest. 2. The reliability is calculated from a single measurement 3. ICC is defined in terms of consistency.
$ICC(3,1)_A$	1. Each subject is measured by each rater, and raters are the only raters of interest. 2. The reliability is calculated from a single measurement

	3. ICC is defined in terms of absolute agreement.
ICC (3,k)$_C$	1. Each subject is measured by each rater, and raters are the only raters of interest. 2. The reliability is calculated by taking an average of k raters' measurements. 3. ICC is defined in terms of consistency.
ICC (3,k)$_A$	1. Each subject is measured by each rater, and raters are the only raters of interest. 2. The reliability is calculated by taking an average of k raters' measurements. 3. ICC is defined in terms of absolute agreement.

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An Application of Computerized Adaptive Testing (CAT) for Measuring Cognitive Impairment in Patients with Acquired Brain Injury

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Abstract

Purpose: The aim of this study was to explore the potential of Computerized Adaptive Testing (CAT) for measuring cognitive impairment in patients with acquired brain injury. **Methods:** 294 patients with acquired brain injury answered some questions from 3 cognitive assessment questionnaires (the Mini-Mental State Examination, the Middlesex Elderly Assessment of Mental State, and the Rivermead Behavioural Memory Test). After exploratory factor analysis and Rasch analysis, a 33-item cognitive impairment item bank was developed. Using this item bank, several simulated computerized adaptive tests (CATs) were developed and their results checked against simulated applications from 1.000 simulees. **Results:** The cognitive impairment status levels generated using item bank and those obtained from the simulated CAT applications were highly correlated. Correlations between each CAT condition and scores based on a 33-item cognitive impairment item bank have ranged from 0.89 to 0.93. CATs with even fewer items also produced scores that were highly correlated with scores based on all items. For example, scores from a 5-item CAT had a correlation of 0.89 with 33-item item bank scores. **Conclusion:** This study showed that the burden of this assessment of cognitive impairment with respect to the number of items administered can be reduced by the application of a CAT procedure. Therefore, a CAT-based cognitive impairment item bank can be a valuable tool for use in clinical and research contexts.

Keywords: Computerized adaptive testing, cognitive impairment, assessment, simulation

1. Introduction

Assessment of cognitive function is essential in neurorehabilitation practice. As cognitive impairment can limit functional gains during inpatient rehabilitation, thus the early and follow-up assessment of cognitive skills is crucial in the management of brain-injured patients in a rehabilitation setting [1, 2]. Cognitive problems might have negative effects on the rehabilitation process and can worsen the functional outcome. Thus, cognitive assessment is an important part of the cognitive evaluation in the management of brain-injured patients in a rehabilitation setting. The assessment of cognitive impairment results in considerable burden to patients with acquired brain injury, as well as an administrative burden to health care professionals. This paper seeks to build on recent developments in outcome measurement to reduce the burden of information collection upon the patient or collect the information with no extra burden. The mechanism by which this solution can be obtained is to implement a Computer Adaptive Testing (CAT) approach [3]. The approach uses a computer to administer test items to patients. In doing so, using a

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previously calibrated set of items called an item bank, it selects the most informative items for each individual patient according to their level on the construct being measured. This avoids the administration of a large number of items by selecting those close to the person's ability level, effectively constructing a "tailored test" for each individual. The CAT can be applied in both routine clinical and research settings [4-5]. Therefore the aim of the current study was to explore the potential of CAT for measuring cognitive impairment in patients with acquired brain injury.

2. Methods

Computerized adaptive testing (CAT)

CAT application was performed using the calibrated cognitive impairment item bank. We have developed new CAT software *Smart*CAT™ (v1.0) [6], following the logic of Thissen and Mislevy [7] during this study.

In CAT, when a test is administered to a patient by using a package program via the computer, the program estimates the patient's ability after each question, and then that ability estimate can be used in the selection of subsequent items. For each item, there is an item information function (centred on item difficulty in the dichotomous case), and the next item chosen is usually that which maximises this information. The items are calibrated by their difficulty levels from the item bank. Figure 1, which is adapted from Wainer et al. [8], shows the sequence of steps inherent in CAT administrations in our study. Initially, the question with the median difficulty level in the item bank is administered (Step 1) and the patient's ability level (θ_{CAT}) and its standard error (SE) is estimated (Step2). The maximum likelihood estimation method with the Newton-Raphson iteration technique is used for this estimate in the current study [9,10]. Given this estimate, the next most appropriate item (which maximizes the information for the current θ estimate) is chosen (Step 3) and then presented to the patient and θ_{CAT} and its SE are re-estimated (Step 4). If the predefined stopping rule is not satisfied, Step 5 involves repeating Steps 3–4 until the stopping rule is met. When the stopping rule is satisfied, another dimension is measured or the assessment is completed. For this study, the stopping rule was defined as either attaining a standard error of ≤0.50 or responding to predefined number of items changing from 5 to 15, whichever was reached first.
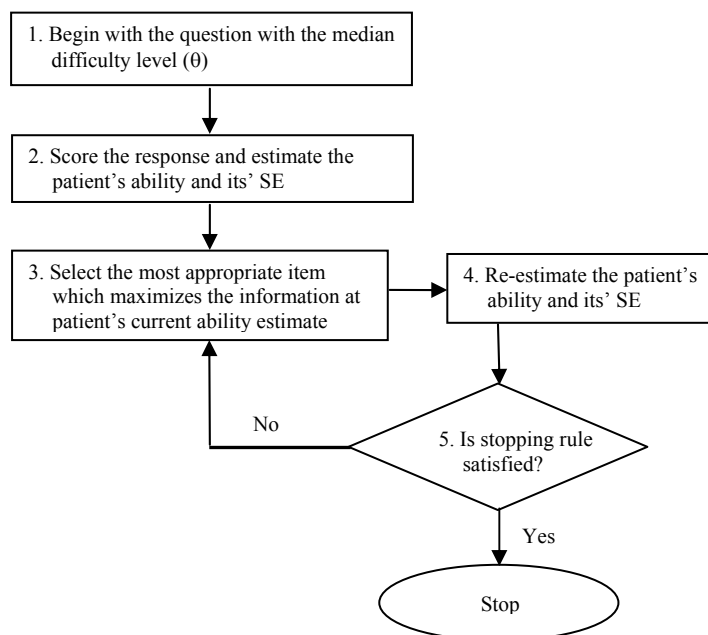

Figure 1: The flow chart of the CAT algorithm used in this study

Simulated CAT application

In the simulated CAT, responses for 1.000 simulees having a normal distribution with a mean of 0 and standard deviation of 1 were derived from the RUMMss simulation program [11]. The simulated data were regarded as what the patient would have given, had the item been administered in the context of a CAT. It was assumed that the mode of administration (i.e. paper and pencil which gave estimates for the item bank or the CAT application) would not substantially have affected item responses when the CAT estimated the cognitive impairment level (θ_{CAT}) and its SE for each patient. The agreement between θ_{CAT} and cognitive impairment level (θ_{Rasch}) generated using the response to all items analyzed with Rasch analysis were evaluated by the intraclass correlation coefficient [ICC(3,1)] [12] and the Bland-Altman method [13]. For this comparison item difficulties were anchored across analyses to ensure results were comparable.

3. Results

For the simulated CAT application, Spearman's correlation coefficient (r), ICC (3,1) with its confidence intervals (CIs) and 95% ranges of Bland-Altman agreement limits between θ_{CAT} and θ_{Rasch} were given in Table 1.

Table 1: Comparison of CAT applications

CATs	Median number of items (Min-Max)	Spearman's r	ICC(3,1) [95% CI]	Median Reliability	Bland-Altman Agreement Limits		
					Lower	Upper	% of within limits
SE≤0.50 or 5-item	5 (5-5)	0.83**	0.91 [0.86-0.93]	0.58	-1.17	1.73	94.5
SE≤0.50 or 6-item	6 (6-6)	0.90**	0.92 [0.87-0.94]	0.60	-1.06	1.62	95.7
SE≤0.50 or 7-item	7 (7-7)	0.91**	0.93 [0.88-0.95]	0.64	-0.96	1.51	94.9
SE≤0.50 or 8-item	8 (8-8)	0.92**	0.93 [0.88-0.96]	0.66	-0.91	1.46	94.9
SE≤0.50 or 9-item	**9 (9-9)**	**0.93****	**0.93 [0.89-0.96]**	**0.70**	**-0.88**	**1.43**	**95.0**
SE≤0.50 or 10-item	10 (10-10)	0.93**	0.94 [0.89-0.96]	0.71	-0.86	1.39	95.3
SE≤0.50 or 11-item	11 (10-11)	0.94**	0.94 [0.90-0.96]	0.73	-0.83	1.34	94.9
SE≤0.50 or 12-item	12 (10-12)	0.94**	0.94 [0.90-0.96]	0.75	-0.82	1.33	94.4
SE≤0.50 or 13-item	13 (10-13)	0.94**	0.95 [0.91-0.97]	0.75	-0.81	1.30	94.3
SE≤0.50 or 14-item	13 (10-14)	0.94**	0.95 [0.91-0.97]	0.75	-0.79	1.26	94.8
SE≤0.50 or 15-item	13 (10-15)	0.94**	0.95 [0.92-0.97]	0.75	-0.76	1.21	95.2
SE≤0.50	13 (10-31)	0.93**	0.95 [0.93-0.96]	0.76	-0.67	0.98	95.5

**: p<0.001; CI: Confidence interval, SE: Standard error

According to Table 1, apart from the first CAT application (SE≤0.50 or 5-item), θ_{Rasch} and θ_{CAT} correlated equal to greater than 0.90. Also, all of the ICCs were between 0.91-0.95. The median reliability increased as the number of items administered increased from 0.58 to 0.76. In other words, the SE was decreased from 0.64 to 0.49 as the number of items increased. For all CATs, the most of the estimates were within the 95% limits of agreement for the cognitive impairment item bank.

When the SE≤0.50 was used as stopping rule, the number of items administered in the CAT application ranged from 10 to 31 (Figure 2). Although the median of 13 items was administered there was substantial variation among simulees in number of items administered and most of the simulees received 14 or fewer items.
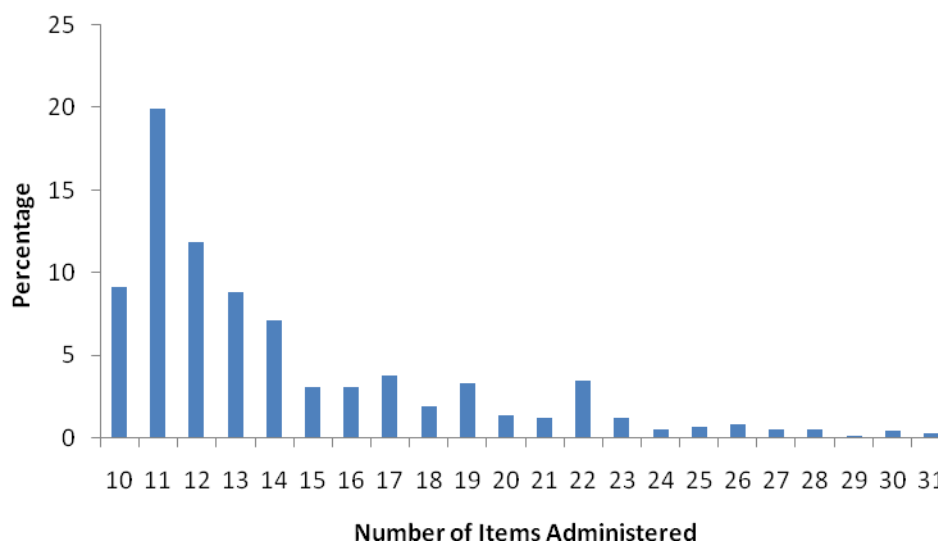
Figure 2: Percentage of simulees receiving different number of items

Usually the reliability of 0.70 was required at the group level. According to our results, half of the simulees had a reliability of 0.70 or more when at least 9 item administered. CATs with as few as 9 items can be a valuable tool for use in clinical and research contexts.

As would be expected, respondent burden was substantially greater for those who completed all 33 items in the item bank, in comparison with those for whom scores were estimated using CATs. In fact, better results can be obtained with a 9-item CAT than with the 33-item, even with the 73% savings in response burden.

4. Conclusion

The sufficient number of items for CAT was found to be 9 for the cognitive impairment item bank and CATs with even fewer items produced cognitive impairment's estimates that were highly correlated with estimates based on all 33 items.

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Effects of Methadone Maintenance Treatment on Decision-Making Processes in Heroin-Abusers: A Cognitive Modeling Analysis

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Abstract. Although decision-making processes have become a principal target of study among addiction researchers, few researches are published according to effects of different treatment methods on the cognitive processes underlying decision making up to now. Utilizing cognitive modeling method, in this paper we examine the effects of Methadone maintenance treatment (MMT) on cognitive processes underlying decision-making disorders in heroin-abusers. For this purpose, for the first time, we use the balloon analog risk task (BART) to assess the decision-making ability of heroin-abusers before and after treatment and compare it to the non heroin-dependent subjects. Results demonstrate that heroin-abusers show more risky behavior than other groups. But, there is no difference between the performance of heroin-abusers after 6 months of MMT and control group. Modeling subjects' behavior in BART reveals that poor performance in heroin-abusers is due to reward-dependency and insensitivity to evaluation. Results show that 6 months of MMT decreases reward-dependency and increases sensitivity to evaluation.

Keywords: cognitive modeling, Methadone maintenance treatment, balloon analog risk task, decision-making.

1. Introduction

Addiction is characterized as compulsive drug use, despite awareness of the deleterious future consequences [1]. The transition from regulated to compulsive drug use is rooted in actions of drugs of abuse on a vulnerable brain. Changing motivational circuitry is followed by associated alterations in several psychological functions, such as decision making. Such drug-induced decision making malfunctions are evidenced to be generalized to real-life circumstances. This provides researchers to investigate addicts brain disorders via tasks called Cognitive Assessment Tasks, which simulate real-life decision making situations. Subjects' performance in these tasks provides a mean for assessing their decision-making abilities. For instant, Iowa Gambling Task (IGT) designed by Bechara et al.[2], has become very influential for studying decision-making deficits in drug abusers. The Balloon Analog Risk Task (BART) is another example which is developed by Lejuez, C.W. et al. [3] to examine risky behaviors. This computer-controlled task involves sequential risk taking with feedback. Several studies have confirmed that subjects' performance in this task, have significant correlation with their real-life risky behavior indices [3,4].

However, merely analyzing subjects' performance, says little about cognitive processes underlying overt behaviors. Indeed, because of the complexity of decision tasks and their large number of unobservable components, it's difficult to identify the causes of disorders. For example, poor performance in gambling task may be due to weakness in contingency learning, difference in evaluation of wins or losses and even

impulsive or erratic behavior [5]. One method to decompose an observed behavior to its underlying cognitive processes is using cognitive modeling approach introduced by Busemeyer and Stout [6]. In their pioneer work, they contrasted various cognitive models of the decision maker (DM) in IGT and used them to describe the causes of poor performance of patients with Huntington's disease. They also used their models to analyse the decision making processes in cocaine-abusers [5]. In another work Wallsten et al. developed cognitive models to explain individuals' behavior in BART [7]. Fitting the models to the individuals' data, they demonstrated that the estimated parameters of the best fit model correlate significantly with measures of real-world risk taking behaviors.

In this paper, we employ cognitive modeling approach to investigate the effects of the Methadone maintenance treatment (MMT) on the decision-making disorders in heroin-abusers. Several studies indicate that MMT decreases risky behaviors such as needle sharing and risky sexual behaviors [8]. Probably, this effect is due to the changes in the activity of prefrontal cortex after MMT [9]. However, the cognitive processes underlying these alterations in risky behavior, remains mostly unknown. Here, to identify effects of MMT, we fit several models to the data of 4 groups of participants, including control male subjects, control female subjects, heroin-abusers before treatment and heroin-abusers after 6 months of MMT. Comparing the parameters of the best fit model, we investigate the causes of alteration in subjects' behavior after MMT.

2. Materials and methods

2.1. The balloon analog risk task (BART)

In BART, participants sit in front of a computer screen on which a circle (as a balloon) is shown. The participants can click on a button on the screen to inflate the balloon. Each successful click that does not result in the balloon explosion, yields a gain of x\$ in a temporary bank. If the participant stops before the balloon explodes, the money is transferred to a permanent bank. But, if the balloon explodes, all the money in the temporary bank will be lost and a new balloon will appear on the screen. Each participant has 30 balloons. The participants are not aware of the probability structure governs the balloon's exploding. In fact, the computer allows a maximum number of n pumps for each balloon. The probability of explosion on the i'th pump is:

$$S_i = \frac{1}{n-i+1} \tag{1}$$

where in the original version, n is equal to 128 and each successful pump yields 5 cents. We used the Persian version of BART which is developed in the Iranian National Center for Addiction Studies (INCAS). This version has no difference with the original one except that each successful pump yields 50 Tomans.

2.2. Models

We used the models developed in [7] to describe the participants' behavior in BART. Each model yields the probability of pumping in each pump opportunity. As we will see later, one of these models fit best to the data of majority of participants (we call it model A). Here, we describe this model briefly.

In Model A, DM believes that the stochastic process of balloon's behavior is stationary. That is, probability of balloon explosion remains constant over all pump opportunity. Hence, we can assume that DM has a prior beta distribution with parameters a_0 and m_0, over this constant probability. This probability is updated using past experience at the start of pumping a new balloon in a Bayesian fashion. Having the probability of balloon explosion, DM evaluates outcomes of pumping and stopping actions. In [7], prospect theory (PT) is used to model how DM evaluates these options. In general the expected PT gain for i pumps on balloon h is:

$$E_i(pump) = \pi_{h,i}(ix)^{\gamma^+} \tag{2}$$

where $\pi_{h,i}$ is the probability of pumping the balloon h, i times without explosion and γ^+ is a free parameter. DM selects a target number of pumping that maximizes the expected gains. It can be shown that the optimal number of pumping , g_h, is:

$$g_h = \frac{-\gamma^+}{\ln(q_h)} \tag{3}$$

In Equation 3 q_h is DM's estimation of the probability that balloon will not explode in each pump. The probabilities of pumping are given by:

$$r_{h,i} = \frac{1}{1 + e^{\beta.\delta_{h,i}}} \tag{4}$$

where $\delta_{h,i} = i - g_h$ and β is the response sensitivity parameter. This model has 4 free parameters: a_0, m_0, γ^+ and β. Let q_1 be the DM's subjective probability that the first balloon does not explode in the first pump. The greater the DM thinks q_1 is, the greater is a_0 and the more certain the DM is about his opinion, the greater is m_0. β determines the sensitivity of DM's response to his evaluation. Greater values of β shows that DM gives more attention to his evaluation of outcomes of pumping. Lower values of this parameter show that DM has more erratic behavior. As we can see in Equation 3, γ^+ determines how DM values gains. Individuals that have higher values of γ^+ give more value to gains. It is clear also from Equation 3 that this parameter determines the optimal number of pumping. Higher values of it, shows that DM pumps more.

2.3. Participants

Data used in this paper consists of 4 groups of participants: control male subjects, control female subjects, heroin-abusers before treatment and heroin-abusers after 6 months of MMT. All heroin-abuser participants are male treatment seeking heroin dependents (based on DMS-IV [10]). The demographical properties of these groups are shown in Table 1.

Table 1. demographical characteristics of participants(Pre: heroin-abusers before treat- ment,P6: heroin-abusers after 6 months of MMT)

Group	Control(male)	Control(female)	Pre	P6
Number of participants	27	23	25	19
Age	26.37 ± 5.50	28.04 ± 6.02	27.69 ± 5.45	30.37 ± 5.58

3. Results

3.1. BART scores

In Table 2 subjects' performance in BART are presented. Typically, riskiness in BART is indexed in terms of adjusted BART score, i.e. the average number of pumps on balloons that did not explode [3]. Results show that adjusted BART score (AV) and maximum number of pumps (MAX) in heroin-abusers before treatment is higher than those of control male subjects and heroin-abusers after 6 months of MMT (p < .05). This demonstrates that heroin-abusers before treatment show more risky behavior than two other groups. However, there is no meaningful difference between the scores of heroin-abusers after 6 months of MMT and control male subjects.

Table 2. performance indices in BART for different groups. (AV: Adjusted Value, MAX: Maximum number of pumping)

BART score	Control(men)	Control(women)	Pre	P6
AV	2754 ± 11.52	22.38 ± 12.00	38.59 ± 13.79	25.14 ± 11.32
MAX	51.88 ± 24.22	45.00 ± 20.77	69.56 ± 22.64	50.16 ± 25.40

3.2. Parameter Estimation

Among the models presented in [7], model A fit majority of the participants. Also, parameters of this model have significant correlation with risk indices. So we focus on this model for analyzing behavior of subjects. Table 3 shows the estimated parameter for this model and Table 4 presents correlation between model A parameters and BART scores.

Table 3. estimated parameters of model A

	Control(male)	Control(female)	Pre	P6
A_o	9220 ± 35033	3123 ± 4883	4305 ± 4529	2351 ± 4343
M_o	9281 ± 35052	3163 ± 4918	4365 ± 4560	2428 ± 4447
β	$0.14 \pm .09$	$.15 \pm .11$	$.10 \pm .08$	$.15 \pm .1$
γ^+	$.93 \pm .64$	$.75 \pm .59$	1.14 ± 1.25	$.93 \pm .92$

Regarding to these results, these points can be inferred:

1. γ^+ in heroin-abusers before treatment is significantly higher than γ^+ in control male subjects (p < .01). This means that heroin-abusers before treatment give more value to gains and hence are more likely to show reward dependence behavior than other groups. Additionally, in heroin-abusers after 6 months of MMT, γ^+ is lower than heroin-abusers before treatment (p < .05) and has no significant difference with that of control male subjects. This proves that MMT decreased reward dependency in heroin-abusers and brought it back to the normal level.

2. As it appears from Eq 3, γ^+ is directly proportional to the optimal number of pumping. Significant correlation of γ^+ with maximum number of pumping is consistent with this fact.

3. β in control male subjects is higher than that of heroin-abusers before treatment (p < .05). Thus, heroin-abusers before treatment disregard their evaluation of outcomes of pumping or stopping. The value of this parameter is higher for heroin-abusers after 6 months of MMT than heroin-abusers before treatment (p < .05) but has no significant difference with control male subjects. Thus, MMT was effective in increasing the sensitivity of response tevaluation in heroin-abusers.

4. a_0 and m_0 have no difference between groups. Hence, the ability of learning the balloons' stochastic process is similar among groups.

5. None of the parameters have meaningful difference between control male subjects and control female subjects, as well their BART scores. Therefore, there is no difference in the risky behavior on BART for male and female subjects.

Table 4. correlation between model A parameters and BART scores(AV: Adjusted Value, SUC: Number of successful pumps, MAX: Maximum number of pumping)

	a_0	m_0	γ^+	β
AV	-0.00	-0.00	0.45	-0.46
MAX	-0.03	-0.03	0.52	-0.66

4. Discussion and Conclusion

In this study we used cognitive modeling to assess effectiveness of MMT on decision-making disorders in heroin-abusers. We fit different models on subject's behavior in BART. Results demonstrated that heroin-abusers before treatment show more risky behavior in comparison to the control group. This disorder in decision making is due to imbalance in reward dependency and insensitivity to evaluation. This group has no deficit in learning the balloons' stochastic process. Also, as there is no meaningful difference between performance of control group and heroin-abusers after 6 months of treatment, we can infer that MMT was effective in improving these disorders in heroin-abusers. Previously, Stout et al, [5] utilized cognitive modeling to study decision- making deficits in cocaine-abusers. Their study shows that cocaine-abusers have poor performance in IGT. Moreover, the result of cognitive modeling revealed that this poor performance is due to motivational and choice consistency factors. In their study, the parameter which determines the relative attention of DM to the loss vs the win was biased in favor of wins. Moreover, deficits in choice consistency indicate that choices of addicts were highly insensitive to their evaluation of different options. From these aspects, pattern of results in our study is consistent with their study.

As current study investigates effect of MMT on cognitive functions using BART for the first time, our results cannot be compared with previous works directly. However, several studies indicate that MMT

reduces risky behavior in drug dependent individuals [8, 9, 11]. But, in general there is no consensus on the effect of MMT on cognitive functions. For example [12] has shown that after 2 months of MMT, subjects demonstrated significant improvements from base- line (before treatment) on measures of verbal learning and memory, visuospatial memory, and psychomotor speed and reduced frequency of drug use. In contrast, [13] reported that subjects under methadone treatment had more errors on the Wisconsin card sorting task (WCST) and performed worse relative to control subjects in IGT. Regarding this reports, more investigations is needed to identify effects of MMT on cognitive functions involved in decision-making, especially in risky situations. One important limitation of our work is that all heroin-abusers were male subjects. For future works effects of MMT on female heroin-abusers can be investigated. Also, effect of MMT on cognitive abilities can be studied using other cognitive assessment tasks such as IGT. If done so, the effects of MMT can be better understood by comparing performance of subjects among different tasks.

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Item Bank Development to Assess Cognitive Impairment in Patients with Acquired Brain Injury

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Abstract

Purpose: The aim of this study was to develop an item bank to assess cognitive impairment in patients with acquired brain injury. **Methods:** 294 patients with acquired brain injury answered some questions from 3 cognitive assessment questionnaires (the Mini-Mental State Examination (MMSE), the Middlesex Elderly Assessment of Mental State (MEAMS), and the Rivermead Behavioural Memory Test (RBMT)). An exploratory factor analysis was used to identify cognitive impairment dimensions which were then subjected to Rasch analysis. Reliability of the item bank was tested by internal consistency and person separation index, external construct validity by correlations with cognitive disability (Functional Independence Measure (FIM) cognitive scale). **Results:** Factor analytic techniques identified one dimension named "cognitive impairment". Except for one item from MMSE, all items loaded on the dimension with a factor loading 0.40 or above. Because of the disordered thresholds, 5 items were rescored. After rescoring, only one RBMT item did not fit to the Rasch model. Most items were free of Differential Item Functioning for age, gender and education. Reliability exceeded 0.86 for the dimension. The correlation between the item bank and the FIM cognitive scale was 0.57, confirming construct validity with an expected moderate association between and cognitive disability and impairment. **Conclusion:** Using a combination approach of exploratory factor analysis (EFA) and Rasch analysis, this study has shown that it is possible to calibrate items to assess cognitive impairment onto a single metric in a way that can be used to provide the basis of a Computerized Adaptive Testing application.

Keywords: Item bank, cognitive impairment, assessment, Rasch model, exploratory factor analysis

1. Introduction

Assessment of cognitive function is essential in neurorehabilitation practice. As cognitive impairment can limit functional gains during inpatient rehabilitation, thus the early and follow-up assessment of cognitive skills is crucial in the management of brain-injured patients in a rehabilitation setting [1, 2]. Cognitive problems might have negative effects on the rehabilitation process and can worsen the functional outcome. Thus, cognitive assessment is an important part of the cognitive evaluation in the management of brain-injured patients in a rehabilitation setting.

The importance of such assessments have been recognized among rehabilitation specialists in Turkey and, consequently, two cognitive screening instruments, the Mini-Mental State Examination (MMSE) and the Middlesex Elderly Assessment of Mental State (MEAMS), and a memory assessment instrument, the Rivermead Behavioural Memory Test (RBMT), have recently been adapted for use with patients with neurological disorders or injury [3-5].

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The aim of the current study was to develop an item bank for measuring cognitive status in patients with acquired brain injury.

2. Methods

Patients and setting

The study was performed in the Department of Physical Medicine and Rehabilitation at the Medical School of Ankara University, Turkey, from November 2000 to February 2004. A total of 294 patients with consecutive acquired brain injury who had been admitted for rehabilitation were included in the study. Patients with significant difficulties in language expression or comprehension or with a history of previous dementia were excluded. All patients/care givers gave informed consent to take part in the study.

Selection of questionnaires

Three questionnaires which are currently used for routine cognitive assessment in the neurorehabilitation setting were included: The Mini-Mental State Examination (MMSE), the Middlesex Elderly Assessment of Mental State (MEAMS), and the Rivermead Behavioural Memory Test (RBMT).

The MMSE is an eleven-item rapid cognitive screening instrument [3]. It comprises 6 domains of cognition: orientation, registration of new information, attention and calculation, recall, language and visuospatial construction. The items have a different number of response categories ranging from dichotomous to a 6-category response. Thus 11 items are summed to give a maximum score of 30.

The MEAMS is also a cognitive screening test which has been validated to be used in acquired brain injury in Turkey [4]. It requires the patient to perform a number of simple tasks, each designed to test some aspect of current cognitive functioning. There are 12 sub-tests in all, each with a variable number of items or tasks to fulfil (Table I). Each sub-test has a 'pass score'. A screening score of either 0 (fail) or 1 (pass) is assigned for each item according to the failure or passing from that item. Then a total screening score is calculated as the sum of the screening scores of the 12 items.

The RBMT is a commonly used memory test developed to detect impairment of everyday memory functioning [6]. The test battery includes 12 subtests. For each sub-test a Standardized Profile (SP) score (range 0–2) is produced based on subject's performance on the tasks of that sub-test, then a Screening score of 0 (fail) or 1 (pass) is given according to pass rate from the SP score [5]. Consequently, the total screening score ranges from 0–12.

As seen above, response options and corresponding scores of items across the scales were different. While the items of the MMSE were polytomous, those of MEAMS and RBMT were dichotomous. Thus the three chosen scales gave 35 items as candidate items for the item bank.

Data analysis

Initial unidimensionality

The 35 items were submitted to an exploratory factor analysis (EFA) for categorical data using weighted least square methods to investigate the unidimensionality of the item set. Model fit was evaluated using the root-mean-square error of approximation (RMSEA) that accounts for model parsimony. RMSEA values <0.08 suggest adequate fit; values <0.05 indicate good fit [7]. Items, whose factor loadings below 0.40, were

eliminated from the item set(s) [8]. After the determination of the dimensions of the total item set by EFA, the next step was to calibrate these items onto the appropriate dimension using an item response theory model.

Internal construct validity and differential item functioning analysis

Internal construct validity of the item bank was assessed by Rasch analysis. Master's partial credit model (PCM) is an extension of the Rasch dichotomous model which can accommodate items with different response categories, such as those proposed for the item bank [9].

Two overall fit statistics summarize item- and person-fit and are distributed such that a mean of 0 and SD of 1 indicate perfect fit to the Rasch model. A chi-square interaction statistics determines the invariance of the scale across the trait and should show a nonsignificant deviation from model expectation. Individual item chi-square statistics should also indicate non-significant deviations and item residual statistics should be within the range ±2.5 [10].

Fitting data to the Rasch model also allows for an examination of Differential Item Functioning (DIF) for groups such as those defined by age, gender and educational level. The DIF occurs when different groups within the sample respond in a different manner to an individual item, despite having equal levels of the underlying characteristic being measured.

A formal test of the assumption of unidimensionality is undertaken by performing a PCA analysis of the residuals [11]. Finally, the assumption of local independence was tested by performing a PCA analysis of the residuals obtained from PCM. If a pair of items had a residual correlation of 0.40 or more, one of the items that showed a higher accumulated residual correlation with the remaining items was eliminated.

Reliability

An estimate of the internal consistency reliability of the item bank was tested by Person Separation Index (PSI), Cronbach's alpha and intraclass correlation coefficient [ICC(3,1)].

External construct validity

The external construct validity is assessed through convergent validity with the FIM cognitive scale and the concurrent validity with MMSE, MEAMS and RBMT.

Sample size and statistical software

For the Rasch analysis it is reported that a sample size of 294 patients will estimate item difficulty, with α of 0.05, to within ±0.3 logits [12]. This sample size is also sufficient to test for DIF where, at α of 0.05 a difference of 0.3 within the residuals can be detected for any 2 groups with β of 0.20. A value of 0.05 is used throughout, and corrected for the number of tests (Bonferroni correction). Statistical analysis was undertaken with SPSS 11.5; exploratory factor analysis with the MPlus program; Rasch analysis with the RUMM2020 package.

3. Results

Descriptive data for the patients

The mean age of the 294 Turkish patients was 58.6 years (SD 14.7), 62.6% were men. The patients had a median time since injury of 48.5 days. The cause of the acquired brain injury was predominately stroke (84%) and almost 1-in-12 patients were illiterate.

Initial unidimensionality

An EFA was conducted including 35 items. This analysis produced a one-factor solution, named "cognitive impairment". Except for one item (MMSE 3), all of the items were loaded on this dimension with factor loading varied from 0.40 to 0.88. Thus, MMSE 3 was removed from the further analysis. The RMSEA value for the one-factor solution was 0.065.

Internal construct validity and differential item functioning analysis

Starting with 34 items, five of the MMSE items displayed disordered thresholds, necessitating collapsing of categories and were re-scored. Following this, all items apart from RBMT 7 were found to fit the model (given a Bonferroni adjustment fit level of 0.002) (Table 1). After deleting RBMT 7, overall mean item fit residual was -0.223 (SD 1.174) and mean person fit residual was -0.201 (SD 0.650). Item-trait interaction was non-significant, supporting the invariance of items (chi-square 154.3 (df = 132), p = 0.090). Overall, the resulting 33-item item bank was particularly well targeted.

MMSE 4 and MEAMS 6 showed DIF by age, whereas MMSE 4 and MEAMS 1 by gender. There was also DIF by education for MMSE 4, MMSE 5, MMSE 9 and MMSE 10, and MEAMS 12.

Table 1. Fit of the item bank to the Rasch model (after rescoring) (n= 294)

Items	Location	SE	Individual Item Fit Residual	p	Items	Location	SE	Individual Item Fit Residual	p
MMSE 1	-0.185	0.074	0.523	0.351	MEAMS 8	-0.986	0.210	-0.195	0.029
MMSE 2	-0.806	0.141	-1.618	0.028	MEAMS 9	0.485	0.189	-0.446	0.272
MMSE 4	0.486	0.118	-1.566	0.349	MEAMS 10	0.751	0.207	0.139	0.618
MMSE 5	1.154	0.123	2.332	0.203	MEAMS 11	-0.763	0.204	1.175	0.036
MMSE 6	-3.789	0.420	-0.094	0.368	MEAMS 12	0.375	0.190	2.949	0.905
MMSE 7	2.713	0.211	1.591	0.526	RBMT1	2.144	0.210	-0.765	0.683
MMSE 8	-1.498	0.147	-0.139	0.683	RBMT2	-2.147	0.272	-0.775	0.570
MMSE 9	-0.913	0.186	-0.910	0.076	RBMT3	1.349	0.189	-0.621	0.062
MMSE 10	0.814	0.164	-1.813	0.167	RBMT4	0.648	0.184	2.074	0.395
MMSE 11	1.530	0.171	-0.798	0.126	RBMT5	0.717	0.184	-1.277	0.178
MEAMS 1	0.269	0.190	-0.886	0.335	RBMT6	0.418	0.185	-1.342	0.202
MEAMS 2	0.552	0.190	0.417	0.743	RBMT8	0.290	0.186	-0.600	0.759
MEAMS 3	-3.061	0.356	-0.439	0.407	RBMT9	0.687	0.184	-1.128	0.590
MEAMS 4	-0.757	0.204	-0.362	0.868	RBMT10	-0.903	0.211	0.255	0.401
MEAMS 5	0.233	0.190	-1.899	0.147	RBMT11	0.130	0.187	-0.421	0.866
MEAMS 6	-0.709	0.202	0.203	0.736	RBMT12	0.004	0.189	-1.084	0.338
MEAMS 7	0.769	0.190	0.167	0.879					

Finally, using the PCA of residuals obtained from PCM, taking the highest positively and negatively correlated items to the first residual factor to make two subsets, no significant difference in person estimates (t= 3.25%; CI 0.5%–6.0%) was found between the two subsets, thus supporting the unidimensionality of the item bank. For the assumption of local independence, there were two pairs of items which had a residual correlation of 0.40 or more.

Reliability

Internal consistencies of the item bank were adequate at the dimension level with Cronbach's alphas of 0.89 and ICC of 0.89. The PSI was good (0.86) indicating the ability of the scale to differentiate more than 3 groups of patients [13].

External construct validity

The Spearman correlation between the item bank and the FIM cognitive scale was 0.57, confirming convergent construct validity with an expected moderate association between cognitive impairment and cognitive disability. High correlations observed between the item bank and the selected questionnaires (r= 0.93 for MMSE; r= 0.89 for MEAMS, and r= 0.92 for RBMT) confirmed the concurrent validity of the item bank.

4. Conclusion

Using a combination approach of EFA and Rasch analysis, this study has shown that it is possible to calibrate items of the three cognitive assessment scales onto a single metric. In conclusion, this item bank can be used to provide basis of a Computerized Adaptive Test application to assess cognitive impairment in patients with acquired brain injury.

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The Influence of the Rotation Point Position and the Weight of Real-World Objects on the Mental Rotation Task's Performance

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Abstract. The goal of the research presented in the above article was to test the hypothesis concerning the dependency between the location of the point of rotation and the weight of displayed natural objects and the time and correctness of carrying out the assignment of their mental rotation. Based on the results of obtained data from 101 people studied using the Shepard-Metzler method, the hypothesis was proved to be in accord with (1) that heavier objects are rotated in the imagination with a greater number of errors than lighter objects (2) mental rotation of objects about point located closer to its edge is susceptible to a greater number of errors than rotating this same object about its geometric center. However, hypotheses concerning the time of carrying out an assignment of metal rotation were not confirmed.

Keywords: mental rotation, weight of real-world objects, position of the rotation point

1. Introduction

Assumption of isomorphism between structures and functional characteristics of objects in the real world and their mental representations became the foundation of research on mental visualization, carried out by Roger Shepard and his coworkers in the 70s [1]-[3]. This assumption arises from the post-Kantian philosophical tradition and relates to the results of research supporting the foundation of the theory of naïve physics [4] [5]. In a particular way, it is undertaken in motor research and motor imagination [6] [7].

In performing motor or manipulative activity on real objects, people use previous experiences. These experiences are written into the figure of motor schemes in the procedural memory and activated every time in a given assignment situation. This means that the factor which to a great degree decides about activating the adequate in a given situation motor program is the visual identification of the physical characteristics of an object (such as for example shape, size or texture) as well as the environment in which it is found [8]. These indicators also comprise the basis for inferring about the unavailable to sight characteristics of a given object, such as for example facture or weight [9]. Motor programs do not have to be activated only in assignment situations (for example lifting or rotating an object), but also in the off-line mode, meaning in the imagination [6] [10]. This has a significant meaning in adaptation. Thanks to this, it becomes possible to plan a set motion activity and foresee its effects.

One of the most frequent manipulation operations made on existing objects is rotation. In accord with common experience, turning about in one's hands a heavier or larger object requires greater effort, and due to this, it occurs somewhat slower and less precisely than manipulating smaller and lighter objects. Another experience from everyday life suggests that rotating an object about a point which is not at its center of weight requires applying somewhat other motor procedures than rotating and object about its center of weight. The difference between these procedures can be perceived, comparing the experience of rotating a hammer about its center of weight, and while hammering a nail, when the point of rotation is shifted in the direction of the edge of the handle.

From the presented assumptions and common-sense observation from everyday life, the article presents the results of the experiment whose goal was to verify the following hypotheses: (1) heavier objects are

mentally rotate over a longer period of time and (2) with a greater number of errors than lighter objects, (3) mental rotating an object about the point located closer to the edge increases the number of errors than rotating this same object about its geometric center, (4) the time for mental rotating an object placed on its lower left edge goes by faster when the direction is in accord with clockwise motion than when it is in the opposite direction to clockwise rotation.

2. Method

2.1. Participants

101 MA students took part in the experiment (54 women and 47 men) aged 19-29 at the John Paul II Catholic University of Lublin (M = 22.47; SD = 2.10). The subjects were randomly divided into three groups on account of the levels of the independent variable, meaning the location of the point of rotation of the object in relation to the geometric center of the rectangle described on this object.

2.2. Apparatus

Stimuli were presented on a 20" WideScreen LCD computer monitor, with 1050 x 1680 pixel resolution. The subjects sat at about 60 cm distance from the monitor and responded by the use of keyboard with a variable key set. Programs for presenting the stimuli and gathering data were written in C++ and E-Prime.

2.3. Stimuli

A set of 29 photographs of objects for everyday use – 28 experimental and 1 comparative (a 1 kg bag of sugar) were prepared. The objects were selected in the pilot study. Choice of objects for research was done according to the following principles: (a) the number of light objects (less than 1 kg), average-heavy (about 1 kg) and heavy (over 1 kg) is comparable, (b) all objects belong to the category of common use objects, (c) the objects are displayed in the canonical position, (d) in order to increase the effect of realism, traces of use are visible on the objects (scratches, dents, dirty and the like). All objects were displayed on monitor in proportional size to the size of the comparable object.

The second, apart from weight, variable factor was the location of the point of rotation. The axis or rotation was placed parallel to the eye of the subject, depending on the experimental group, and was located in the geometric center of the object (see Fig. 1a), in the point between the geometric center of the object and the lower left edge of the object (see Fig. 1b) or on the lower left edge of the object (see Fig. 1c).
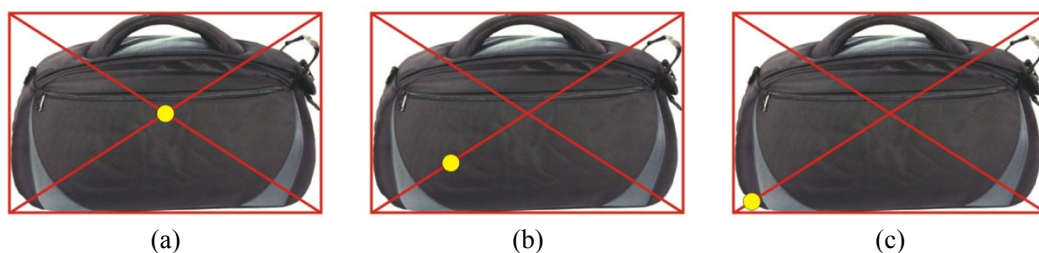

(a)   (b)   (c)

Fig 1. Location of the points of rotation of objects displayed in the experiment.

2.4. Procedure

The experimental procedure was composed of two phases, one following directly after the other.

In the first phase a series of 28 photos of pairs of objects was randomly presented to the subjects. In each pair there was a comparative object (a one kilogram bag of sugar) and one of the objects used in everyday life. The assignment of the subject was to give a reply to the question: which of the presented objects on the screen is heavier? The types of decisions were recorded (most often the key pointing to the heavier object was pressed) and the time it took to do so. Based on subjective evaluation of the weight of the displayed objects, the computer program selected 2 of the lightest objects, 2 – heaviest and 2 – average weight. These objects were used in the following part of the experiment.

In the second part the procedure of researching the mental rotation, analogous to the method worked out by Shepard and Metzler [2] was applied. After instructions and a short series of training assignments, the monitored displayed a gray mask for 1 second, and then for 2 seconds one of the six objects selected in the

first part, in the non-rotation position. Next, the mask was again shown for 2 seconds, after which the same object was displayed, but either in the rotated position at 60, 120, 180, 240 or 360 degrees, or rotated at one of the mentioned angels and at the same time in a mirror reflection. All objects were rotated on a parallel plane to the field of vision.

The assignment of the subject was to give a reply to the question whether the object seen in the second position is only rotated or also at the same time rotated in the mirror reflection, in comparison to the one shown on the previous photo. The type and time of making a decision was registered. During the entire experiment, every subject performed 60 assignments of rotation in relation to six objects selected in the first part of the experiment.

3. Results

Every reply of the subject to the question of whether the object is only rotated, or rotated and in the mirror reflection evaluated under the aspect of correctness. The indicator of correctness of the decision concerned the location of a given object, and received the value of 1 – for the correct answer or 0 – for the incorrect answer. The time of response (decision) was measured from the moment of the appearance on the screen of the rotated object to the moment of undertaking a decision by the tested person concerning its position. With the goal of normalizing the layout of this variable, the reaction time was given to logarithmic transformation (ln). For both dependant variables, an analysis of variation ANOVA was carried out (3 x 3), with a repeated measure in the field of subjective feeling variable of the weight of the rotated object.

3.1. Correctness

The statistically significant drop of the correctness of performing the assignment of mental rotation together with placing the point of rotation of the object from the geometric center of the rectangle described on this object on its lower left edge was stated ($F_{(2.66)} = 3.61$; $p<0.032$; $\eta^2 = 0.10$; see Fig. 2). The result confirms the hypothesis, in accord to which the most errors were made by the subjects who mentally rotate objects about the point found on the edge of the object, rather than those who rotate it about the point placed in the geometrical center of the rectangle described on this object.
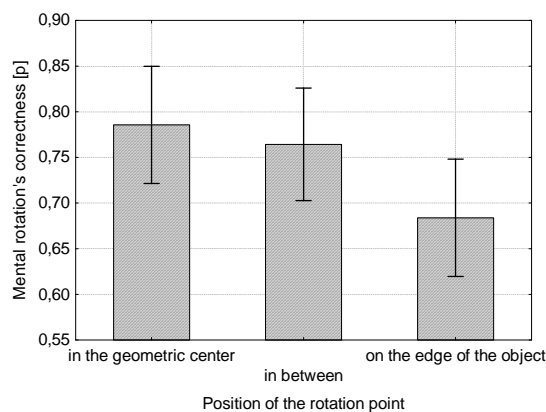

Fig. 2: Correctness of performing the assignment of mental rotation depending on the location of the point of rotation.

Dependency between the subjective feeling of the objects' weight and the correctness of their rotation, independent of the point about which it was rotated was also stated ($F_{(2,132)} = 7.67$; $p<0.001$; $\eta^2 = 0.10$; see Fig. 3). The most errors were made by subjects mentally rotating heavy objects, and the least by those mentally rotating average-heavy and light objects. Statistically essential differences were made between heavy objects and average-heavy ($F_{(1,66)} = 18.04$; $p<0.001$) as well as heavy and light ($F_{(1,66)} = 4.86$; $p<0.031$). The difference between average-heavy and light objects was statistically insignificant.
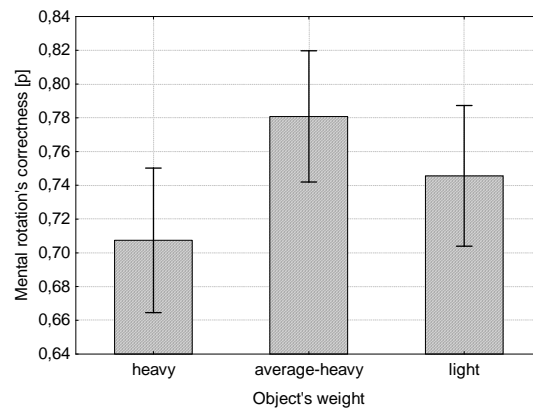
Fig. 3: Correctness of undertaking the assignment of mental rotation depending on the subjective feeling of the weight of the rotated objects.

Between the subjective weight of the rotated objects and the location of the point of rotation enters in the interaction concerning the correctness of performing the mental image assignment ($F(4,132) = 2.46$; $p<0.048$; $\eta^2 = 0.07$; see Fig. 4). It was stated that only in reference to heavy objects is it statistically significant ($F(2,76) = 6.25$; $p<0.003$; $\eta^2 = 0.14$). In the case of the remaining two groups, it has a similar character, but it is statistically insignificant. In addition, it was stated that statistically significant differences between the objects of various subjective weight appeared only in the situation of the mental rotation of objects about a point located at its edge ($F(2,42) = 7.69$; $p<0.001$; $\eta^2 = 0.27$; see Fig. 4).
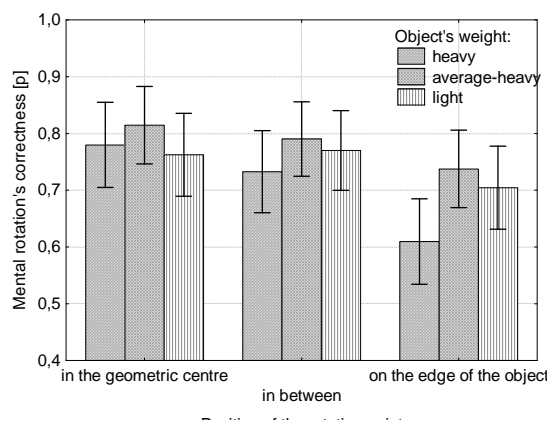

Fig. 4: Correctness of performing the assignment of mental-image rotation depending on the interaction of the location of the point of rotation and the subjectively evaluating the object's weight.

Almost like a model, the symmetric, V-shaped layout of the probability of correct replies depending on the angels of rotation was confirmed. Texted people committed the fewest errors in rotating the objects with small angles, however, in the case of 180° degree angels, they committee the most errors.

3.2. Time for Carrying Out the Mental Assignment

A tendency is found which is expressed by the increase of time for performing the assignment of mental rotation together with change in the position of the point of rotation of the object beginning with the geometric center of the rectangle described on this object and ending on its lower left edge (a statistically insignificant difference).

The statistically significant dependency between the subjectively felt weight of the objects and the time of their rotation was also not stated. On the other hand, the tendency, in accord to which the most quickly rotated objects were average-heavy, and most slowly – heavy.

The typical layout of dependency between time for performing the imagination assignment and the angel of rotation, reflected on the chart in the shape of an overturned letter V, was registered. Despite forecasts, it was not stated whether the location of the point of rotation (at the geometric center, on the edge of the object or between then) had an essential influence on the time for performing the assignment.

4. Discussion

As a result of the carried out tests, two hypotheses were proven: the first, in accord to the heavier objects being rotated with a greater number of errors than lighter objects and the third, in accord to which rotating an object about a point placed closer to the edge is susceptible to a greater number of errors than rotating this same object about its geometric center. Both results are in accord with foreseen results of the theory of naïve physics [4] [5] and the theory of emulation[6].

The hypothesis concerning times of rotation about points at the edges of objects was not confirmed. On the contrary, among others, in relation to the results of research by Wexlera, Kosslyna i Berthoza [7] and the universal experience, thought to be almost ideal, the reversed V-shaped outline of dependency between time of executing a mental assignment and the point of rotation was stated. Most likely, a lack of unequivocal contextual indicators influence this effect, concerning the point of resting an object for the task of mental rotation, particularly when it relied on rotating and object about a point set on its edge. It was expected that in the case when the point of rotation will be placed on the lower left edge of the object, then in accord with the laws of mechanics, its rotation to the right will require less strength and will be carried out more quickly than if it were rotated to the left.

The hypothesis in accord to which heavier objects are rotated longer than lighter objects was also not confirmed. Only insignificant statistical tendency in accord with foreseen data in the hypothesis was stated. It appears that, similarly, in referring to the previous hypothesis, here also works the negative effect of asemantics of the background, which lowered the psychological reality of the experimental situation[9].

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The Difference in Psychological Characteristics between Suicidal and Non-suicidal Attempt Inpatients with Depressive Disorders : Using MMPI-2

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Abstract. The objective of this study was to explore possible psychological characteristics related to suicide behavior in patients with depressive disorders. Using the MMPI-2, BDI, and HAM-D, results were compared for two groups of namely suicidal and non-suicidal attempt inpatients with depressive disorders(Major Depressive Disorder, Dysthymic Disorder, and Depressive Disorder Not Otherwise Specified) to the exclusion of bipolar disorder and psychiatric feature (n=36). The results showed that suicidal inpatients with depressive disorders were more impulsive, aggressive, and vulnerable to substance use and intoxication, and less anxious, repressive. And the depressive symptoms rated by clinician did not significantly differ in suicidal and non-suicidal group, but suicidal patients exhibited significantly higher score in Self-devaluation and Suicidal ideation, subscale of DEP, depressive content scale of MMPI-2. Therefore, results of the study suggested that a careful exploration of MMPI-2, DEP scale in patients with depressive disorders helps clinicians to identify patients at high suicide risk. Generalization for enough size of patients with depressive disorders should be investigated by inducing additional future evaluation of Suicide.

Keywords: depressive disorder, suicide, MMPI-2

1. Introduction

Suicide is one of the main causes of death worldwide, and this has been considered major public health issue with increasing prevalence[1]. Suicide is complex phenomenon occurs with interactions of various psychosocial factors, and researchers has tried to identify different variables related with high relevance to suicide and to contribute to prevention of suicide.

The most important factor affecting suicide is known as depressive disorders. As suicidal ideation and suicidal attempt are included in depressive episode diagnostic criteria in DSM-IV, depression and suicide seems to have close relation. Depression is known as the most dangerous single factor leading to suicide, and it was reported that 15-30% of patients diagnosed as depressive disorders commit suicide[2,3]. Suicidal risk is particularly high for depressive patients, and special notice for suicide is needed.

However, interestingly objective severity of depressive disorder is not directly related to suicide behavior in depressive patients[4]. That is, in frequency or severity of major depressive episode of depressive patients who attempted suicide, it was not significantly different from those who did not attempted suicide.

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Researchers have been studying psychological characteristics moderating or mediating between depression and suicide to identify predictors of suicide in depressive patients.

It was suggested that impulsiveness and aggressive behavior were characteristics moderating psychological disorder and suicide in several studies. Mann et al.(1999)[5] found that aggression and impulsivity are important personal traits increasing risk of suicide attempts, and Dear(2000)[6] has suggested that impulsivity affects suicidal ideation mediating depression. Also suicide attempters with depressive disorder showed higher harm avoidance tendency, and Giegling(2009)[7] also suggested that harm avoidance is a significant predictor of self-aggression with impulsivity. In addition, it was reported that people with high neuroticism and introversion have higher likelihood suicide attempts[8].

To summary previous studies above, depressive patients are more vulnerable to suicide, and some psychological characteristics are considered to be more related to suicidal behavior than objective severity of depressive disorder. That is, suicide attempters are inclined to have impulsive/aggressive trait, and harm avoidance. And they are less inclined to experience positive emotion, vulnerable to stress, and less gregarious.

In this study, we explored possible psychological characteristics related to suicide behavior in suicidal attempters and non-suicidal attempters with depressive disorder using MMPI-2. MMPI-2 profiles cover various psychiatric symptoms and personality traits, and are the most actively used test in clinical field. In this sense, MMPI-2 can provide useful information about psychological traits and personality of depressive patients. Also we explore psychological traits of depressive patients with suicide attempt in clinical setting, and these findings can help clinicians evaluate suicide behavior.

2. Method

2.1. Sample

The present material consists of 36 inpatients primarily diagnosed as DSM-IV Axis I. Major Depressive Disorder, Dysthymic Disorder or Depressive Disorder Not Otherwise Specified in C University Hospital, Psychiatry on March-August 2009. Patients with bipolar disorder and psychiatric phase were excluded, but other comorbid axis I and personality disorders were included. And two groups of suicidal and non-suicidal patients with depressive disorder cooperated. Diagnostic evaluation process and psychological evaluation were all established by clinical psychologist, and the patients and their family provided written informed consent for the evaluation and study.

Suicidal attempt group showed significantly younger age than non-suicidal attempt group. Table 1 gives an overview of demographic data of these two groups.

Table 1. Demographic information of two groups

Variables	Suicide attempt (11)	Non-suicide attempt (25)	t
Age	31 (10.53)	43.92 (12.63)	2.96**
Gender			
Male	2 (18.2%)	4 (16%)	
Female	9 (81.8%)	21 (84%)	
Diagnosis			
Major Depressive Disorder	7	14	
Dysthymic Disorder	0	1	
Depressive Disorder NOS	4	10	
Other comorbid axis I disorder			
Panic Disorder		1	
Alcohol Abuse	2	3	

Anxiety Disorder NOS	3	2
Dissociative Disorder		1
Undifferentiated Somatoform Disorder		1
Obsessive-Compulsive Disorder		1

** p <.01

2.2. Measure

- **MMPI-2** [9,10]. MMPI-2 is Korean revised version of Minnesota Multiphasic Personality Inventory (MMPI) published in 1943, and widely used to understand behaviors and clinical characteristics of individuals. MMPI-2 is a self-report instrument that has 567 items and consists of Validity Scale, Clinical Scale, and Content Scale.
- **Hamilton Rating Scale for Depression** (HAM-D; [11]). HAM-D is a structured interview instrument used to be assessed by clinicians to rate depressive symptoms.
- **Beck Depression Inventory** [12,13]. BDI is a 21-question self-report questionnaire to measure depressive symptoms.

2.3. Statistical Analysis

We compared T score of all MMPI-2 scales (except for subscale) and BDI, HAM-D total score in two groups, and Mann-Whitney U Test was used for not meeting normality assumption of samples.

3. Result

Analysis results showed that total score between suicidal and non-suicidal attempts group was not significant in BDI and HAM-D.

For all MMPI-2 scales, suicidal attempt group showed significantly higher T score on 11 scales of Pa, Ma, RC9, DISC, DEP, ANG, ASP, PK, Ho, MACR, AAS than non-suicidal group were. Conversely, the test showed that non-suicidal attempt group obtained higher T score on 2 scales of FRS and R than suicidal group in a statistically significant fashion. Table 2 gives on the mean(M) and standard deviation(SD) of BDI, HAM-D in two group, M and SD of MMPI-2 scales that is significantly different in two group, and analysis results of Mann-Whitney U Test.

Table 2. The mean and standard deviation of T score of MMPI-2 Scale, BDI, and HAM-D in suicidal and non-suicidal attempt group

Scale	Suicide attempt (n=11)	Non-suicide attempt (n=25)	Z
	M(SD)	M(SD)	
Pa	64.55(9.15)	56.40(12.62)	-2.54*
Ma	57.00(11.15)	48.68(9.63)	-2.24*
RC9	56.54(13.90)	45.32(8.40)	-2.29*
DISC	55.91(16.57)	43.96(9.52)	-2.12*
FRS	50.00(10.29)	61.08(14.49)	2.26*
DEP	79.45(12.05)	66.20(16.30)	-2.27*
ANG	61.64(13.82)	52.92(9.91)	-2.07*
ASP	57.82(11.77)	48.12(12.41)	-2.35*
R	44.09(7.38)	53.36(8.13)	3.74**
PK	71.00(7.83)	63.08(11.47)	-2.22*
Ho	58.91(7.33)	51.60(11.12)	-2.08*

MACR	61.09(12.81)	49.00(9.69)	-2.55*
AAS	58.91(13.13)	47.64(13.13)	-2.51*
BDI	34.18(8.98)	27.56(10.07)	-1.56
HAM-D	14.00(4.31)	12.76(5.38)	-0.54

* p<.05, **p<.01

4. Discussion

In this study, we compared psychological characteristics of two groups of suicidal and non-suicidal attempt inpatients who diagnosed primarily as depressive disorders (Depressive Disorder, Dysthymic Disorder, and Depressive Disorder Not Otherwise Specified) without bipolar disorder or psychiatric feature. The results and implications are summarized as below.

First, there was no significant difference between two groups in clinical evaluation of depressive symptoms, HAM-D. The results correspond with the findings of previous study that objective severity of depressive disorders are not directly related to suicidal behavior[4]. However, self-reports of depressive patients showed inconsistent results. That is, the D scale, a clinical scale of BDI and MMPI-2, was not significantly different in two groups, but the DEP scale, a content scale of MMPI-2, was significantly different in two groups. When viewed in detail, a suicidal attempts group with depressive disorders showed higher scores on DEP3(self-devaluation) and DEP4(suicidal ideation) among subscales of DEP scale than non-suicidal group(each Z=-2.41, *p<.05*, Z=-.536, *p<.05*).

Considering these results, when clinicians evaluate and predict suicidal problems of depressive inpatients, review of the MMPI-2 DEP scale can be helpful than objective evaluation of depressive symptoms and the overall severity of depression(BDI and MMPI-2 D scale).

Second, suicidal attempt group is inclined to have greater anger, takes more risks, and be more impulsive, compared to a group without suicide attempts. This results are consistent with the research findings that aggression and impulsivity take the role of precipitating suicidal behaviors[5,6]. In other words, suicidal attempt group could be also considered as less repressive, for the fact that suicidal attempt group showed relatively lower scores on DISC, R scale connected with self-defense(e.g. repression).

Furthermore, suicidal attempt group has shown significantly lower scores on the FRS scale of MMPI-2 compared to non-suicidal attempt group. This finding supports the previous study[14] that anxiety reduces the possibility of suicide planning.

Third, suicidal attempt group scores significantly higher than non-suicidal attempt group in scales related to addiction, including alcohols, of MMPI-2. It is related to impulsiveness and underestimation of danger which are the characteristics of suicide attempters and it may suggest the possibilities of lack of attention, judgmental skills, and interpersonal problems. Since both groups in current study include patients diagnosed with alcohol abuse, further study should be conducted also toward groups of depressive disorders, and groups of substance abuse and intoxication.

The present study raises a question of possibility in generalization of the results and interpretation due to the limitation in the number of cases. The present study suggests, when assessing suicidal problems in inpatient diagnosed with depression, it is more important to examine DEP scale of MMPI-2 that reflects one's self-abasement and suicide ideation than to assess objective severity and self-report (BDI, MMPI-2 scale D) of depression. Future studies should include assessment tools related to suicide for more detailed information. Furthermore, MMPI-2 should be analyzed in more depth according to the clinical, validity, content, supplementary, restructured clinical scales, and critical items related to suicide, and also analysis of MMPI-2 profiles manifested in each group should be conducted.

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Individual mechanisms of self-regulation: mobilization and prediction under conditions of high ambiguity

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Abstract. In this paper we present typology of the strategies of self-regulation using the biofeedback computer game-based technology. The model of ambiguity situation is described. The biofeedback technology simulates an ambiguity situation and allows searching the main principles and strategies of self-regulation, defining its impact for overcoming the ambiguity situation. To test the described typology, we conducted a set of experiments in the different groups of subjects. The results of the study define the individual characteristics of the subjects with different strategies of self-regulation that are differences in the level of tolerance to ambiguity, and level of intellectual plasticity. Analysis of changes of the strategies in the course of biofeedback training showed that using computer game-based biofeedback allowed to increase their efficacy in overcoming stress-related reactions and developing effective behavior under stress.

Keywords: psychical self-regulation, biofeedback technology, self-regulation training, individual characteristics, ambiguity, strategies of self-regulation.

1. Introduction

Modern requirements to the human well-being, a high rhythm of everyday life, the necessity to make decision under situations of ambiguity and deficit of time, and high standards of competency result in the wide use of the methods of self-regulation in various areas of human activities, and stimulate scientific interest to these problems.

A person's perception and attitude to the ambiguity affects general effectiveness of the individual adaptation, and effectiveness of behavioural strategies in the context of ambiguity in particular (Owen & Sweeney, 2002) [1].

The term "ambiguity" is relatively new for scientific use, and analysing its contents is complicated due to multiple ways of the translation. Ambiguity is defined as "unfinished perception or cognition". It is manifested when someone faces non-distinct or controversial information, or a lack of information in general. In literature ambiguous information is mostly defined as "new, complicated, or containing multiple controversial interpretations". [2]. In the study of Mazhirina, Jafarova, & Pervushina (2007) ambiguity is defined as "complete absence of information regarding the ways of dealing with unknown situations" [3].

A person's ability to self-regulate is of the utmost importance in the context of ambiguity and stressful life conditions. The mechanism of self-regulation is aimed to form the models of adequate behaviour in humans under psycho-physiological tension, and increase the efficiency of the performance in various situations.

As the main goal of application of the self-regulation techniques is the ability to control the processes that normally people are not aware of, the effectiveness of learning these techniques depends mainly on the complex of subjective feelings and sensations related to normalization of psycho-physiological state. To facilitate learning and increase the effectiveness of training we used the biofeedback computer game-based training.

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The biofeedback is a modern computer therapeutic and health-improving technology based on the principles of the adaptive feedback. Game-based biofeedback is one of the versions of the biofeedback technology. This method based on modern multimedia was designed in 1997 in the Institute for Molecular Biology and Biophysics. This is a new type of biofeedback system for training the skills of self-regulation. A player competes with an opponent. A small biofeedback device, "Pulse Detector", registers, amplifies and feedbacks player's body parameter, heart rhythm (or skin temperature). A sports competition is modeled on the computer screen which allows revealing player's pattern of behavior in the situation of emotional tension. A player's pulse controls the speed of virtual sportsman during a game trial. The lower pulse, the faster is sportsman's speed. To win in the competition one has to control his/her pulse level below certain threshold despite the challenge of simulated stress.

In our study we used a set of games, including:

- «VIRA!», which represents a divers' competition to get a treasure from a sea bottom; and
- «RALLY», which represents an exciting race of two car drivers, where the player has to react immediately to the rocks appeared unexpectedly on the road.

The testing procedure using VIRA and RALLY appeared to be highly ambiguous, as biofeedback games were a new and unknown method for all participants, who were aware of the aim of playing the game (winning a race), but did not know how to achieve it.

2. Materials and methods

148 subjects (males and females) took part in the experiment; their age was between 23 and 35 years old. The study included two stages (diagnostics and training).

All subjects were divided into two groups.

Group 1 included the participants of the two-weeks workshop which involved professional and psychological trainings. The biofeedback training was conducted in a computer class in a group form.

Subjects from Group 1 went through 6 trials of game VIRA that lasted about 20 minutes. They had to control their pulse, not letting it increase. After that the subjects went through 5 trials of game RALLY that lasted about 20 minutes. These game trials were considered as testing procedure. During trials, RR intervals (cardiointervals) and RT intervals (time of reaction) were registered and recorded. To win the race, the players had to increase their speed by controlling/slowing down their heart rhythm. In addition, they were instructed to respond as quickly as possible to the rocks that randomly appeared along the way. The subject won the game trial only if his time of reaction progressively reduced from the first trial to the last one, and the duration of cardiointervals progressively increased at the same time. The ability to maintain a state of "peak performance" (maximal achievement in a critical situation and readiness to act urgently) during game session was evaluated. We also assessed the ability to fulfill several tasks at once (in game RALLY).

Group 2 included volunteers who were invited to undergo biofeedback self-regulation training. The sessions were conducted individually. On the first session the subjects underwent 6 trials of game VIRA and 5 trials of game RALLY, similarly to the subjects from Group 1. After that participant from Group 2 completed 10 sessions of biofeedback self-regulation training, each session lasted 30 min. The sessions were conducted 2-4 times a week. After training completion the subjects were tested as during session 1. After one year some of the subjects went through control testing similar to Group 1.

All participants underwent psychological testing before starting game sessions. The battery of tests included: Questionnaire of Formal-Dynamical Properties of Individual of Rusalov (QFDPI); Multiple Stimulus Types Ambiguity Tolerance (MSTAT) test of McLain; Californian personality inventory (CPI), and others.

All data of the subjects recorded during game trials were included in his/her personal file, which was a part of the total database. All individual artifact-free records were analyzed using conventional statistical methods.

For both game models analyzed were the following data: the duration of cardiointerval (msec) which is interval between two consequent heartbeats (VIRA, RALLY); time of reaction to a stimulus (msec) which is time between stimuli's appearing on the screen and subject's response (RALLY).

3. Results and discussion

As a result of studying the dynamics of physiological parameters (cardiointervals and time of reaction) we created a classification of the strategies of self-regulation in the situation of ambiguity (see Fig 1). The strategies 1-5 were similar for both games, whereas the sixth strategy differed for VIRA and RALLY.

Fig. 1: Classification of the strategies of self-regulation
Left column: Examples of the strategies of self-regulation in "Vira!"-"Rally" game sessions.
Axis X: Trials. Axis Y: ♦ - Mean value of cardiointervals duration; Δ - Mean time of reaction during trial.

Regarding the effectiveness of the achieved result, all strategies of self-regulation formed by the end of training were divided into Effective strategies (№1, №4), Non-effective strategies (№2, №6), and Intermediate strategies (№3, №5).

According to correlation analysis (Spearmen rang correlation coefficient was used), these pairs of strategies were found similar in their interrelations with psychological characteristics.

Effective and non-effective strategies were opposite in two parameters: ambiguity tolerance which was estimated using the Multiple Stimulus Types Ambiguity Tolerance (MSTAT) test of McLain (Fig. 2), and intellectual plasticity which was estimated using QFDPI (Fig.2), in this context it represented the ability to learn, the flexibility of thinking and behavior.
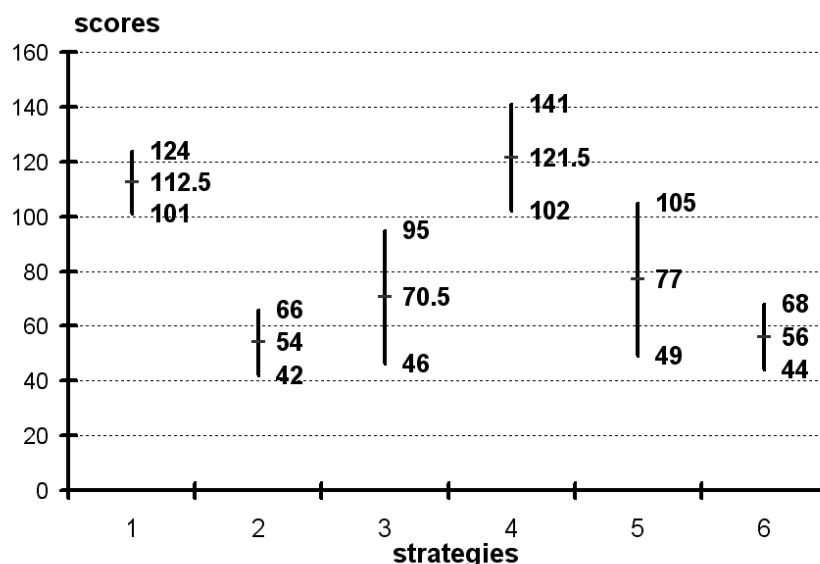
Fig. 2: Group differences of ambiguity tolerance (MSTAT)

The effectiveness of the results was found to correlate with the following psychological characteristics: ambiguity tolerance (MSTAT), intellectual plasticity (QFDPI), index of intellectual activity (QFDPI), and flexibility (CPI). The higher score, the more effective the behavioral strategy was.

It was shown that the participants with effective strategies (№1, №4) had high ambiguity tolerance

(mean values 112.5 and 121.5, correspondingly). By contrast, the participants with non-effective strategies (№2, №6) had low ambiguity tolerance (mean values 54 and 56, correspondingly). No significant correlations were found between ambiguity tolerance and strategies №3 and №5.
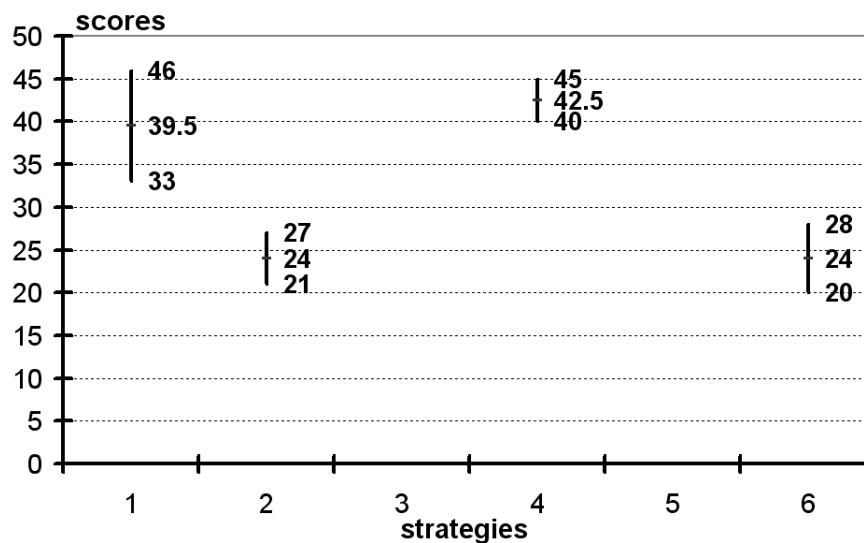

Fig. 3: Group differences according to Intellectual Plasticity Scale (QFDPI)

It was shown that there were differences between effective strategies (№1, №4) and non-effective strategies (№2, №6). Strategies №1, №4 were characterized by high level of intellectual plasticity (group mean 39.5 and 42.5, variation range from 35 to 48). By contrast, strategies №2, №6 were characterized by low level of intellectual plasticity (group mean 24, variation range from 12 to 25).

Contrasted to the characteristics mentioned above, non-effective strategies of behavior correlated with the following characteristics: lack of disposition towards following social norms and rules, unscrupulousness (scale "Responsibility" of CPI), preference of stereotyped solutions (scale "Intellectual plasticity» of QFDPI), and inability to take effective actions in ambiguous situations (MSTAT).

4. Summary

Using this classification allowed for the development of new practical tools for psychological counseling in various areas (individual counseling, organizational psychology). It also allowed for the individual assessment of each subject which can provide them with the available strategies of self-regulation to be used in ambiguous situations.

Predicting tolerance of ambiguous situations is believed to be of high practical significance. It allows early identification of individuals who may reduce effectiveness of performance in ambiguous situations, and allows for taking preventative measures to help them develop effective strategies of behavior. Early forecast of possible deviations and prompt correction allow people to stay healthy and improve performance in ambiguity.

Our results also indicated that it was possible to train one's ability to perform effectively in ambiguous situations, bringing about an increase of individual adaptability. This also may prevent the development of extremely intense and prolonged stress reactions and the impairment of neuro-psychic activity in healthy people under ambiguity in everyday life.

It was also shown that game-based biofeedback can be regarded as an objective model of ambiguous situation which allows combining the psychological testing with the recording of psycho-physiological parameters during the respondent's implementation period of choosing his/her own individual strategy of self-regulation. Thus, there is big potential to increase the sensitivity of novel diagnostic techniques.

The results of 10 sessions of game-based biofeedback training demonstrated that non-effective strategies of self-regulation can be corrected. By the end of training 73% of the participants demonstrated effective self-regulation skills, comparing to 19.7% at the beginning. It was also shown that in 97% of the participants the trained behavioural strategies persisted after a period of one year.

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The Use of the Neurofeedback Technology in the Correction of Attention Disorders in AD/HD Risk Groups

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Abstract. The problem of hyperactive children (AD/HD disorder) has been in acute focus for last 2 decades. Low learning activity of students is related to rapid fatigability, attention deficit, and hyperactivity. To provide a solution it is necessary to create a system of psycho-physiological methods that can help developing individual skills of self-control, training attention parameters, achieving optimal performance, and distributing the organism's resources optimally. We suggest a new method of correction which can be implemented in school conditions. In 2003-2007 an experimental class for children with attention deficit disorder and hyperactivity (AD/HD risk groups) was organized in a public school in Novosibirsk, Russia. Regular neurofeedback-based training sessions were conducted during the school year. The study was carried out to assess the effectiveness of using neurofeedback at school. The results showed that the attention parameters of the subjects improved, vegetative balance was normalized, and the students demonstrated high academic achievements. As the result of neurofeedback-based training they have met the requirements of the academic process as healthy children, successfully graduated from primary school, and were able to continue studying in normal classes.

Keywords: AD/HD syndrome, neurofeedback, primary school students, attention parameters.

1. Introduction

During the past few decades teachers and parents have focused on the problems of hyperactive (AD/HD) children. These children are diagnosed as having attention deficit/hyperactivity disorder syndrome and require special medical observation and treatment using medications. The problems increase dramatically after children start school learning. Academic requirements appear too high for them and their behavior does not fit the age standards. Thereafter most of these students are unable to achieve the results corresponding to their capacities despite that many research has indicated that children of AD/HD risk group appear to be highly intelligent.

Our scientific and practical experience in the development of preventing and correcting programs allows regarding a school as a place where children of AD/HD risk group can go through programs of optimal correction of attention and behavioral disorders based on biofeedback technology.

Biofeedback is a modern computer therapeutic and health-improving technology based on the principles of adaptive feedback. Using special machines allows for monitoring and registering of the physiological parameters of the human organism and converting them into feedback signals which can be received by an individual from the computer screen as meaningful visual or audial information. As this information presents physiological functions in real time, the individuals are able not only to monitor registered parameters, but also learn to control them and change in the desired direction.

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We regard a non-medication biofeedback-based approach to be an alternative to the existing methods of AD/HD prevention and correction. According to our data the effectiveness of biofeedback is 80-84% whereas the effectiveness of other medical and psychological/ pedagogical technologies does not exceed 60-62%. Neurofeedback programs for AD/HD correction are based on the course of beta-stimulating training. Children are allowed to observe the graph of the dynamics of their own beta rhythm in real time on the PC screen.

Considering children motivation, reduction of fatigue and the need to optimize training sessions we have designed multimedia game versions of beta stimulating neurofeedback training combined with electromyography and heart rhythm-based biofeedback. A game, as the most spectacular method of emotional self-regulation, allows achieving most important function of the biofeedback technology, which is to turn a child from a passive object of treatment into an active and interested participant of the process of AD/HD correction.

Game-based neurofeedback training brings about a dramatic enhancement of motivation. During normal (non-game) sessions a child needs various forms of positive rewards, whereas playing a biofeedback game is already a reward. This stimulates them to better fulfill their tasks being rewarded by higher scores (as in the Flowers game), by parking a car in a garage (as in the Automaster game), or to be in the Top Ten. The increase of self-confidence and self-awareness as a result of winning as well as the ability to be the best, even in a virtual environment, appear to be an effective tool of psycho-therapy bringing about positive personality dynamics. According to the parents, the children become more sociable and active, anxiety level drops, and their moods improve. The biofeedback game is therefore regarded not only as a neuro-physiological or therapeutic method of relaxation which modifies cortical neurodynamics in the positive direction, trains relaxation skills and normalizes vegetative balance, but also as therapeutic behavioral model which helps patients practice new behavioral patterns and form positive self-images.

2. Materials and methods

2.1. Experiment 1

In 2003-2007 an experimental study was conducted to compare the effectiveness of using neurofeedback method at school. A special class for children with attention deficit disorder and hyperactivity (AD/HD risk groups) was organized in a public school in Novosibirsk [1]. Diagnosis of AD/HD/ syndrome was based on psycho-neurologist conclusion, psychometric testing, and neuro-physiological analysis of the EEG. The basic correction course was conducted during the first academic year; minimal number of training sessions was 30. During the following 3 years the students received supporting sessions of beta-stimulating training once a week.

The study included psychometric testing (an evaluation of attention' effectiveness, productiveness, stability, switch, distribution, and span), EEG analysis (power of beta-rhythm, ratio of theta and beta rhythms). Examinations were repeated at the beginning and at the end of each academic year.

2.2. Experiment 2

At the specialized medical centre the study was conducted involving 28 patients with AD/HD syndrome combined with oppositional behavior with organic brain disorders caused by perinatal pathology (see Table 1.2.). The age of the children varied from 7 to 13 years old. On average each participant underwent 53 correction sessions, the maximum number of sessions was 72.

3. Results

3.1. Experiment 1

The dynamics of the attention parameters during the neurofeedback course is shown in Table 1.1 and Figures 1 and 2, revealing significant changes before and after each training course.

Table 1.1. Dynamics of attention parameters in the experimental group during the first 4 years of school education

Attention parameters	09.2003	05.2004	09.2004	05.2005	09.2005	05.2006	09.2006	05.2007
Attention concentration (scores)	6.3	7.2*	7.18	7.81*	8.15	9.21*	9.28	9.42
Attention stability (scores)	1.85	4.72***	4.65	6.33***	5.21	6.32**		6.89
EEG index of attention (Theta/Beta ratio)	6.05	4.62	4.6	3.8**	3.72	2.33*	2.5	2.28
Speed of reading (words per minute)	-	-	37	54	62	77	86	98

* - P < 0.05; ** - P < 0.01; *** - P < 0.001 (Wilcoxon Criteria)

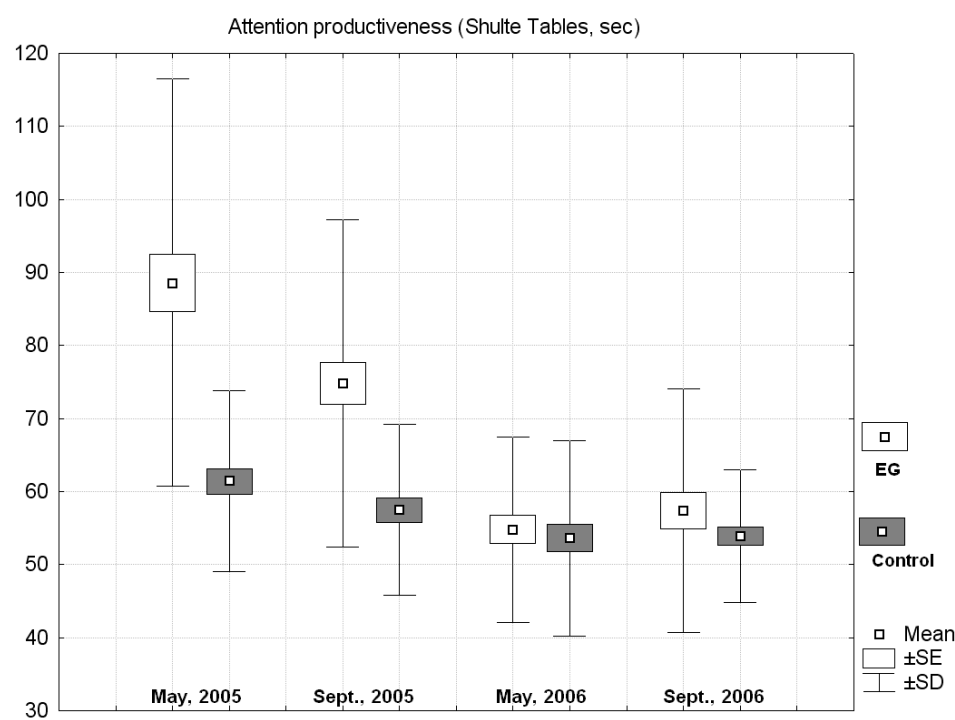Fig. 1: Box-Whiskers plot of Attention Productiveness changes (Shulte Tables index) during experimental study. EG – Experimental group, Control – control group of students of the same grade of the same school.
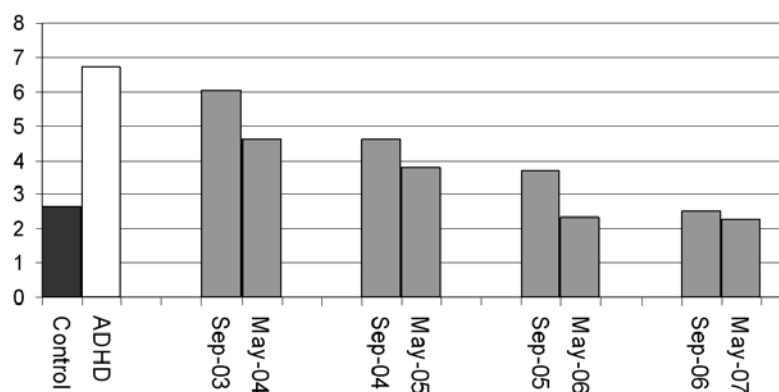

Fig.2. Dynamics of the EEG index of attention (Theta/Beta power ratio) in the experimental group compared with the values of the control group and the AD/HD group (children of 6-11 years old, [1]).

As it is shown in the table and figures, all attention parameters significantly improved, the EEG index of attention significantly reduced and was found to be close to the age norm. The most dramatic changes were noticed during the first year of correction training. Additional sessions were assigned if required, not more than 10 sessions in total. The effectiveness of correction training in the experimental group was 94%.

As a promising result of the whole set of pedagogical, psychological and psycho-physiological methods the students demonstrated high academic achievements, all of them successfully graduated from primary school, having met the requirements of the academic process as healthy children and being able to continue their studying in normal classes.

3.2. Experiment 2

Remission of AD/HD syndrome was registered in 63 to 83% of cases depending on the severity of the case. In patients with oppositional behavior remission was registered in 71% of the cases. We should mention that the number of children who completed correction course at the medical centre was less then 50% of those who started this training course.

Table 1.2. Main characteristics of beta-stimulating training at school and at the medical centre

School	Medical centre
Early diagnostics of AD/HD and risk group was provided	Most patients were referred to centre already having serious academic and behavioral problems
Correction training was conducted during first year of studying at school	Most of the referred patients were 2-3 year students, 30% were adolescents
High effectiveness was based on the sufficient number of correction sessions	No more than 50% of patients completed correction training
AD/HD risk groups were under control	Children of AD/HD risk group were not referred to centre
Children who have completed correction training were under observation during the entire study period	Repeated examination was conducted for less than 20% of children
School teachers were involved into correction process	Most of the parents refused to contact with school teachers
Consulting medical specialists was required	Medical control during correction training was possible

Analysis of the experimental data demonstrated high effectiveness of the biofeedback classes at school as the method of treatment of children of AD/HD risk groups. The result was high social and psychological adaptability of the children from the experimental group who were able to attend regular school courses. We believe that only at school children of AD/HD risk groups can be treated effectively, as normally they are out of the focus of traditional social and medical structures.

The main result of our study is providing the possibility to detect children of AD/HD risk groups and organize their treatment based on the biofeedback technology in the school environment. It may dramatically increase the effectiveness of monitoring and permanent (yearly) detection of AD/HD risk groups among first graders with their subsequent permanent observation.

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Stress tolerance assessment and stress management training using biofeedback

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Abstract. The focus of this paper is the assessment of the ability of subjects to demonstrate the skills of self-regulation under stress. The five-year experience of using the biofeedback technology in stress management allowed us to develop the program of preventing and correcting the negative stress effects using game-based biofeedback training aimed to mobilize the organism's resources and form an optimal working state when the individual is calm and at the same time ready to act.

Keywords: stress tolerance, game biofeedback, skills of self-regulation, optimal functioning

1. Introduction

The term "stress" appears to be a "champion" among scientific terms, being widely used in common language as well as in the educational environment [1]. The skills of self-regulation of negative emotional states which arise under stressful conditions at school (test anxiety, informational overload, constantly changing programs, etc.) may be regarded as a powerful tool for neutralizing the negative effects of stress. Practicing various techniques to control psycho-physiological functions was always considered as a promising way to improve attention, control test anxiety, maintain high performance during long periods of time, and achieve relaxation.

As the main aim of practicing self-regulation is to voluntary regulate normally unaware processes, the effectiveness of learning the skills depends mostly on how well the person uses his/her awareness on physiological functions of his/her body. To facilitate forming this complex of feelings and to increase effectiveness of the learning process, the biofeedback technology has been effectively used during last decades. Along with the traditional biofeedback techniques we should draw special attention to the computer game-based biofeedback training controlled by heart rhythm. This method, based on modern multimedia, was designed in 1997 at the Institute for Molecular Biology and Biophysics, Novosibirsk, Russia [2]. The biofeedback game is based on a competition between two characters. Sports competition is modeled to create a virtual situation of emotional tension. The player controls the speed of one of the sportsmen. His task is to overtake his competitor whose speed is the speed of the player from the previous game trial. The slower the pulse, the faster the player's speed is. The player can win in the trial only if he/she is able to control heart rhythm in the situation of virtual stress. The games are controlled using a special sensor "Pulse Detector" attached to the finger which monitors the signal using the Photoplethysmography method.

The assessment of the ability of the participants to demonstrate the skills of self-regulation under stress and the development of the program of prevention and correction of the negative stress effects using game-based biofeedback technology was the focus of our work during last five years. We studied the relationship between person's characteristics and self-regulation skills in emotional conditions.

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2. Materials and methods

2.1. Experiment 1

The experimental group consisted of 40 participants (undergraduate students, 17-20 years old). The study involved a training course consisting of 10 sessions of biofeedback-based game (Rally). The sessions were conducted twice a week, each session lasted about 20-25 minutes and included 6-7 trials). During training sessions RR intervals (cardiointervals) and RT (time of reaction) intervals were registered and recorded. For each session its effectiveness was calculated. Each participant was instructed to slow down his own pulse and at the same time reduce his time of reaction. A session was considered effective if RR-interval has been increased at least by 1%. At the same time average RT-interval should not have been increased by more than 10% of its initial value. Before and after training each participant underwent psychological testing including computer and paper tests. The following set of tests was used:

Minnesota Multiphase Personality Inventory (MMPI); State-Trait-Anxiety Inventory (STAI); Eysenck Personality Questionnaire (EPQ); Jenkins Activity Survey (JAS); Buss-Durkey Inventory; Inventory of Emotional Tension; Thomas Kilman Conflict Mode Inventory (TKI); Rigidity Scale; Risk Orientation Questionnaire (ROQ); K.Leonhard's Accentuated Character Traits Questionnaire; V.Rusalov's Questionnaire of Formal-Dynamical Properties of an Individual (QFDPI);) R. Lazarus and S. Folkman's The Ways of Coping Questionnaire (WOCQ); Endler and Parke's Coping Inventory for Stressful Situations (CISS);. Taylor's Anxiety Scale.

2.2. Experiment 2

During the 5-year period 126 senior students of a public school in Novosibirsk attended an optional stress prevention course. Each student underwent from 8 to 10 training sessions which included from 7 to 9 game trials. Each session lasted 25-30 minutes. Four biofeedback-based games (Rally, Vira, Rowing Canal, and Magic Blocks) were used. The classes were conducted by a biology teacher or by a psychologist in the computer class which comprised 12 work stations connected into a local network.

To estimate attention, concentration, and productivity, the computer cognitive selection test was used. It involved two stages. In the first stage the participant was instructed to respond to a target stimulus and to ignore the other stimulus. During the second stage the task was complicated by the choice condition (GO/NOGO test).

3. Results

3.1. Experiment 1

The study has shown that the best skills of self-regulation under emotional stress were demonstrated by the subjects with the following individual psychological characteristics: sociability, resoluteness, active life style, rare aggressive behavior, moderate emotional tension, lability of emotional control, preference of cooperative behavior in conflict situations, stability of mood, independence from external events, and inventiveness.

Lower effectiveness of self-regulation under emotional stress correlated with the following individual psychological characteristics: high level of anxiety, sensitiveness to failures, regarding most situations as threatening and responding with anxiety, high level of emotional tension, lability of mood, dependence from external events, and rigidity of attitudes.

Therefore the differences in the effectiveness of self-regulation between the participants could be explained by factors described above.

We can assume that the ability to control own emotional state under stress depends on certain psychological characteristics. These characteristics determine the effectiveness of one's ability to control heart rhythm and reaction time, and at the same time form an effective psychological type of a trainee.

Correlation analysis has shown that the level of emotional tension and the level of anxiety could be regarded as determining factors of the effectiveness of self-regulation.

The ability to use the skills of self-regulation under stress may require additional psychological characteristics. The results have shown that effective control of one's physiological state under stress

(besides low anxiety and moderate level of emotional tension) is connected to the following psychological characteristics: high activity; resoluteness, ease of actions, superficiality of feelings, low aggressiveness, and sociability.

Assessment of the dynamics of the emotional state of the participants showed that the use of game-based biofeedback training resulted in a lower level of anxiety, improved mood, lower psycho-physiological tension, and higher psychic activity, therefore positively affecting the overall psycho-physiological conditions (see Table 1.1). Before training the overall emotional state of the students was assessed as satisfactory. Although some of the students with increased anxiety showed non-productive psycho-physiological tension, suppressed aggressiveness, and impaired performance, by the end of the training course these characteristics had improved. However, the dynamics of the parameters in this group was less effective, probably because the task was too complicated and the duration of the course was not sufficient.

Table 1.1. Dynamics of psychological parameters during biofeedback training course

Parameters	Average score before training	Average score after training	P (Wilcoxon criteria)
NPT Scale[1]	57.3	42.4	< 0.001
Low Mood Scale[2]	49.6	38.9	< 0.01
Wolneffer coefficient[3]	19.5	13.1	< 0.05
Anxiety-state (STAI)	45.1	32.4	< 0.001
Anxiety-trait (STAI)	38.3	38.3	0.7

[1] Scale of Nemchin's Questionnaire for Measurement of Neuro-Psychic Tension [3]
[2] Zung Subdepression and Low Mood Scale [4]
[3] 8-colored Luscher Test [5]

A special program of stress prevention at school was designed by the authors and incorporated into the educational process as the following versions:
1. Optional training programs on ecology, biology, and psychology for high school students
2. Health lessons for primary school students
3. Individual prevention and correction training conducted by a school psychologist.

3.2. Experiment 2

During the biofeedback training the students were able to learn more about their individuality. The analysis of their actions during the sessions enabled them to choose the most proper individual strategy of the tension reduction, and to extend their behavioral repertoire. The students also practiced to scan their inner state, develop the feeling of relaxation and physical comfort which is important to prevent stress-related (psycho-somatic) disorders. According to the students' self-reports, while playing biofeedback games they became aware of the importance of the ability to control their own behavior, emotions, and automatic reactions, and not to attend to the success of the competitor. As a result they have formed a new, more effective pattern of behavior under emotional stress. Transferring these skills into everyday life allowed developing constructive strategies of stress management essential for preventing emotional overload and improving adaptability (see table 1.2.).

Table 1.2. The effects of the biofeedback-based training course on the psychological characteristics of the 13-16 years old school students

	Anxiety-state (score)	Anxiety-trait (score)	Attention concentration (%)	Attention productivity (%)
Before	43.4	43.6	88.0	74.3
After	36.2***	40.8	96.0*	83.6***

* $P < 0.05$; *** $P < 0.001$ (Wilcoxon criteria)

As an important result of our study the protocol for the stress test was developed. It can be used in clinical psychology to detect self-regulatory abilities and the methods of their improvement for personality growth, and in organizational psychology to evaluate and correct professionally important characteristics, such as stress tolerance, self-organization, high level of performance, and so on. Diagnostics can be performed both individually and in a group in a computer class with 10-15 work stations.

Protocol of stress test includes two biofeedback-based games, VIRA and RALLY. Diving competition (VIRA) represents a psycho-physiological model of stress as a game with the player's speed reciprocal to the player's heart rate. In RALLY the task is more complicated and requires simultaneous control of heart rhythm and high concentration defined as time of reaction to stimuli. In this game the dynamics of the attention parameters under monotonous conditions is analyzed, and the ability to simultaneously control several psycho-physiological processes opposing one another is evaluated. Special features of RALLY include using it to evaluate optimal organization of the individual's resources under prolonged stress.

It is known that in order to adequately evaluate the ability of optimal functioning in a complicated situation numerous psychological and psycho-physiological tests have to be applied. Using computer multi-parameter monitoring and biofeedback training makes it possible to model a wide range of various conditions and situations (including stress, ambiguity, monotony, competition, etc) which allows for obtaining objective information on the individual physiological reactions to stress exposure and speed of recovery, considering heart rate, muscle activity, and brain rhythms. The objective information obtained using biofeedback technology can be a base for creating individual protocol of optimal functioning training.

We designed a special training course which involved 6-hours classes in a computer class comprising 14 work stations. The training was included in the skill improvement course for locomotive drivers. As an example of effective learning of the skills of self-control the results of one subject are given (see Fig.1 and 2).

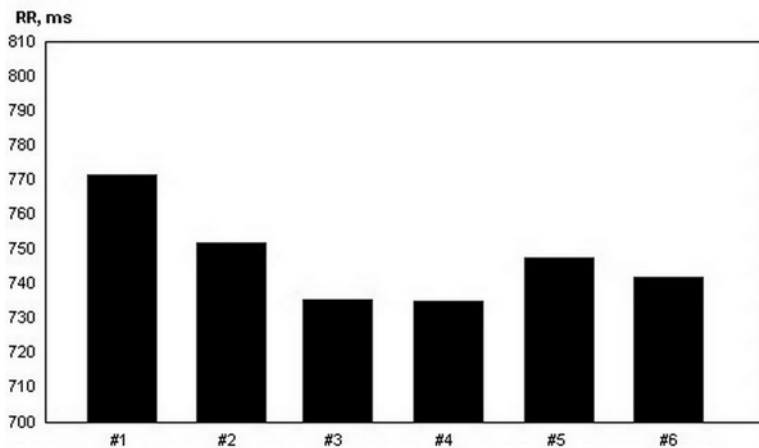*Case study:* Subject B. High-medium stress resistance.

Fig. 1: RR-interval values averaged over trials (ms) in "Vira" test. Session effectiveness (RR interval) is -3.8%. Session is not effective.
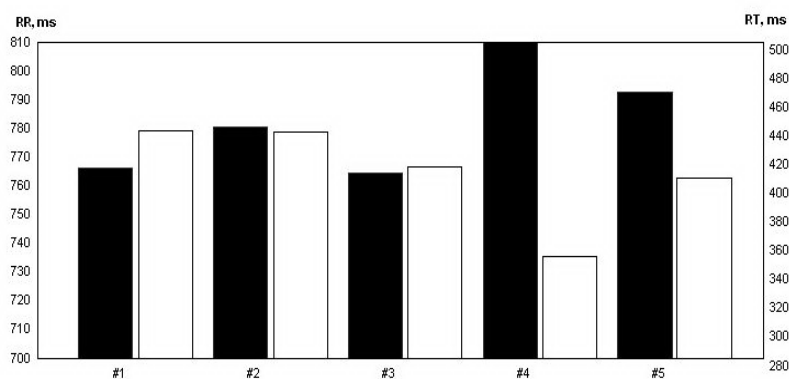
Fig. 2: RR-intervals (black) and RT (time of reaction, white) averaged over trials (ms) in "RALLY" test. Session effectiveness (RR interval) is 2.8%. RT effectiveness is +2.2%. Session is effective.

At the first stage of testing it was noticed that it took a lot of time before the subject was able to perform the tasks. Playing VIRA the student followed ineffective strategy of emotional control trying to find an effective one.

In the next task the participant could mobilize his self-regulatory abilities, demonstrating high performance and proficient ability to concentrate and promptly switch attention between the objects. He also managed to concentrate on several objects simultaneously. In this situation he picked up appropriate behavior strategy considering his experience from the first stage of the testing.

The results of subject's testing demonstrated that he had moderate skills of self-regulation, and to achieve optimal functioning level these skills should be corrected and practiced.

4. Discussion

The procedure of the stress test described above was successfully integrated into the "Stress management training" program designed by the authors of the paper. The key tool there was using the biofeedback technology.

Stress management is a modern approach to develop the methods of controlling stress to provide learning the skills of self-control and self-regulation, neutralize the negative effects of psycho-physiological tension, increase stress tolerance and self-confidence while acting in non-standard situations [6].

An important aspect of practical assessment of the ability to prevent stress is optimizing the way of responding to stress. It means that besides normalizing emotional conditions it is necessary to mobilize the organism's resources and form an optimal working state when the individual is calm and at the same time ready to act.

The structure of biofeedback training as described above appears to be a universal method, as even during group training each participant is working with his/her own emotional conditions, developing the individual mechanisms of self-regulation independently or under supervision. Stress management sessions, allow for each participant to further develop the acquired skills and knowledge independently. After the completion of training course they will be able to apply the acquired skills in everyday activity at any moment when it is needed (during exams, working in hard conditions, making decisions, and under emotional stress of any type).

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Comparison of the Prognoses of Patients with Broca, Wernicke and Mixed Aphasia via Gulhane Aphasia Test (GAT)

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Abstract. The purpose of the study is to research the prognosis of patients with aphasia due to ischemic cerebrovascular disease (SVO). In this study, a total of 40 patients with aphasia (8 with Wernicke, 18 with Mixed, 14 with Broca aphasia) that were hospitalized due to SVO have been tested with Gulhane Aphasia Test (GAT) after 1,5 and 6 months and the prognoses have been examined.
When the factors affecting the aphasia prognosis are compared, it is determined that the aphasia prognosis of the patients with high education under the age of 50 is better.
When the effect of time on the improvement in aphasia is assessed, while there was significant recovery within 1,5 months in patients with Wernicke aphasia, it was seen that the recovery process continues up to 6 months in patients with Broca and Mixed aphasia.
The most recovered language component is determined to be naming in Wernicke and Broca groups and repeating in patients with Mixed aphasia. It is found that the repeating component improves faster than the speaking component in patients with Broca aphasia.
In the assessments of the patients with Broca, Wernicke and Mixed aphasia after 6 months it was not determined that the type of aphasia has no affect on prognosis.

Key words: Aphasia, Language functions, Gulhane Aphasia Test (GAT), Cerebrovascular Disease

1. Introduction

Diagnosis of aphasic disorders and their anatomopathological correlations with realistic observations have been possible in the 19th century [1]. According to the theory named phrenology suggested by Franz Joseph Gall, language and learning localize to the frontal lobes, to the eye and the contiguities behind [2]. It was first suggested by Marc Dax that language is more closely related to one of the two cerebral hemispheres (2). It was first revealed as a result of pathological examinations by Broca that speaking, which is one of the most important language functions, is impaired due to a lesion of the left hemisphere [2,3]. In 1874 Wernicke diagnosed patients with fluent but incomprehensive speech, different from Broca's cases and localized the lesion to the upper posterior part of the superior temporal gyrus in the left hemisphere [1].

According to the data obtained from the lesion model studies started for the first time in a modern manner by Broca (1861) and Wernicke (1874) there are three language specific cortical areas shown in the dominant hemisphere of human; Broca field (44th field), Wernicke field (22nd field) and the Angular gyrus (39th field). These fields are located in the frontal lobe, temporal lobe and parietal lobe, respectively [1]. The assessment of the meaning of spoken words is associated with the *Wernicke center* [2].

For understanding what we read, there must be connection between the primary visual cortex and the association fields, between the visual association fields and the angular gyrus and between the corpus callosum splenium and both visual association fields [1,2].

Connections related to writing (graphy) are provided by the connections between the information storage centers and the cortical center of the hand, dominant parietal lobe and frontal lobes where motor centers of both hemispheres are located [1,4].

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GULHANE APHASIA TEST (GAT)

As the translation of standard tests into Turkish was not possible because of the basic differences such as Turkish being an agglutinating and gender neutral language, Turkish aphasia test standardization studies have been conducted. Most common test in Turkey is the Gulhane Aphasia Test [1, 5]. Throughout the test there are a series of subtest where the language functions also examined by the other tests are individually tested. In this test, speech, verbal and visual comprehension, repeating, naming, reading, writing and numerical skills are individually assessed. [2].

The purpose of the study is to research the prognosis of patients with aphasia due to ischemic cerebrovascular disease. It is planned to assess the effect of the age, gender, education level and ischemic SVO etiology of the patients on the prognosis. Speech, understanding simple instructions, right-wrong, following complex instructions, comparing, repeating, naming pictures and colors, writing modalities in GAT subscores that were applied to the patients are individually assessed. The effect of the aphasia type on the recovery is determined according to the aphasia subscores. The association of the recovery in the aphasia subscores with the type of aphasia is studied by comparisons based on time.

2. Material and Methods

22 female and 18 male, a total of 40 patients hospitalized in our service due to ischemic cerebrovascular disease and suffering from aphasia are included in the study. The ages of the patients were between 32 and 81 (mean±SD:63,13±24,01). All patients were diagnosed with ischemic infarct based on anamnesis, neurological inspection and BBT findings. It is seen that all our patients were right hand dominant.

Gulhane Aphasia Test (GAT) was applied to all patients and the types of aphiasia were separated as Broca, Wernice and Mixed aphasia. It was found that 8 of the patients concord with Wernicke, 14 with Broca, 18 with Mixed aphasia.

Age, gender, hand dominance, education level, aphasia type, etiology, lesion localization of all patients have been recorded. Patients with lesion other than the vascular lesion causing the clinic situation at that time, with aphasia due to subcortical, thalamic localization infarct, intracerebral hemorrhage, with sensory loss preventing Aphasia test and with systemic diseases impairing the general condition were not included in the study.

The aphasia prognosis of the patients has been assessed with GAT applied on the first day of stroke, after 1.5 and 6 months. During the course of the study 2.4 g/day piracetam has been given to all patients.

Statistical Analysis

Statistical analysis of the data has been conducted in SPSS for Windows Release 11.5 (Chicago Inc.) software. The tests that were utilized in the analyses were Chi-Square test for categorical data, One-way ANOVA and Bonferroni test for continuous data in comparisons between the groups, t test for dependent variables in comparisons within the groups. Also to analyze time and group activities together, repeated measurement of two way ANOVA was utilized [6,7]. Statistical significance limit was considered as P<0.05.

3. Results

40 patients, 8 with Wernicke, 18 with Mixed aphasia, 14 with Broca aphasia were included in the study. It was determined that the average age of the patients with Wernicke is 65.42±26,82, that of the patients with Broca is 66.20±18,12, that of the mixed aphasic patients is 67.39±25,56. There was no statistically significant difference between the aphiasia type and the ages of the patients (P>0,05). No difference found between the groups based on gender distribution (male/female: Broca 5/9, Wernicke 4/4, Mixed 9/9) (P>0.05). 12 (30%) of all individuals were illiterate, 20 (50%) were primary school, 2 (5%) were secondary school and 6 (15%) were high school graduates. Any smoking, alcohol abuse and past SVO case in the history of all patients have been questioned. Blood pressure, blood glucose and heart condition have been clinically monitored. When SVO etiologies were studied carotid artery color doppler USG has been obtained for all patients. The possibility of SVO based on carotid disease in Wernicke group is found to be lower than both other groups at a statistically significant level (Wernicke 0%, Broca 78.6%, Mixed 55.6%) (P<0.05). There was no difference in smoking, past SVO case, hypertension and diabetes mellitus (P>0.05). When analyzed as to the localization of lesions causing aphasia inside the hemisphere, there was statistically significant temporal lobe localization in patients with Wernicke aphasia. In patients with Broca aphasia statistically significant frontal and frontoparietal lobe localization were observed. Aphasia localization observed in patients with Mixed aphasia was statistically significant temporoparietal localization (P<0.05).

For all components, standardization was made by taking percentage values according to the total number of questions constituting the components, the values are provided in Table 2. Results of comparison based on time are provided in Table 3.

Speaking of the Broca patients was a value expected to be found as 5% lower values for speaking parameters at first arrival when compared with the others (P<0.001). Understanding, the patterns of which were a value expected to be high in patients with Broca aphasia. However the ratio of understanding simple instructions at first arrival in patients with Broca aphasia to be determined as 85.71% is believed to be resulted from a certain amount of loss in the understanding pattern also in Broca aphasia. This group was at a better statistical level than the other groups in each time unit. The ratio of simple instructions in Wernicke aphasia cases to be as low as 12.5% was coherent with the literature data. Understanding ratio of patients with Broca was found as 96.03% in average in controls made 6 months later. Broca patients understood almost completely. (Table 2).

Table 2. Descriptive Statistics and Comparison Results of three groups according to the GAT components.

GAT*		Wernicke	Broca	Mixed	
		Mean±SD	Mean±SD	Mean±SD	P Value
Speech	First arrival	46.88±8.84	5.36±10.65	18.75±28.20	**<0.001**
	1.5 months	60.94±18.22	32.14±21.77	33.33±29.39	**<0.05**
	6 months	68.75±11.57	41.07±27.49	40.28±29.25	>0.05
Simple instructions	First arrival	12.50±18.25	85.71±18.71	30.86±33.99	**<0.001**
	1.5 months	45.83±40.91	95.24±8.40	60.49±34.13	**<0.01**
	6 months	52.78±40.17	96.03±8.28	75.31±25.44	**<0.01**
Right-wrong	First arrival	5.00±14.14	42.86±40.65	11.11±18.44	**<0.05**
	1.5 months	30.00±37.03	64.29±35.24	35.56±27.91	**<0.05**
	6 months	35.00±41.06	71.43±34.83	48.89±33.76	**<0.05**
Complex questions	First arrival	0.00±0.00	13.10±26.29	0.00±0.00	**<0.05**
	1.5 months	20.83±38.58	55.95±46.50	14.81±26.75	**<0.05**
	6 months	20.83±38.58	66.67±40.30	24.07±32.45	**<0.01**
Reading	First arrival	5.71±7.87	14.17±15.64	10.00±30.00	>0.05
	1.5 months	25.71±31.55	45.00±26.80	31.82±35.45	>0.05
	6 months	28.57±29.68	52.50±30.49	29.10±25.87	>0.05
Written instruction	First arrival	1.59±4.20	20.37±29.52	6.06±20.10	>0.05
	1.5 months	15.87±37.33	60.19±43.80	24.24±34.00	>0.05
	6 months	23.81±39.25	65.74±42.76	39.39±39.55	>0.05
Comparison	First arrival	0.00±0.00	33.33±44.95	6.06±20.10	<0.05
	1.5 months	19.05±36.55	86.11±33.21	54.55±47.78	<0.05
	6 months	26.19±34.50	88.89±29.59	65.15±46.22	<0.05
Repeating	First arrival	3.29±7.41	6.39±14.18	3.22±6.29	>0.05
	1.5 months	24.34±28.96	46.99±34.88	28.66±31.54	>0.05
	6 months	28.29±30.29	71.80±40.80	37.72±34.12	<0.05
Naming pictures	First arrival	8.93±20.11	3.06±8.27	2.38±7.35	>0.05
	1.5 months	42.86±37.40	73.47±41.88	29.37±36.82	<0.05
	6 months	46.43±35.61	74.49±42.37	39.68±37.81	>0.05
Naming color	First arrival	8.33±23.57	4.76±10.19	1.85±7.86	>0.05
	1.5 months	41.67±37.80	67.86±43.10	30.56±42.11	<0.05
	6 months	45.83±42.49	73.81±39.07	40.74±43.62	>0.05
Writing	First arrival	30.00±10.95	36.36±21.57	25.00±12.43	>0.05
	1.5 months	43.33±26.58	63.64±23.35	41.67±19.92	>0.05
	6 months	46.67±30.11	74.55±25.44	53.33±27.41	>0.05

*(According to GAT the analysis was made with 8 points for speech, 9 for simple instructions, 5 for right-wrong questions, 6 for complex questions, 10 for reading, 9 for comparing, 19 for repeating, 7 for naming pictures, 6 for naming colors, 6 for writing. Increase in the percentage value shows the success).

There was a statistically significant ratio of recovery between *first arrival, 1.5 and 6 months* values in speech, understanding simple instructions, comparing, repeating, naming tests. In reading assessment a later significant recovery than the other parameters was observed in the 6th month. However no statistically significant difference was observed in right-wrong questions, complex questions, reading and writing written instructions tests. In patients with Wernicke aphasia, no statistically significant recovery in all parameters of GAT was observed in the 6th month in addition to the assessments made in 1.5 months.

There was a statistically significant ratio of recovery in comparisons based on time (in all 3 comparisons) when speech, repeating, writing, reading and right-wrong questions were analyzed in patients with Broca aphasia. Significant recovery observed between first arrival and 1.5 months analyses in understanding tests (in understanding of simple instructions and complex instructions), in reading tests (reading and comparing written instructions), in picture and color naming tests. There was no statistically significant difference between the 6th month analyses and 1.5 month analyses in the same tests.

Statistically significant recovery observed in all time based comparisons in speech, understanding tests (simple instructions, right-wrong questions, complex), in reading, repeating written instructions, naming (color and picture) and writing tests. While significant recovery was observed between the first arrival and 1.5 month analyses, no statistically significant difference was observed between the 1.5 and 6th month analyses in reading and comparing (Table 3).

Table 3. Comparison results based on time in Aphasia Groups (P value)

GAT		Wernicke		Broca		Mixed	
		1.5 months	6 months	1.5 months	6 months	1.5 months	6 months
Speech	arrival	<0,05	<0,05	<0.001	<0.001	<0.01	<0.001
	1.5 ay	----	>0,05	-----	<0.05	----	<0.05
Simple instructions	arrival	<0.05	<0.05	<0.05	<0.05	<0.01	<0.001
	1.5 months	----	>0.05	----	>0.05	----	<0.01
Right-wrong	arrival	>0.05	>0.05	<0.05	<0.05	<0.01	<0.01
	1.5 months	----	>0.05	----	<0.05	----	<0.01
Complex	arrival	>0.05	>0.05	<0.0.1	<0.01	<0.05	<0.05
	1.5 months	----	>0.05	----	>0.05	----	<0.05
reading	arrival	>0.05	<0.05	<0.01	<0.01	<0.05	>0.05
	1.5 months	----	>0.05	----	<0.05	----	>0.05
Written instruction	arrival	>0.05	>0.05	<0.01	<0.01	<0.05	<0.05
	1.5 months	----	>0.05	----	>0.05	----	<0.05
Comparing	arrival	>0.05	<0.05	<0.01	<0.01	<0.05	<0.01
	1.5 months	----	>0.05	----	>0.05	----	>0.05
Repeating	arrival	<0.05	<0.05	<0.01	<0.001	<0.001	<0.001
	1.5 months	----	>0.05	----	<0.01	----	<0.01
Naming pictures	arrival	<0.05	<0.05	<0.01	<0.01	<0.01	<0.001
	1.5 months	----	>0.05	----	>0.05	----	<0.01
Naming color	arrival	<0.05	<0.05	<0.01	<0.001	<0.05	<0.01
	1.5 months	----	>0.05	----	>0.05	----	<0.05
Writing	arrival	>0.05	>0.05	<0.01	<0.01	<0.05	<0.05
	1.5 months	----	>0.05	----	<0.05	----	<0.05

When the effects of other individual and clinical aspects on prognosis is studied, no significant effect of gender on recovery was observed (p>0.05). When the differences between the age groups are considered, patients <50 recovered more in a statistically significant manner than patients >50 (P<0.05). Education levels are divided into 3 and assessed as illiterate, primary school graduates and secondary education (secondary school and high school) graduates. Statistically significant difference was observed between the groups. This difference is resulting from better recoveries of secondary school and high school graduates. Lower recovery observed in patients with past HT and SVO (P<0.05). While no significant recovery was observed between the first arrival and 1.5 month analyses of DM patients, statistically significant recovery was observed between the first arrival and 6th month analyses (P<0.05). A lower level of recovery in long term was observed in patients with DM (P<0.05). It was observed that carotid disease and heart condition has no significant effect on prognosis (P>0.05).

4. Discussion

Speech therapy is controversial but randomized clinical studies showed that patients treated with speech therapy recovered more than the patients that were not treated [8]. *Age of the patient among the factors affecting prognosis in aphasia is important* [9]. In our study prognosis of the patients in <50 age group was found to be better than that of the patients in >50 age group. Gender was not considered as an effective factor for recovery [1,10]. No significant difference in prognosis was observed between genders in

our study. It is believed that the skills of learning and using information gained by education have positive contribution to prognosis in the period of recovery from aphasia (2). In our study secondary school and high school graduates recovered significantly faster and more. In limited number of long term study on recovery from aphasia, it is stated that recovery from aphasia is fast in the first three months, significant recovery continues up to 6 months, after that the recovery slowed down and reached to a chronic plato [11,12,13]. In our study while there was statistically significant recovery in patients with Wernicke aphasia, it is believed that the recovery up to 6 months continued due to high recovery parameters in the first 1.5 months. It was not observed that the recovery process continues up to 6 months in patients with Broca and Mixed aphasia. *Most recovered language component in Wernicke and Broca groups of our cases is 'naming'.* Our assessments show that % recovery in patients with Broca aphasia is more than the patients with Wernicke aphasia. However no statistically significant difference was found. According to the results of our studies, it cannot be said that the types of aphasia are different from each other in terms of recovery. Mixed aphasia id the type of aphasia with least recovery observed [1]. Best recovery parameters of patients with mixed aphasia are repeating, naming, understanding and speaking, respectively.

5. Conclusion

What the priority order in recoveries of language elements indicates in the recovery process and its effect on the prognosis are not known. The effect of the order of language elements in recovery on rehabilitation is not clear. However it can be said that the prognosis will be better in patients recovering comprehension better and faster.

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Survey the Effective Factors of Stopping Hermann Grid

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Abstract. In the research we want to know how to stop the vision illusions, so designers won't cheat consumers by vision illusions. We used "Method of Constant Stimuli". Stimuli were presented numerous times in random order and the subject reports whether he/she could detect them. We had three control factors, 'direction of vertical lines' and 'direction of horizontal lines', and 'decreasing the area of squares'. When right declined the squares, the control factors were 'decreasing the area of squares' and 'direction of horizontal lines'. When rotated the squares, the control factors were 'direction of vertical lines' and 'direction of horizontal lines'. The effect of 'direction of horizontal lines' was much more then the effect of 'decreasing the area of squares'. In Stage 1, we found the speed smudges disappear is Ratio 10:16 > Ratio 10:14 > Ratio 10:12 > Ratio 10:10, no matter when we right declined the squares or when we rotated the squares. In Stage 2, we found when the style of squares is Right declined, the speed smudges disappear was Ratio 10:12 > Ratio 10:11; when the style of squares was Down declined, the speed smudges disappear was Ratio 10:11 > Ratio 10:12; in the experiments, when we down declined the squares, the smudges would disappear quickly than when we right declined the squares.

Keywords: Hermann Grid, Vision Illusion, Absolute Threshold

1. Introduction

The Hermann grid illusion is an optical illusion. The illusion is characterised by "ghostlike" grey smudges perceived at the intersections of a white (or light-colored) grid on a black background. In advertisement, some designers used to make vision illusions to confuse consumers. The responsibility of advertisement designers should be telling the truth to consumers, but not treating consumers by vision illusions. The range of application of Hermann grid and visual illusion is from Graphic Design to Media Design and Advertisement Design. After World War Two there is a common view internationally that war is destroy for human. Then some designs become tools of colonization. Some designers encourage unnecessary consumption by confuse consumers. But designers should tell the truth to consumers, not should cheat consumers for consumption. It is the responsibility for designers to educate consumers correct perceptions of consumption.

The Hermann grid illusion consists of smudges perceived at the intersections of a white grid presented on a black background. In 1960 the effect was first explained by a theory advanced by Baumgartner suggesting the illusory effect is due to differences in the discharge characteristics of retinal ganglion cells when their receptive fields fall along the intersections versus when they fall along non-intersecting regions of the grid. This figure is called the Hermann grid after L. Herman (1870). The dark smudges can be explained by reference to receptive fields and lateral inhibition. Dark smudges (patches, blobs) appear in the street crossings, except the ones which you are directly looking at.

Hermann's Grid is an example of lateral inhibition — a mechanism of our visual system. Light sensitive cells are arranged in rows on the retina and it is possible to stimulate just one cell, called Cell X, to send a signal to the brain. If, however, Cell X's neighbors are also stimulated, Cell X's signal won't be as strong. Stimulating the neighbors of any particular cell actually inhibits the strength of that cell's response. This means that the strength of any signal sent from the retina is dependent on the signals nearby. The places where the white lines in Hermann's Grid intersect have white surroundings in four different directions so they appear darker than they actually are.

Kevin Berbaum, Chan Sup Chung(Berbaum K, Chung C S, 1981, p85 –89) mentioned the Hermann grid has been explained in terms of concentric receptive fields and also used to determine the size of centers and surrounds in perceptive fields in humans. A new figure, which is simply the outlines of the squares of the Hermann grid, shows that receptive fields having a range of excitatory and inhibitory sizes may be responsible for the Hermann illusion.

2. Absolute Threshold

Absolute threshold is the minimal amount of energy necessary to stimulate the sensory receptors. A term often used in neuroscience and experimental research. An absolute threshold is the smallest detectable level of a stimulus. For example, how much does the power of a massage chair should provide to make customers feel comfortable. Upper absolute threshold is the maximal amount of stimulus to the sensory receptors. When the amount of stimulus is more than upper absolute threshold, then the sensory receptors have no sense. Sometime they will even get hurt.

3. Psychological Investigations of Perception

Method of Constant Stimuli:
3.1. A number of stimulus intensities (5-10 typically) are selected beforehand by the researcher.
3.2. The stimuli are presented numerous times in random order and the subject reports whether he/she can detect them.
3.3. A graph is plotted showing percent of times detected as a function of stimulus intensity.
3.4. The point at which the stimulus was detected 50% of the time is deemed the absolute threshold.

4. Experiment Design

4.1. Stdge 1

In Stage 1 we used 'method ofConstant Stimuli' to get the value of absolute threshold, and we had eight experiments. In the 1-4 experiments we right declined the squares in Hermann Grid from 0° to 20°, every following drawing increased 2° than the former one, and in the ratio of width and height 10:10, 10:12, 10:14, 10:16. In the 5-8 experiments we rotated the squares in Hermann Grid from 0° to 20°, every following drawing increased 2° than the former one, and in the ratio of width and height 10:10, 10:12, 10:14, 10:16. We used Microsoft Office Excel 2003 to make all the drawings for experiments. Both of the experiments we had the squares with height 1.01cm and width 1.01cm. Every square was in a grid with a height 53 pixels(6 points, almost 1.32cm) and a weight 53 pixels(39.75 points, almost 1.32cm). In the stage we had 4 subjects and all of them were sophomores of Multimedia Design Department of Fortune Institute of Technology. And the subjects did the experiment one by one.

Experiments	1	2	3	4	5	6	7	8
Style of squares	right declined	right declined	right declined	right declined	rotated	rotated	rotated	rotated
Ratio of width and height	10:10	10:12	10:14	10:16	10:10	10:12	10:14	10:16

Table1. Experiments design of Stage 3

4.2. Stage 2

In stage 1, we only had 4 subjects. Because we found the smudges disappear too quickly in Stage 3. The in Stage 4, we changed the ratio to be 10:11 and 10:12. And we changed the style of squares to be down

declined and right declined. In Stage 4, we have another change in experiments. We change the page set up form vertical to horizontal. We had four experiments, Declined the squares in Ratio 10:11, Declined the squares in Ratio 10:12, Rotate the squares in Ratio 10:11, and Rotated the square in Ratio 10:12.
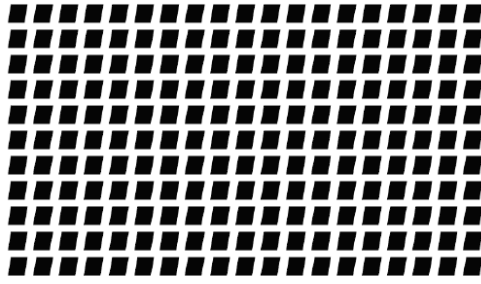

Figure 1.Right decline the squares 10° in ratio 10:11
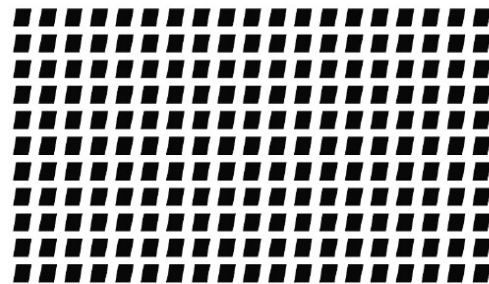
Figure 2.Right decline the squares 10° in ratio 10:12
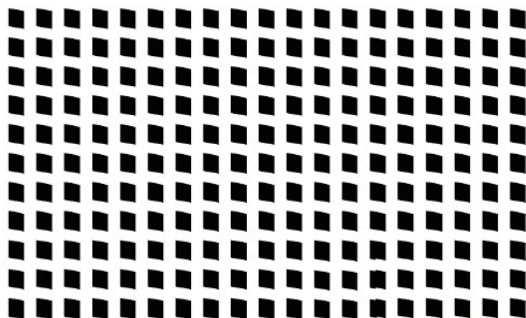
Figure 3.Down decline the squares 10° in ratio 10:11
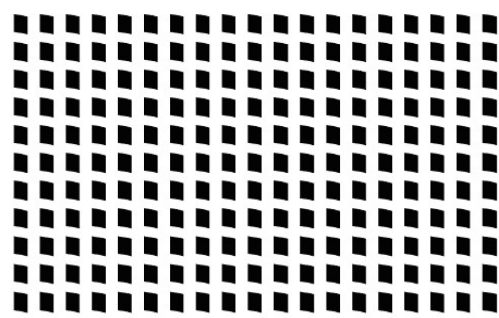
Figure 4.Down decline the squares 10° in ratio 10:12

5. Result

5.1. Stage 1

Decline degree	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°
Right decline the squares in ratio 10:11	0	0	0	0	1	4	5	5	7	7	9
Right decline the squares in ratio 10:12	0	0	0	2	3	5	8	9	9	9	9
Down decline the squares in ratio 10:11	0	0	1	3	4	7	8	8	9	9	9
Down decline the squares in ratio 10:12	0	0	0	1	2	6	9	9	9	9	9

Table 3. Result of Stage 2

In Stage 2 we found that

★When the style of squares was **Right declined,** the speed smudges disappear was Ratio 10:12 > Ratio 10:11.

★When the style of squares was **Down declined**, the speed smudges disappear was Ratio 10:11 > Ratio 10:12.

★In the experiments, when we down declined the squares, the smudges would disappear quickly than when we right declined the squares.

Then we can find the effect trend ratio on stopping Hermann Grid may be a √ mark. In the future we will have other experiments to prove it.

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Relationship between Repressive Coping Style and Positive Illusion

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Abstract. The purpose of the present study is to examine the relationship between repressive coping style and positive illusion. Positive Illusions Questionnaire(Positive Views of the Self, Illusions of Control, Unrealistic Optimism), Manifest Anxiety Scale, Marlowe-Crowne Social Desirability Scale, Index of Well-Being Scale, Beck Depression Inventory were administered to 166 university students. Using both average scores on the Marlowe-Crowne Social Desirability Scale and the Manifest Anxiety Scale as the cut-off scores, the subjects were divided into two groups: repression and non-repression group. Correlation analysis was used to examine the relationship between repressive coping style and positive illusion. Based on these findings, the functioning of positive illusion and the intervention targeting the repressive people were discussed.

Key words: Positive illusion, Repression, Coping style, Well-being, BDI

1. Introduction

Traditional conceptions of mental health in clinical psychology and psychiatry assert that well-adjusted individuals possess accurate perceptions of the self, the world, and the future. Yet considerable research in cognitive and social psychology of the normal individual suggests that mentally healthy person appears to distort reality in a direction that enhances self-esteem, maintains beliefs in personal efficacy, and promotes an optimistic view of the future [1]. Taylor and Brown [1] suggest that most people exhibit positive illusions in three domains: unrealistically positive views of the self, exaggerated perceptions of personal control, and unrealistic optimism.

Taylor and Brown [2] argued that positive illusions improve social functioning and promote the capacity for creative, productive work. Colvin and Block [3] acknowledge that positive illusions may assist in the regulation of mood and may provide relief for individuals experiencing negative affect. However, they do not believe cognitive distortions about oneself and one's social surroundings can result in adaptive behavior over long periods of time in a real world that provides feedback on the individual [3]. Robins and Beer [4] suggest that positive illusions are adaptive in the short term but not in the long term. In terms of the subjective indicators of adjustment in a laboratory context, the findings support that the adaptive value of positive illusions. However, in longitudinal study, positive illusions could not predict higher academic performance or high graduation rates. Faced with unrealistic performance expectations and environmental demands that are beyond their abilities, self-enhancing individuals eventually respond to self-esteem threats by disengaging from the tasks that were once so important to them [4].

According to [5], the essence of repression lies simply in turning something away, and keeping it at a distance, from the conscious. Repression is a neurotic ego defense mechanism that serves as a defensive function of preventing or eliminating psychological pain [6]. On the other hand, suppression is a mature ego defense mechanism. It involves the semiconscious decision to postpone paying attention to a conscious

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impulse and/or conflict [7]. A critical difference between repression and suppression is that suppression allows all the components of conflict to exist at least partially in consciousness [8]. Individuals who use repression as a defensive strategy are known to have neurotic problems and multiple psychosomatic diseases [9, 10]. Repressive people can appear to others as socially desirable in superficial level (Freud, 1930/1961). However, they are preoccupied with excessively socially desirable behavior and could have problems of accurate perception [12].

The purpose of the present study is to examine the relationship between repressive coping style and positive illusion. Hypothesis of this study are as follows. Individuals with repressive coping style have higher positive illusion tendency.

2. Method

2.1. Participants

The sample comprises of 166 undergraduate students. The mean age of the total sample subjects was 22.03(SD=4.13) years old.

2.2. Instruments

Positive Illusion. Positive illusion was assessed using Positive Illusion Questionnaires (PIQ). First domain was assessed using Positive Views of the Self Scale. PVSS is a 20-item self-report questionnaire for measuring positive views of the self. 10 adjectives indicating a positive personality trait and 10 of negatives are presented and participants measure them by their own standard. Second domain, illusions of control was assessed using Illusion of control Rating Scale. ICRS is a 20 item self-report questionnaire for measuring controllability in everyday life events. 20 items were selected from Weinstein′s questionnaires [14] and translated into Korean [15]. Questions of 10 were positive and remaining was negative. Third domain, unrealistic optimism was assessed using Unrealistic Optimism Rating Scale. UORS is composed of same items used in ICRS. High point on positive events and low point on negative events means optimistic [14].

Repressive Coping Style. Repressive coping style was assessed based on scores of Manifest Anxiety Scale(MAS) and Marlowe-Crowne Social Desirability Scale(MCSDS). MAS is 50-item self-report questionnaire for measuring chronic anxiety [16]. MCSDS is used to evaluate defensive attitude of individual. [17]

Well-being and Depression. Well-being was measured using Index of Well-Being [18], and depressive symptom was assessed BDI [19].

2.3. Data analysis

Correlation analysis was used to examine the relationship between repressive coping style and positive illusion. EM (expectation-maximization) in SPSS, one of maximum likelihood estimation was used for missing value. Reference coding was conducted for group classification variable. Repression group is coded as 1 and non-repression group is coded as 0. The statistical analyses were performed using SPSS 12.0 for Windows.

3. Results

In this study, Positive illusion questionnaire, MAS, MCSDS, Index of Well-being, and BDI are conducted to 166 undergraduate students. Based on the methods proposed by Weinberger, Schwartz and Davidson [20], subjects were classified into 4 groups based on the average scores of MAS and MCSDS. [High anxiety-High defensiveness (*n*=30), High anxiety-Low defensiveness (*n*=51), Low anxiety-High defensiveness (*n*=53), Low anxiety-Low defensiveness (*n*=32)]. The average score of MAS was 7.67 (*SD*=4.33), and MCSDS was 13.79 (*SD*=4.33). Cut-off score of MAS for group classification was 8, and MCSDS was 14. To compare between repression and non-repression group, Low anxiety-High defensiveness group was classified into repression group and the remaining three groups were classified into non-repression group.

Table 1. *Mean*(*SD*) **of Repression and Non-Repression Group**

	Positive Illusion			Well-Being	BDI
	PVSS	ICRS	UORS		
RG (*n*=53)	64.37(5.80)	60.94(7.74)	64.49(5.49)	14.34(2.61)	6.32(5.34)
NRG (*n*=113)	60.23(6.55)	57.61(6.77)	60.59(6.64)	12.58(2.76)	11.34(6.06)

Note. PVSS: Positive Views of the Self Scale, ICRS: Illusions of Control Rating Scale, UORS: Unrealistic Optimism Rating Scale, Well-Being: Index of Well-Being, BDI: Beck Depression Inventory, RCS: Repression Group, NRG: Non-Repression Group

Repression group showed high positive illusion tendency. In addition, there was a trend for the repression group to have significantly higher Well-Being total score than who were in non-repression group. BDI score was reported significantly lower in repression group than non-repression group. However, there are several questions remaining to be answered to conclude that repressive people have positive self-perception, more controllability on everyday events, and optimistic thinking about the future.

Table 2. Correlation between PVSS, ICRS, UORS, Well-Being, BDI and RG/NRG

	PVSS	ICRS	UORS	Well-Being	BDI	RG/NRG
PVSS						
ICRS	.41**					
UORS	.61**	.47**				
Well-Being	.27**	.16*	.28**			
BDI	-.36**	-.28**	-.36**	-.59**		
RG/NRG	.29**	.22**	.28**	.29**	-.37**	

Note. PVSS: Positive Views of the Self Scale, ICRS: Illusions of Control Rating Scale, UORS: Unrealistic Optimism Rating Scale, Well-Being: Index of Well-Being, BDI: Beck Depression Inventory, RG/NRG: reference coding of group classification, $^{*}p < .05$, $^{**}p<.01$

Findings from multiple regression suggest that 15.6% of BDI score was explained by positive illusion, and positive illusion was significant correlates. However, results from hierarchical multiple regression indicate that regression coefficient of positive illusion was no more in significant level and only repressive coping style was significant correlates of BDI score at step 2. These findings support the notion that inhibitory effect of depression is best described by repression, rather results of positive illusion. Same evidence is presented at table 4. Interestingly, predictive capacity of positive illusion to subjective well-being reduced when repression variable added in hierarchical multiple regression model.

Table 3. Hierarchical multiple regression of BDI scores on Positive illusion and Repression

		β	R^2	*Adj.* R^2	ΔR^2	F	ΔF
step 1			.156	.139	.156	9.337**	9.337**
	PVSS	-.189*					
	ICRS	-.154					
	UORS	-.099					
step 2			.221	.200	.065	10.691**	12.611**
	PVSS	-.146					
	ICRS	-.122					
	UORS	-.077					
	RG/NRG	-3.630**					

Note. PVSS: Positive Views of the Self Scale, ICRS: Illusions of Control Rating Scale, UORS: Unrealistic Optimism Rating Scale, RG/NRG: reference coding of group classification, $^{*}p < .05$, $^{**}p<.01$

Table 4. Hierarchical multiple regression of Well-Being on Positive Illusion and Repression

		β	R^2	*Adj.* R^2	ΔR^2	F	ΔF
step 1			.095	.077	.095	5.240**	5.240**

	PVSS	.053				
	ICRS	.097[*]				
	UORS	-.001				
step 2			.133	.109	.037	5.657[**]	6.344[*]
	PVSS	.039				
	ICRS	.084				
	UORS	-.007				
	RG/NRG	1.232[*]				

Note. PVSS: Positive Views of the Self Scale, ICRS: Illusions of Control Rating Scale, UORS: Unrealistic Optimism Rating Scale, RG/NRG: reference coding of group classification, $^*p < .05$, $^{**}p<.01$

4. Discussion

Taylor and Brown [1,2] proposed that positive illusions promote psychological well-being as well as higher motivation, greater persistence, more effective performance and ultimately, greater success [4]. Contrary to Taylor and Brown's assertion, Colvin and Block [3] conclude that the adaptive value of positive illusion is unproven and may be seriously wrong in many circumstances. Individuals who distort reality may misjudge antecedent-consequent relations and must necessarily emit suboptimal, if not maladaptive, behavior patterns over the long run of a life. Robins and Beer [4] suggest that positive illusions may be adaptive in the short term but not in the long term. They warn that high expectations can be double edged sword, motivating achievement behavior in the short term but contributing to disengagement and perhaps a helpless response pattern.

Finding of this study have important clinical implication. Repression is a neurotic ego defense mechanism that served the defensive function of preventing or eliminating psychological pain [6]. Repressive people are preoccupied socially desirable behavior and could have problems of accurate perception of the self, the world, and the future [20]. Many studies show consistent evidence that subjective self-report result of repressive people is estranged from their objective behavior in stressful events. [21] Therefore, positive illusion of repressive people is likely to be a reflection of tendency to avoid facing stimulus associated with unpleasant or painful experience [22]. Therefore, in psychotherapy and counseling setting, self-report result of repressive clients are expected to have limitation of reflecting their subjective distress. Professions should encourage repressive people to expect their performance at the realistic and achievable level and help them to make an objective view of self instead using positive illusion as rigid defense.

The present research suggests future directions for the study of positive illusions. Claims about the adaptive or maladaptive consequences of positive illusions need to specify the particular type of person and circumstances.

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The Mediation Effect of Somatization in the Relationship between Depression and Anxiety, and Insomnia

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Abstract. The purpose of this study was to examine the mediation effect of somatization in the relationship between depression and anxiety, and insomnia. Insomnia Severity Index and Symptom Check List-90-revised version were administered to 526 adults in general population, and path analysis was conducted. As a result, there was full mediation effect in the pathway between anxiety and insomnia, and partial mediation effect between depression and insomnia. Clinical implications of the findings were discussed.

Keywords: insomnia, depression, anxiety, somatization, pathway

1. Introduction

Insomnia can be a symptom itself as a complaint of difficulties in sleep initiation and can be a disorder as it causes significant pain and dysfunctions along with the complaint [1,2]. Furthermore, as insomnia has found to be a risk factor of causing depression, panic disorder, and obsessive-compulsive disorder [3-5], insomnia has treatment value as a symptom itself. Although 10 years of recent researches on insomnia has progressed tremendously, the causes of insomnia is not yet known clearly. The important issue related to insomnia is the association with other psychopathologies. High levels of anxiety and depression are evident in many patients with insomnia, on the other hand, the rates of sleep disturbances in patients with anxiety or depression are also high [6,7]. These findings suggest depression and anxiety exist in one axis and insomnia at the other axis and that the interesting interrelationship of two axes exists.

Many studies have been conducted regarding the interrelationship between anxiety and depression, and insomnia. The early studies of this interrelationship viewed anxiety, depression, and insomnia as simply co-occurring and it would be explained by mechanisms that precipitate or maintain the other symptom. A second possibility is that insomnia is not only epiphenomenal to anxiety and depression, but also anxiety and depression can be epiphenomenal to insomnia. A third is the possibility of anxiety and depression operate as a risk factor for future insomnia. It is obvious that insomnia is related to anxiety and depression, and can be a risk factor in the development of the disorders [8.9]. However, studies investigating insomnia as a result of anxiety and depressive disorders are not conducted sufficiently yet and have not reached consensus concerning the results [9-10].

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Recently few studies have examined the bidirectional relationship between anxiety and depression, and insomnia [11]. However, the effects of anxiety and depression on insomnia still remain unresolved due to the lack of supporting studies.

A number of limitations have arisen in the previous studies concerning the interrelationship between anxiety and depression, and insomnia. The other is that most longitudinal or retrospective studies focused and examined psychopathologies as a result of insomnia, however, not vice versa. Additionally, it was pointed out that due to the excessive dependency on clinical samples regarding the insomnia studies, the reported association between three symptoms can be deflected as stronger than actual. By supplementing the limitations of previous studies through investigating the association between psychopathologies and insomnia as a causal factor among adults from general population, it would be helpful in broader understanding of the mechanism of insomnia. Moreover, examining the association between anxiety and depression, and insomnia would bring theoretical understanding of the issues and would provide guidelines for appropriate treatment intervention according to each different developmental stage. Thus, the present study investigates the pathway from anxiety and depression to insomnia along with the mediation effect of somatization which is highly related to these symptoms.

2. Method

2.1. Participants

The present study is a population-based investigation and we have obtained informed consent from all the participants for surveys. A survey with many no-response on questions and insincere ones were excluded which reserve for 526 participants. Age ranges from 17 to 45 and the mean age is 24.55 (SD=5.41).

2.2. Measures

- *Insomnia Severity Index (ISI).* The instrument was developed by Morin (1993) which is a short instrument that simply assesses insomnia according to the diagnostic criteria of DSM-IV and I CSD [12]. It consists of 7 questionnaires that evaluate severity, satisfaction of current sleep, dis turbances in daytime function, and degree of suffering due to impairments from sleep problem. It uses likert scale from 0 (none) to 4 (very severe) and the total score of over 15 is interpreted as having clinically significant insomnia.

- *Symptom Check List-90-Revision (SCL-90-R).* The instrument was developed by Derogatis (19 97) which was standardized in accordance with Korea's circumstances by KwangIl Kim, JaeH wan Kim, and HoTaek Won (1984) [13]. It contains 90 items and consists of 9 primary sympto m dimensions of Somatization, Obsessive-Compulsive, Interpersonal-Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. Also, GSI (Global Sy mptom Index), PSDI (Positive Symptom Distress Index), and PST (Positive Symptom Total) ar e contained as a general index. It uses likert scale from 0 to 4 for evaluation. The present study used Depression, Anxiety, and Somatization subscales.

3. Results

As a result of evaluating the correlation between depression, anxiety, and somatization, and insomnia, Correlation coefficient of depression were .35, anxiety = .31, somatization = .37 that yielded significant level. Correlation between anxiety and depression was .84, between depression and somatization was .77, and between anxiety and somatization was .83 that all yielded high correlation (p<.01).

After establishing the study model under the assumption that relationship between depression and anxiety, and insomnia would be mediated by somatization, it was analyzed using path analysis of AMOS 7.0. As a result, except for the direct pathway from anxiety symptoms to insomnia symptoms in the basic model (full mediation model) that we have postulated, everything was statistically significant. However, since the

direct pathway between anxiety symptoms and insomnia symptoms was not significant it was excluded from the examination of the alternative model. As a result, overall compliance level yielded satisfactory results; x^2(df=1, N=526)=1.81, p=.18, GFI=.99 CFI=.98, NFI=.99, RMSEA=.39. Considering the rule of simplicity of the model and the fact that the pathway from anxiety symptoms to insomnia symptoms was not significant in the partial mediation model, Fig 1 explains well the relationship between anxiety and depressive symptoms and insomnia symptoms. That is, somatization symptoms mediate anxiety and insomnia symptoms completely, and it mediates depressive symptoms only partially.
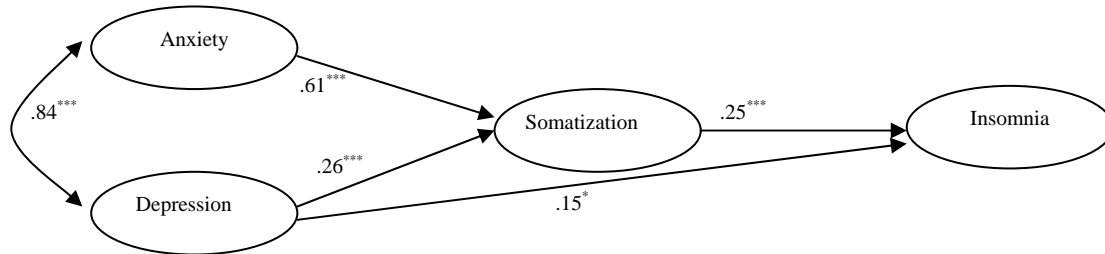
* p<.01, *** p<.001

Fig 1: Final model and standardized estimates

Table 1. Compliance Index

Compliance Index	x^2 (df=1)	CMIN/DF	GFI	CFI	NFI	RMSEA
Final Model	1.81	1.81	.99	.98	.99	.39

4. Discussion

The purpose of present study was to examine the mediation effect of somatization in the process of anxiety and depression affecting insomnia. As a result, somatization showed full mediation effect in the relationship between anxiety and insomnia, but partial mediation effect in the relationship between depression and insomnia. That is, an individual with depression may suffer for insomnia when somatization symptoms are accompanied, moreover, depression itself can be a causal factor for future insomnia. On the other hand, in case of anxiety, anxiety itself may not directly cause insomnia but insomnia is induced only when somatization symptoms are presented. These findings support to previous research that anxiety and depression seem to be related to insomnia in different ways [8]. In addition, the present study indicates different treatment approach is required when dealing with issues of insomnia in patients with depression and patients with anxiety. Insomnia symptom manifested in patients with anxiety should not be the focus of treatment but instead, it would be more effective if it is also managed in the contexts of psychological treatment of somatization disorders. On the other hand, insomnia symptom presented in depressive patients may be independent of somatization disorders, thus, the symptoms should be treated as a sole critical issue regardless of the presence of somatization disorders.

The present study suggests a few theoretical implications related to insomnia. First, anxious individuals have difficulties in sleep because they tend to focus more on their body due to anxious affect, exhibit physiological hyperarousal, and experience a process of over-interpreting and perceiving pathologically the changes in even a trivial sensation of body that combined to produce insomnia, rather than excessive worry or rumination [14]. This implication is a supporting evidence of Espie's(2006) Attention-intention-effort pathway [15]. That is, anxiety symptoms amplify somatic sensation and induce somatization symptom that lead to failure in inhibition of wakefulness before sleep, thus, eventually causing insomnia.

Second, the study implies not only the risk factor that contributes to development and maintenance of insomnia, but also predictable factor of patients who do not respond to medication or cognitive-behavioral therapy, and other various interventions for insomnia. So to speak, somatization symptom or tendency of somatization may be a factor of development and maintenance of insomnia, moreover, a critical factor that predicts the effect of treatment. External attribution on cause of events and tendency of avoidance and repression to the stressful situation are the characteristics of individuals who complain somatization

symptom. Therefore, in treating insomnia patients it would be more effective if their general coping style is dealt. Most cognitive-behavioral therapy of insomnia considers individual's cognition toward sleep and anxiety that follows as the main issues. However, it is thought to be more helpful in maximizing the treatment outcome and preventing relapse if avoidant and repressive coping style is also dealt of those who complain somatization symptom.

Third, the study suggests another clinical implication that relaxation training, that promotes physical and psychological release, should be included as a main module in the process of insomnia treatment. While cognitive-behavioral therapy of insomnia focuses on cognitive approach that mainly deals with sleep scheduling and dysfunctional belief of sleep, relaxation training is often neglected or selected as an option. However, relaxation training reduces the arousal state of body in general that also reduces anxiety in long term, thus reduces somatic sensitivity would be effective in improving insomnia symptom.

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Relationship between Repressive Coping Style and Facial Asymmetry

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Abstract. The purpose of the present study is to examine the relationship between repressive coping style and facial asymmetry. The subjects of the present study were 127 college students. For calculation of facial asymmetry, we used the calculation methods suggested by Grammer and Thornhill (1994). Two different indices (FA, CFA) of horizontal asymmetry were measured in the present study. Repressive coping style was assessed based on the scores of Manifest Anxiety Scale (MAS) and Marlowe-Crowne Social Desirability Scale (MCSDS). The subjects were classified into 4 groups based on the average scores of MAS and MCSDS; High anxiety-High defensiveness, High anxiety-Low defensiveness, Low anxiety-High defensiveness, Low anxiety-Low defensiveness. The analysis resulted in significant correlation between CFA (one of the facial asymmetry indices) and the contrast coding variable for comparing the low anxious group with the other three groups. That is, the low anxious group showed relatively higher CFA values than the other three groups. The present finding suggests that facial asymmetry is not necessarily related to negative personality characteristics.

Keywords: facial asymmetry, repression, coping style

1. Introduction

A growing body of evidence has considered facial asymmetry as a possible indicator of genetic and developmental instability, physical and psychological health, and sexual selection and preference. It was proposed that people prefer averageness and symmetry in appearances of opposite-sex individuals [1]. It was also reported that attractiveness increased when symmetry was increased and decreased when symmetry was reduced symmetry [2]. Evolutionary biologists and psychologists proposed that a preference for symmetry would be adaptive because symmetry is a signal of health and developmental stability [3-4]. More recent evidence investigated that perceived health correlated negatively with facial asymmetry [5]. Even in cognitive decline in old age, facial symmetry is proposed as a candidate marker related to developmental stability [6].

In accordance with these findings, Shackelford and Larsen supposed facial asymmetry as a possible indicator of psychological, emotional, and physiological distress [7]. They largely investigated enormous indicators of personality, emotional, and psychological tests such as BDI (Beck Depression Inventory), Eysenck Personality Questionnaire, and Life Orientation Test. As physiological variables, they included various physical and psychosomatic complaints such as headaches, trouble concentrating, and nausea. They measured horizontal and vertical asymmetry and their results showed somewhat strong positive relations

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with the personality and psychological variables such as depression (.51), fear (-.35), impulsivity (.34~.62), and conscientiousness (-.30~-.53). They showed evidence that facial asymmetry signals poor psychological, emotional, and physiological health for both men and women.

When considering growing notions that facial asymmetry shows relation with general genetic, developmental, and psychological stability, is it safe to conclude that greater facial asymmetry positively related with emotional instability? It is little known about positive psychological function of people with facial asymmetry. A substantial amount of research must be done before researchers can make any definitive conclusions about the relevance of facial asymmetry in poor psychological function [7].

People with facial asymmetry may become sensitive to evaluation of others in interpersonal relationships because people in general prefer symmetry in appearances of opposite-sex individuals. If facial asymmetry is closely related to poor psychological function as the previous research has suggested, it would increase the anxiety level of people with facial asymmetry. If the degree of facial asymmetry is not that extreme, people with facial asymmetry would exert efforts to keep their emotional stability when they make social relationships. In other words, they try not to be disturbed by the impression evaluation of others on them (desensitization effort). If this kind of psychological efforts reaches the extreme, it may result in emotional insensitivity. This may be particularly true for psychiatric patient groups. As for non-clinical groups, however, facial asymmetry may be closely related to a low level of anxiety. In order to examine these possibilities, we investigated a potential relation between facial asymmetry and repressive coping style.

Repressiveness is a general personality style with manifestations in many domains such as emotion, self-concept, cognition, behaviour, etc. [8-10]. Repressive individuals avoid threatening information and tend to keep unpleasant experiences out of their consciousness [11-13]. This style has been known as coping style that regulates emotional distress and emotion expression, and also is related with intra-psychological characteristic, physiological or even physical state. Repressors are regarded as those individuals who are motivated to maintain self-perceptions with little subjective negative emotion despite tendencies to respond physiologically and behaviourally in a manner indicative of high levels of perceived threat [10]. In fact, repressive coping style has consistently shown positive correlations with measures of sympathetic nervous system activation [13]. Also, some researchers examined the relationship between repressive coping style and brain activation asymmetry [14].

The Measure of repression is usually based on combined scores of the Manifest Anxiety Scale and the Marlow-Crowne Social Desirability Scale [15-17]. The combination of measures (2 X 2) yields a classification into four groups, in which people who score high on a social desirability and low on a measure of trait anxiety are classified as repressors. The other three groups are low anxious (low MAS, low social desirability), high anxious (high MAS, low social desirability), and defensive high anxious (high MAS, high social desirability). The validity of the distinction among four groups has been supported in many studies [10, 18]. We used the same classification method in order to investigate a possible relation between facial asymmetry and repressive coping style.

2. Method

2.1. Participants and Procedures

Facial pictures of 127 college students were obtained. The subjects were asked to remove facial jewerly and hat before being taken photographs. The participants were instructed to seat upright, maintain a neutral facial expression and look directly at the camera. The distance from digital camera, lighting conditions, and camera zoom kept constant. Participants completed the Manifest Anxiety Scale and the Marlow-Crowne Social Desirability Scale before being taken a picture.

2.2. Facial Measurements

Measurements points. The facial measurements were made using Scion Image 4.0.3.2 (www.scioncorp.com). We placed 15 points on each facial picture (Fig. 1). Corresponding points were on inside and outside corners of the eyes (P1-P4), cheekbones (P5, P6), widest points at the sides of the nostrils (P7, P8), the jaw (P9, P10), the mouth (P11, P12), and the corners of the chin (P14, P15). One point was placed on the lip vertex (P13). These standard points have been shown to be highly reliable [1, 4, 6].

Calculation of asymmetry. We used the methods of calculation from Grammer and Thornhill [1]. Two different indices (FA, CFA) of horizontal asymmetry were measured in the present study. Overall facial asymmetry (FA) was measured using sum of all differences between midpoints of seven horizontal lines between the pairs of points: P1-P2, P3-P4, P5-P6, P7-P8, P9-P10, P11-P12, and P14-P15. These seven lines were designated D1, D2, D3, D4, D5, D6, and D7, respectively. The CFA (central facial asymmetry) was calculated by summing of the differences of the midpoints of the lines D1 and D2, D2 and D3, D3 and D4, D4 and D5, D5 and D6, and D6 and D7. FA and CFA were reliably used by researchers [1, 6].
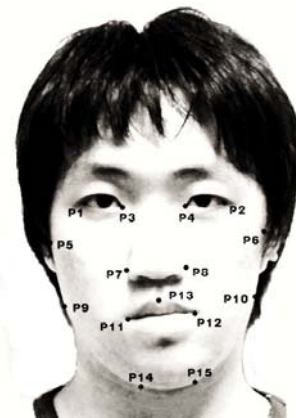

Figure 1
The location of points placed on faces for the measurement of asymmetry

3. Results

After excluding participants with unsuitable photos or missing data, 127 subjects (47 men, 80 women) were remained for the following analysis. Their mean age was 21.27 (SD=2.2). The means of CFA and FA were 43.95 (SD=21.7) and 53.02 (SD=21.5) respectively.

For the analysis of the three repressive coping style groups, we conducted contrast coding. The low anxious group was contrasted to the other three groups. The repression group (high MAS, low social desirability) was contrasted to the two groups with high MAS because repressors deny their anxiousness. The defensive group which was identified as a defensive high anxious group (high MAS, high social desirability) was contrasted to the high anxious but low social desirability group.

The results showed that only CFA and the low anxious group had a positive relationship (.182, $p<.05$; Table 1). The other correlations were not significant.

Table 1

Pearson correlations among symmetry indices and repressive coping styles

Variable	CFA	Low ANX_C	REP_C	DEF_C
CFA	-	.182[*]	-.083	.006
FA	.523[**]	.059	-.041	-.150

Note. Low ANX_C = low anxious group contrast coding variable, REP_C = repression group contrast coding

variable, DEF_C = defensive group coding variable. $^*p<.05$.

4. Discussion

A substantial body of research has reported that facial asymmetry is positively related with poor psychological, emotional, and physiological health for both men and women. However, the present study showed a positive correlation between facial asymmetry and the low anxious group among the repressive coping styles. That is, greater facial asymmetry is positively related with low anxiety levels as an individual trait. Therefore in the non-clinical group, facial asymmetry seems to be more closely related to desensitization than sensitization which increases interpersonal anxiety.

It has been supposed that the non defensive, low anxious group is healthier than the other three groups when repressive coping style was indentified by the use of the Manifest Anxiety Scale and the Marlow-Crowne Social Desirability Scale. The low anxious group has shown close relationships with flexibility, vitality, and enjoyment of interpersonal relationships [9]. Therefore, the present finding seems to suggest that facial asymmetry is not necessarily related to negative personality characteristics.

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The Paradoxical Role of Optimism: Focusing on Depression in Parents of Children with Cancer

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Abstract. The role and relationship of optimism and repressive coping style on depression were examined in 50 parents of children with cancer and 53 parents of healthy children. Optimism was negatively related to depressive symptoms and positively related to repression in parents of children with cancer. When predicting depression through hierarchical regression analyses, three-way interaction of Group x Repressive coping x Optimism was statistically significant. The moderator-predictor interaction including repressive coping and optimism was statistically significant in the parent group of children with cancer and not significant in the parent group of healthy children. In the present study, repression and optimism worked as a buffer for depression. As for the parent group of children with cancer, however, there was an interaction effect of optimism and repressive coping. That is, optimism failed to work as a protective factor for the repressors in parents of children with cancer.

Keywords: optimism, repressive coping, depression, parents of children with cancer

1. Introduction

For the past 20 years, considerable attention has been given to the effect that stressful life events have on physical and psychological well-being [1]. However, the relationship between these variables has accounted for less than 15% of the variance in outcome [2-3]. For this reason, researchers have identified the necessity to investigate variables that affect the nature and strength of the relationship between the stressful life events and well-being [1, 4-5].

Having a child who is diagnosed with cancer and undergoes the medical treatment for cancer is a highly stressful experience for many parents [6-7]. Parents have to cope with anxieties, fears, and frustrations emerging from the interactions with the affected child, integrate the child's needs into established family routines, and manage the financial costs and strain in social life. Increased burden for multiple demands can lead to adverse psychosocial outcomes for parents. Several studies on mental health of pediatric cancer patient's caregivers have reported higher level of depression and anxiety than parents of healthy children [8-9]. It is important to identify the protective factor and risk factor of parents' psychological distress to provide a well suited help for them because parents are so focused on their children that they do not care of themselves.

Many researchers focusing on variables of positive psychology suggest that optimism is a good predictor of better psychosocial adjustment [10]. For example, more optimistic individuals were reported to have

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lower perceived stress, lower depressive symptoms and greater life satisfaction [11]. Even though many studies have investigated the relationship of optimism and many well-known personality variables such as neuroticism, self-mastery and self-esteem, more research would be needed to identify the role of optimism on well-being over the influences of other personal predictors.

A growing number of studies have argued that coping mediates the relationship between negative life events and the impact of such events on psychological and physical well-being [12-14]. Previous investigations have discovered that the repressive coping is an important construct to the individual's mental and physical health. As proposed by Weinberger, Schwartz, and Davidson [15], the repressive coping refers to a tendency of individuals to report enhanced psychosocial functioning on self-report measures relative to actual functioning. Encompassing reports of both lower than expected distress and higher than expected psychosocial functioning, repressive coping has been theorized to contribute to an "illusion of mental health" held by those employing the adaptive style [16]. In contrast, as for physical health, a variety of studies have indicated association between repressive coping and physiological indicators of stress including high blood pressure, cardiovascular disease, cancer, and asthmas [17-20].

Given the results of these studies, a crucial question rises whether the self-reports of low level of depression from this repressive sample are "real", or reflection of "unrealistic positive expectancy or perception for mental health." [16] Although repressive coping and optimism have been extensively examined, few studies have examined the role of their relationship on psychological adjustment. The aim of the present study is to investigate the role and relationship of optimism and repressive coping on depression of relatively higher stress group, parents of children with cancer. Based on the previous research, we expected that parents of children with cancer would be more depressed than those of healthy children. We also expected both optimism and repressive coping would be a protective factor of depression for parents with children suffered cancer.

2. Method

2.1. Participants and Procedures

The final sample consisted of 103 participants: 50 parents of children with cancer (48.5%) and 53 controls (51.5%). Fifty parents of children with cancer were the parents of the patients who were admitted to the center of pediatric oncology of National Cancer Center in South Korea. The control group was drawn from parents who have a child attending an elementary school and high school located in Seoul, South Korea. Prior to beginning the study, all participants were asked to fill up the informed consent form indicating voluntary participation and secure confidentiality. The ages of parent participants ranged from 29 to 51 years, with a mean age of 43.13 ($SD = 6.08$). Most parents were female (women = 88, men = 15).

Analyses were conducted in two steps. First, correlations were computed among three variables to assess simple relationships. Second, moderator analyses were conducted using the procedure described by Baron and Kenny [21]. Analyses were performed using the SPSS for Windows version 15.0.

2.2. Measures

Optimism and Depression. Optimism was measured using the revised version of Life Orientation Test (LOT-R) [22]. The LOT-R is a six-item self-report measure (plus four filler items) using a 5-point scale assessing generalized expectancies for positive versus negative outcomes. Beck Depression Inventory-Ⅱ (BDI-Ⅱ) was used to assess depression [23].

Repressive Coping. Consistent with the methods employed by Weinberger et al. [15] and subsequent investigators [24], we divided the sample to two groups based on a median split on the measure of defensiveness (The Marlowe-Crowne Social Desirability Scale, MCSDS) [25] and anxiety (Manifest Anxiety Scale, MAS) [26]. Forty-three individuals qualified for the repressor group who scored 8 or below on the MAS and 17 or above on the MCSDS. Fifty-eight individuals who were not repressors classified as non-repressors.

3. Results

Cases with missing data on one or more variables were deleted from the sample. All of the correlations were significant and in the expected direction in parents of children with cancer. Specifically, optimism was negatively related to depressive symptoms ($r = -.47$, $p < .001$) and positively related to repression ($r = .32$, $p < .05$), and repression was negatively related to depression ($r = -.56$, $p < .001$) in parents of children with cancer. For parents of healthy children, repression was negatively related to depression ($r = -.41$, $p < .01$), and the correlation between optimism and repression and the correlation between optimism and depression were not significant.

We used a hierarchical multiple regression analysis in order to test our prediction that optimism X repressive coping interaction would be predictive of depression increases, particularly for parents of children with cancer (Group 1). The predictor variables were entered in the regression equation in step 1, followed by the two-way, three-way interactions in steps 2, 3, 4, and 5. Because lower-order interactions cannot be interpreted in the presence of significant higher-order interactions [27], only the highest-order significant interactions between group, repressive coping style and optimism were of interest in the present study. When predicting depression, the three-way interaction of Group X Repressive coping X Optimism was statistically significant.

Table 1. Hierarchical Multiple regression of Depression on Group, Repressive coping, Optimism and Their Cross-products.

	β	R^2	adj. R^2	ΔR^2	F	ΔF
step1		.40	.38	.40	19.85***	19.85***
Group	5.80**					
Repressive coping	-9.41***					
Optimism	-2.60**					
step2		.42	.39	.02	15.97***	3.01
Group	5.29**					
Repressive coping	-9.76***					
Optimism	-5.07***					
Repressive coping*Optimism	5.52**					
step3		.43	.40	.02	13.49***	2.52
Group	7.57**					
Repressive coping	-7.31**					
Optimism	-4.81***					
Group*Repressive coping	5.22**					
	-5.18					
step4		.47	.43	.04	12.82***	5.82*
Group	7.41**					
Repressive coping	-7.47**					
Optimism	-3.90*					
Group*Repressive coping	4.76*					
Repressive coping*Optimism	-4.67					
Group*Optimism	-1.25					
step5		.49	.45	.03	11.99***	4.20**
Group	6.90**					
Repressive coping	-7.07**					
Optimism	-1.02					
group*Repressive coping	.42					
Repressive coping*Optimism	-5.29					
Group*Optimism	-5.18					
Group*Repressive coping*Optimism	7.99*					

Note. Group is coded as parents of children with cancer=1, control =0; repressive coping is coded as repressor = 1,

non-repressor = 0. *$p < .05$, **$p < .01$, ***$p < .001$

To examine the *form* of the variable's inter-relations, hierarchical regression analysis was used again to test the moderating effect of repressive coping and optimism in predicting depression for each group. When predicting depression, a moderator-predictor interaction including repressive coping and optimism was statistically significant in the parents of pediatric cancer patients and not significant in the parent of healthy children. The interaction effects of repressive coping and optimism for each group are presented in Fig. 1 and Fig. 2 .
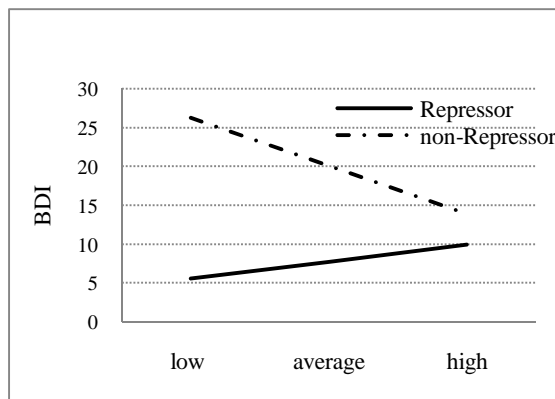

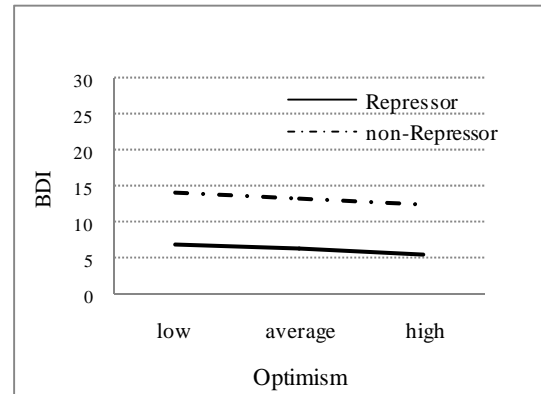Fig. 1. Parents of Children with Cancer (Group 1)

Fig. 2. Control; Parents of Healthy Children (Group 0)

As shown in Fig.1 and 2, there was an interaction effect between optimism and repressive coping only in group 1. That is, optimism could have an adverse effect on depression of parents with pediatric cancer patients if they rely on repressive coping.

4. Discussion

The main purpose of the present study was to examine the role and relationship of optimism and repressive coping for parents of children with cancer. In consistent with the previous research, depression was higher in parents of children with cancer than in parents of healthy children. Some researchers have been suggesting that, despite the negative image of repression, employing repressive coping style might serve as a protective factor in the course of stressful life events [28]. In the present study, repression and optimism worked as a buffer for depression as we predicted. However, an interaction effect of optimism and repressive coping was found in the parents of children with cancer. That is, optimism failed to work as a protective factor for the repressor in the parents of pediatric cancer patients.

The present finding has important clinical implications regarding the direction of the intervention for parents of children with cancer. Generally, optimism training could be a good choice to reduce or prevent depression. If clients use repressive coping as a main adaptive mechanism, however, undifferentiated optimism training would hamper the intervention process designed to improve the psychosocial well-being of clients.

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Eye movement and visual illusion perception in chronic schizophrenia

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Abstract.
Numerous studies have examined the relationship between smooth pursuit eye movements and motion perception. In this study, it was testified that the abnormality of smooth pursuit eye movements in the chronic schizophrenic patients was associated with the positive syndrome and was related to the negative syndrome by using the illusory motion stimuli. The visual perceptual accuracy about the illusory motion stimuli was lower in the patient groups with chronic schizophrenic than in the normal control group. These results imply that schizophrenics have deficits in smooth pursuit eye movement and these deficits causes the differences of motion perception between schizophrenics and normal adults.

Keywords: Smooth pursuit eye movements, Motion perception, Chronic schizophrenic patients, Visual perceptual accuracy

1. Introduction

Previous studies have found that motion perception is impaired in the schizophrenic patients (Stuve, Friedman, Jesberger, Gilmore, Strauss, & Meltzer, 1997). The schizophrenic patients were less sensitive in detecting motion stimuli, compared to normal subjects. Schizophrenics were impaired in visual, as well as in auditory, attention, in accordance with the idea that attention impairment may represent a core deficit in schizophrenia (Li, 2002).

Deficits in eye trackings are robust abnormalities in schizophrenia, but the neurobiological disturbance underlying these deficits is not known (Sweeney, Luna, Srinivasagam, Keshavan, Schooler, Haas, & Carl, 1998). Dysfunctions in eye tracking are one of the best established familial markers of risk for schizophrenia (Levy, Holzman, Matthysse, & Mendell, 1994). A dysfunction of smooth pursuit eye movements is one such co-familial trait that occurs in about 40 to 80% of schizophrenic patients and about 25 to 40% of their first degree relatives (Holzman, 2000).

Numerous studies have examined the relationship between smooth pursuit eye movements and motion perception. It is related to a deficit in the motion perception that chronic schizophrenic patients' smooth pursuit eye movement is abnormal (Hong, Turano, O'Neill, Hao, Wonodi, McMahon, & Thaker, 2009). The schizophrenics with positive symptoms show that scanning is increased and fixations is reduced, while the schizophrenics with negative symptoms show that staring is increased and duration of fixation is increased (Gaebel, Ulrich, & Frick, 1987).

In this study, it was testified that the abnormality of smooth pursuit eye movements in the chronic schizophrenic patients was associated with the positive syndrome and was related to the negative syndrome by using the illusory motion stimuli.

2. Method

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2.1. Participants

The participants were 8 normal adults (control group), 7 chronic schizophrenic patients with positive symptoms, and 8 chronic schizophrenic patients with negative symptoms. Diagnoses were based on the DSM-Ⅲ or DSM-IV criteria. Each person with schizophrenia was assessed using the Positive and Negative Syndrome Scale (PANSS; Kay, Opler, & Fiszbein, 1991). A group with schizophrenia was recruited from mental health center for outpatients in Cheongju and Cheongwon, Chungbuk. Control participants were recruited from undergraduate and graduate students. The demographic characteristics of the three groups are presented in table 1.

Table 1. Demographic characteristics of the participants

Variable	Normal participants	Patients with positive symptoms	Patients with negative symptoms
Male (N)	5	5	5
Female (N)	3	2	3
Age (years)	31.1	43.3	36.9
Length of education (years)	15.3	11.9	11.8
Length of illness (years)	0	18.7	10.8

2.2. Procedure

All of the test were performed in a silent room, where the participants sat in front of the monitor. The task of participants was to respond to whether the illusory motion stimulus was spin, and if the stimulus was percepted spin, which direction was percepted (clockwise or counter) by using keyboard of PC. All participants completed two versions of the test. In the experiment 1, the participants were asked to maintain visual fixation in the center of a computer monitor. In the experiment 2, the participants were asked to change eye movement actively.

Three typical stimuli, shown in figure 1, were used in experiment. On each trial, the stimulus was one of the brightness variations of five levels and the exposure time was 2, 4, or 6 sec. A total of stimuli were 45 and stimulus was presented at random order. Stimulus' length and breadth were about 5.5 inch.

Figure 1. Examples of stimuli
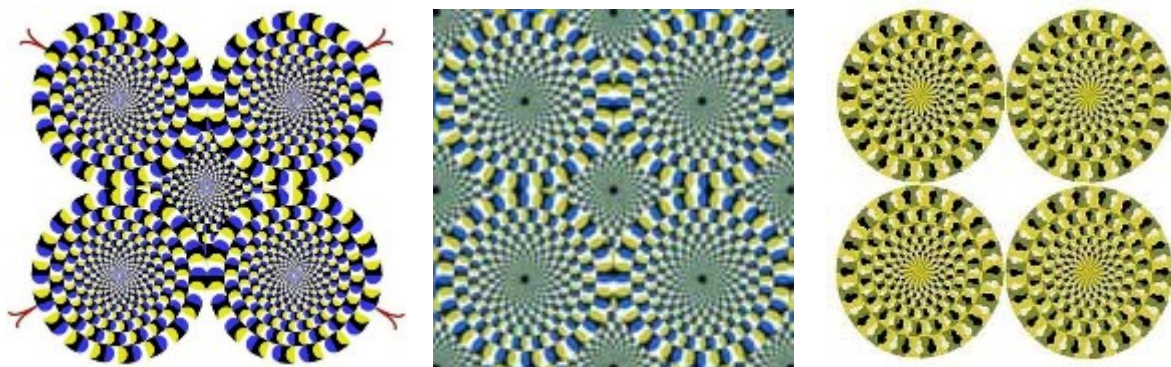
3. Results

There were differences between the normal control group and the patient groups in the accuracy of spin direction. The positive symptom group and the negative symptom group were lower than the normal control group in the accuracy of spin direction in the experiment 2 (Table 2, Table 3).

Table 2. Anova table for the accuracy of spin direction between the experiments

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Group	Accuracy of spin direction in Ex 1	2692.244	2	1346.122	2.202	.139
	Accuracy of spin direction in Ex 2	7089.863	2	3544.932	7.947	.003
Error	Accuracy of spin direction in Ex 1	11003.565	18	611.309		
	Accuracy of spin direction in Ex 2	8029.089	18	446.061		
Total	Accuracy of spin direction in Ex 1	13695.810	20			
	Accuracy of spin direction in Ex 2	15118.952	20			

Table 3. Scheffe's post-hoc group comparisons table for the accuracy of spin direction in the experiment 2

Dependent Variable	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Accuracy of spin direction in Ex 2	Normal	Positive	37.80	10.931	.010
		Negative	37.88	11.406	.014
	Positive	Normal	-37.80	10.931	.010
		Negative	.07	11.750	1.000
	Negative	Normal	-37.88	11.406	.014
		Positive	-.07	11.750	1.000

Shown in table 4, the accuracy of spin direction in the normal control group was higher in the experiment 2 than in the experiment 1. In the case of positive symptom group, the accuracy of spin direction was lower in the experiment 2 than in the experiment 1, while the frequency of motion perception was higher. In the negative group, the frequency of motion perception was lower in the experiment 2 than in the experiment 1, but the accuracy of spin direction was higher.

Table 4. Descriptive statistics for the experiment 1 and the experiment 2

Variable	Group	Experiment 1 Mean (SD)	Experiment 2 Mean (SD)
Frequency of motion perception	Normal	19.50 (12.352)	19.37 (7.671)
	Positive	19.57 (12.830)	23.43 (15.098)
	Negative	15.38 (14.020)	13.75 (9.377)
	Total	18.09 (12.652)	18.65 (11.183)
Accuracy of spin direction	Normal	80.38 (22.884)	93.38 (5.755)
	Positive	64.14 (23.491)	55.57 (28.792)
	Negative	52.83 (28.379)	55.50 (23.763)
	Total	67.10 (26.169)	69.95 (27.495)

Table 5. Loglinear analysis for the frequency of motion perception in the experiment 1

Effect	df	Partial Chi-Square	Sig.	Number of Iterations
Group	1	1.233	.267	2
Brightness	4	76.565	.000	2
Time	2	.417	.812	2
Group*Brightness	4	2.524	.640	2
Group*Time	2	1.530	.465	2
Brightness*Time	8	2.756	.949	2

The brighter stimulus was, the higher the frequency of motion perception was (Table 5, Table 6). In experiment 2, there were statistically significant results on main effect of the group, main effect of the brightness difference, interaction effect between the group and the brightness difference (Table 7).

Table 6. Descriptive statistics for the frequency of motion perception by the brightness difference

Group	Brightness difference	Experiment 1 Mean (SD)	Experiment 2 Mean (SD)
Normal	Very definite	15.00 (3.464)	16.33 (1.528)
	Slightly definite	15.67 (2.082)	16.33 (.577)
	Usually	12.00 (1.000)	12.33 (1.528)
	Slightly indefinite	7.00 (1.000)	6.67 (1.528)
	Very indefinite	2.33 (1.155)	.00 (.000)
	Total	10.40 (5.501)	10.33 (6.565)
Positive	Very definite	14.67 (.577)	14.00 (.000)
	Slightly definite	12.00 (1.732)	15.00 (1.000)
	Usually	11.00 (1.000)	12.33 (1.155)
	Slightly indefinite	4.67 (.577)	7.33 (.577)
	Very indefinite	3.33 (.577)	6.00 (.000)
	Total	9.13 (4.612)	10.93 (3.788)
Negative	Very definite	10.67 (.577)	10.00 (1.732)
	Slightly definite	10.00 (.000)	9.67 (1.155)
	Usually	9.33 (.577)	9.00 (.000)
	Slightly indefinite	7.33 (.577)	6.00 (1.000)
	Very indefinite	3.67 (.577)	2.00 (1.000)
	Total	8.20 (2.651)	7.33 (3.266)
Total	Very definite	13.44 (2.744)	13.44 (3.005)
	Slightly definite	12.56 (2.833)	13.67 (3.162)
	Usually	10.78 (1.394)	11.22 (1.922)
	Slightly indefinite	6.33 (1.414)	6.67 (1.118)
	Very indefinite	3.11 (.928)	2.67 (2.693)
	Total	9.24 (4.412)	9.53 (4.920)

Table 7. Loglinear analysis for the frequency of motion perception in the experiment 2

Effect	df	Partial Chi-Square	Sig.	Number of Iterations
Group	2	12.203	.002	2
Brightness	4	100.669	.000	2
Time	2	.098	.952	2
Group*Brightness	8	26.489	.001	2
Group*Time	4	.197	.995	2
Brightness*Time	8	1.252	.996	2

4. Discussion

The visual perceptual accuracy about the illusory motion stimuli was lower in the patient groups with chronic schizophrenic than in the normal control group. These results imply that schizophrenics have deficits in smooth pursuit eye movement and these deficits causes the differences of motion perception between schizophrenics and normal adults. This study has limitation that eye movement could not be tracked and controlled by using objective device.

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Visualizing Preference and Trust for Online Activities via Multidimensional Proximity Scaling

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Abstract. Communicating and retrieving information using online medium are among the common activities within the society of digital era. Many online communication and activities are especially preferred by students of higher learning institutions as it offers various flexibilities in retrieving and accessing information for academic or non-academic use. In this paper, we present an exploratory study to investigate the online media behavior of undergraduate students relating to their preference and trust for online activities. Participants comprise of thirty eight Universiti Teknologi MARA (UiTM) undergraduate students who were computer literate as well as regular computer users. Data were analyzed using multidimensional proximity scaling and multiple response techniques. In general, the results indicated that male and female students differ in their preferences and trust for online activities. Female students were consistent in their preference and trust for a certain online activity while the males were rather inconsistent in their preference and trust for several online activities. The results in this study would be useful for future research in investigating factors that could influence the behavior of users in seeking reliable information.

Keywords: Preference, trust, online behavior, online activities, multidimensional proximity scaling.

1. Introduction

There are several mediums of communicating information. Besides having direct face to face communication, information can also be delivered through many alternative forms of media such as books, television, radio, telephone, e-mail, posters and many more. Since there are many ways to communicate information, the media that people prefer in receiving such information, may differ. There are several factors that can influence the medium of the communication. The background of these people may influence their preferences in acquiring certain information. Age, academic background, lifestyle, living environment, habits are among various factors that could affect preference.

This study shall explore the phenomena in order to gain insights and understanding on the preference and trust for online activities of undergraduate students, of whom we belief will be the future key players in communication of information via online medium in various private and government agencies. The main focus of this research is to explore the online behavior of undergraduate students based on their preference and trust towards the online activities. In this paper, we shall present the exploratory findings through visualization of response patterns of the undergraduate students on their preferences and trust for online activities.

This paper is organized as follows - Section 2 describes the related work whilst Section 3 presents the undertaken methodology. Section 4 provides the details on the results and analysis prior to the concluding remarks in Section 5.

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2. Related Work

Students have access to the Internet faster than books, television, the telephone, or any other technology for information and communication [1]. Hence, university students are exposed to plenty of digital information via online media such as online news paper, blog, You Tube, Facebook, Yahoo Messenger and e-mails. Such online media become a means of reaching wider audience regardless of time and place. The so-called online media or social media allow anybody to access information and disseminate them to anyone who is ready and willing to respond to the opinion and commentaries in interactive and dynamic manner [2]. Kuiper *et. al* [3] concludes that most students "*like to use the Web but often do not possess the necessary skills to find the right information. And when they do find the right information, it is also difficult for them to use it to pursue an inquiry or solve a problem. Searching for information, usually results in insufficient knowledge, understanding, and insight*". However, they find that "virtually no empirical research" has focused on these abilities: students' insufficient knowledge, understandings and insight [3].

Leu *et al.* [4] refer the abilities of the students to access and read online information as part of new literacy. They describe the new literacy as literacy that possesses five major functions:

- developing important questions,
- locating information,
- critically analyzing information,
- synthesizing information, and
- communicating information to others.

Thus, students must learn how to find the information, evaluate how significant the found information is to their need; and how to use the information to construct their knowledge [1]. While they concentrate on the first three functions above, Leu *et. al* perceives that new literacy should include all of the functions. The later two functions are the crucial elements for current and future online behavior [4]. According to Lawrence [5], information is neutral and it does not have inherent meaning, but information can be manipulated to manage user perception. Therefore, synthesizing and communication information are depended solely on the individuals. In open-access media communication, the impacts of individuals' perception may be able to influence others instantly while reaching to borderless communities.

Even though, for over 20 years, international literacy studies have included locating information as for adolescent and adult literacy, most research on online information, however, is focused on search engine use [6] and online searching behavior [7]-[9]. Little is known, however, about students' preference and trust for certain online activities as well as factors that influence the online behavior.

3. Methodology

Study Design

A snap-shot survey was conducted to gather information on the online communication medium. A self-administered paper-based survey questionnaire was used to collect information on the preferred and trusted medium of communication used by the undergraduate students at the Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA. This study employed an exploratory statistical technique in order to investigate the proximities in the patterns of responses which relates to the preference and trust in using online media. Response data were processed using SPSS16.0 and analyzed via multidimensional proximity scaling and multiple response techniques.

Participants

Thirty eight undergraduate students of mixed gender group from different backgrounds who were regular computer users took part in the paper-based survey. They were selected based on several criteria which include having knowledge and exposure on different types of available online information and media communication. The participants were gathered in a room where they were given ample time to complete the questionnaires.

The questionnaire comprises of 12 multiple choice items that measure respondents' online behavior. It requires students to state their preferences and trust for online media activities. The items were subdivided into two categories - preference (6 items) and trust (6 items) for online activities.

Data Management and Analysis Technique

Responses from the thirty eight participants were converted into binary codes in which for each answer, the value '1' represent a 'yes' or preferred activity and '0' represent a 'No' for non-preferred activity. Each attribute was labeled for reference and identification. Table 1 shows the label for attributes and their descriptions.

Table 1 Data attributes and description

Name Of Attributes For Preference	Name Of Attributes For Trust	Description
q4OnNP	q5OnNP	Online news paper
q4Blogs	q5Blogs	Any blog
q4e-mail	q5e-mail	Using electronic mail
q4Ytube	q5Ytube	You tube videos
q4Ymsg	q5Ymsg	Yahoo messenger
q4Fbook	q5Fbook	Facebook

The data was analyzed using multidimensional proximity scaling technique where it enables the users' response patterns to be formed and visualized into two-dimensional solutions. Multidimensional scaling (MDS) starts with a data set of proximities, which indicate the degree of similarity or dissimilarity among elements in a defined set. The objective of multidimensional proximity scaling is to take proximities data and represent the elements in small dimensional space so that the distances among the elements in the space accurately represent the original proximity measures [10]-[12].

4. Results and Analysis

The two-dimensional solutions in Fig. 1(a) shows that males prefer to use Blogs, Email and YouTube more than females in search for information online. On the other hand, females tend to use Facebook and Yahoo Messenger slightly more compared to the males. However, both male and female respondents were quite similar in their preferences for the Online Newspaper.

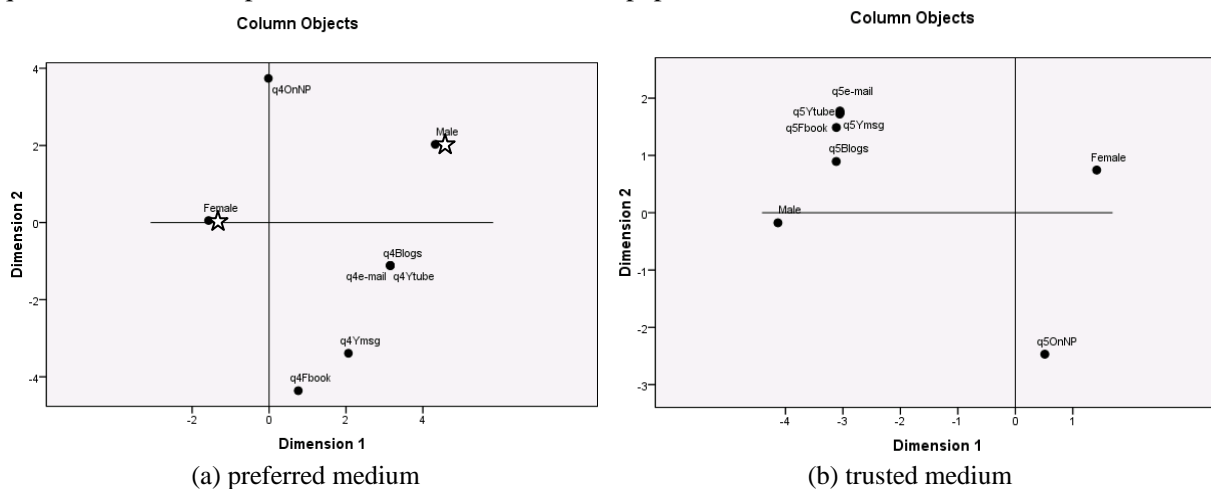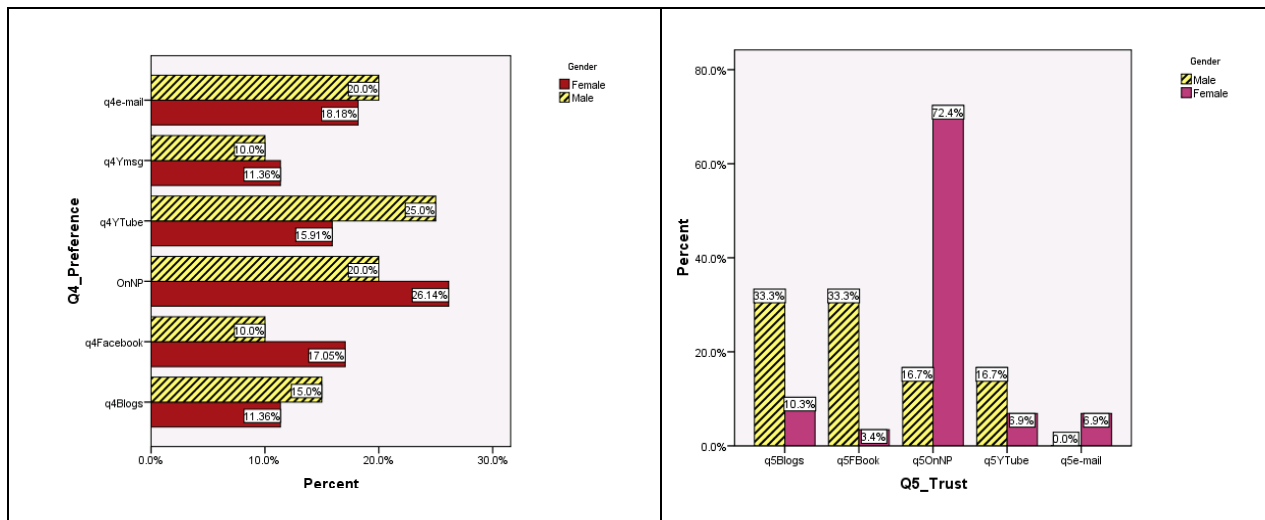(a) preferred medium   (b) trusted medium

Fig. 1 Proximities in response patterns

The two-dimensional solutions in Fig. 1(b) show that female respondents believed that Online Newspaper gives them more reliable information. Males on the other hand, believed that Blogs, Yahoo Messenger, Email, YouTube and Facebook gave them more reliable information. Females response patterns

on trusted medium for online activities were found to be consistent with their response pattern on preferred medium.

(a) Preferred medium   (b) trusted medium

Fig. 2 Comparison between male and female users

From the clustered bar chart in Fig. 2(a), YouTube was the most preferred choice for majority of male respondents while Online Newspaper was the most preferred choice for majority of female respondents. In terms of trusted medium (Fig. 2(b)), majority of female respondents went for Online Newspaper in search for a more reliable information while male respondents equally trusted Blogs and Facebook for reliable information.

Table 2: Female rank usage

(a) Preferred online activities   (b) Trusted online activities

$Q4 Frequencies (Among Females)

		Responses			Rank
		N	Percent	Percent of Cases	
$Q4	q4Blogs	10	11.4%	35.7%	5.5
	q4Fbook	15	17.0%	53.6%	3
	q4OnNP	23	26.1%	82.1%	1
	q4Ytube	14	15.9%	50.0%	4
	q4Ymsg	10	11.4%	35.7%	5.5
	q4e-mail	16	18.2%	57.1%	2
	Total	88	100.0%	314.3%	

$Q5 Frequencies (Among Females)

		Responses			Rank
		N	Percent	Percent of Cases	
$Q5	q5Blogs	3	10.3%	13.6%	2
	q5Fbook	1	3.4%	4.5%	5
	q5OnNP	21	72.4%	95.5%	1
	q5Ytube	2	6.9%	9.1%	3.5
	q5e-mail	2	6.9%	9.1%	3.5
	Total	29	100.0%	131.8%	

Tables 2(a) and 2(b) show that female respondents were consistent in their preference and trust for Online Newspaper. However, there was inconsistency between preference and trust in the other online activities.

Table 3: Male rank usage

(a) Preferred online activities   (b) Trusted online activities

$Q4 Frequencies (Among Males)

		Responses			Rank
		N	Percent	Percent of Cases	
$Q4	q4Blogs	3	15.0%	50.0%	6
	q4Fbook	2	10.0%	33.3%	4.5
	q4OnNP	4	20.0%	66.7%	2.5
	q4Ytube	5	25.0%	83.3%	1
	q4Ymsg	2	10.0%	33.3%	4.5
	q4e-mail	4	20.0%	66.7%	2.5
	Total	20	100.0%	333.3%	

$Q5 Frequencies (Among Males)

		Responses			Rank
		N	Percent	Percent of Cases	
$Q5	q5Blogs	2	33.3%	50.0%	3.5
	q5Fbook	2	33.3%	50.0%	3.5
	q5OnNP	1	16.7%	25.0%	1.5
	q5Ytube	1	16.7%	25.0%	1.5
	Total	6	100.0%	150.0%	

In Tables 3(a) and 3(b), male respondents were more consistent in their preference and trust for Online Newspaper and YouTube. However, there was a slight inconsistency between preference and trust in other online activities.

5. Conclusion

From the exploratory analysis, it is obvious that male and female respondents differ in their preference and trust for certain online media behaviour. Females were consistent in their preference and trust for a certain online activity while the males were rather inconsistent in their preference and trust for several online activities. This is evident as females preferred and trust the Online Newspapers more than the other activities for seeking information. While males tend to prefer the Online Newspaper in search for information, they however, trusted the Blogs, YouTube, Yahoo Messenger and Emails more than the other activities as reliable source of information. While no factors were investigated for reasons in the behaviour of the male respondents to occur as such, however, it is anticipated that such behaviour was influenced by their curiosity to experiment on the activities rather than to critically analyzing and synthesizing the information.

While Kuiper *et al*. [3] emphasized that students must learn to evaluate how significant the found information is to their need; and how to use the information to construct their knowledge, somehow the findings in this study do not give indication that students are geared toward such behavior. On the other hand, the findings are quite consistent to Lawrence [5] who emphasized that the information acquired can be manipulated to manage user perception and that synthesizing and communication information are depended solely on the individuals.

Therefore, in the next stage of our study, factors that influence the behaviour of the respondents to occur as such shall be investigated.

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Home and School Based Intervention Model for Thai Children with Attention Deficit Hyperactivity Disorder

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Abstract. The objectives of this research were: 1) to develop The Home and School Based Intervention Model for supporting the children with Attention Deficit Hyperactivity Disorders (ADHD), and 2) to compare The ADHD Children's behavior between pretest and posttest of the experimental group regarding to the work success, self-control, and social skill. The samples were 16 ADHD Students studying in Pratomsuksa 4 of Khon Kaen University Demonstration School during 2008 school year. They were assigned into the experimental group and control group by using Simple Random Sampling. There were 2 kinds of instrument including: 1) for collecting data, consisted of 4 issues: Work Success Assessment Scale, Self-Control Behavioral Assessment Scale, Social Skill Assessment Scale, and Self-Control Behavioral Observation and Record Form, and 2) for the experiment, consisted of 3 sets: Parents' Workshop Training Program, Teachers' Workshop Training Program, and Group Counseling Program for ADHD Children. There were 5 phases of research methodology including: Phase 1; demographic data study regarding to ADHD, Phase 2; development of intervention model, Phase 3; development of model, Phase 4; tried out model, and Phase 5; model improvement and revision by using experimental design as Pretest-Posttest Control Group Design. Data were analyzed by using basic statistics, and compared between group differences by Mann-Whitney Test, and within group differences by Wilcoxon Signed Ranks Test. The findings could be concluded as follows:
1. For Home and School Based Intervention Model for Thai ADHD Children, it consisted of collaboration between parents and school. The students' parents played their role in child rearing practice. The school played its role in 2 aspects including Group Counseling and Learning Support.
2. For the experimental group ADHD children, their behaviors in work success and self-control from posttest were higher than those of the control group at .05 significant level.
3. For the experimental group ADHD children, their behaviors in work success, self-control, and social skill were higher than the pretest at .05 significant level.
Keywords: AD/HD, Home and School Based Intervention, Group Counseling

1. Introduction

The state of Attention Deficit Hyperactivity Disorder was caused by Neurological Condition Disorder. As a result, the problem in lacking of concentration, being impulsive and easily angry. These conditions always occurred with some children during school or preschool age (NIMH cited in Pieangelo and Giuliani, 2008). In Thailand, found that there were approximately 3-5% of classroom with 50 students from schools in Bangkok (Prompan Piangtip, 2007). Those symptoms not only directly affected their learning but also society. For medical field, found that the attention deficit often occurred with other kinds of disorder, for instance, Oppositional Defiant, Conduct, Anxiety, Depression, and LD. When the attention deficit weren't supported, they would be risky for stimulating other kinds of disorder to be more severe. Those results not only continued until they were adolescents and adults, but also caused the problems of behavioral problems including the lack of restraining themselves and thinking over carefully, or having different risky behaviors which would lead to the accident and crime (Goldstein, 1997).

It was indispensable in providing intervention for the children with Attention Deficit Hyperactivity Disorder in order to alleviate problems as the above. According to the studies, found that The Holistic

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Approach and Multiple Modality Approach by combining various techniques including the parents' training to obtain knowledge and understanding in child rearing technique, teachers' knowledge in managing the instructional context and group counseling for children with attention deficit hyperactivity disorder to improve their own behaviors, would be efficient and lead to sustainable outcome.

2. Research Objectives

1) To develop the model for supporting the children with Attention Deficit Hyperactivity Disorder by using home and school based intervention.

2) To compare behavior of the children with Attention Deficit Hyperactivity Disorder between the experimental group and control group regarding to work success, self-control, and social skill.

3) To compare behavior of the children with Attention Deficit Hyperactivity Disorder of the experimental group between the pretest and posttest regarding to work success, self-control, and social skill.

3. Samples: were 16 Pratomsuksa 4 Students of Khon Kaen University Demonstration School during 2008 school year, diagnosed as children with Attention Deficit Hyperactivity Disorder by the physician. Eight students were assigned into experimental group and the other 8 students into control group.

4. Research Instruments: There were 2 kinds of instruments: 1) the instrument using for collecting data, consisted of The Behavioral Assessment Form of Work Success, Self-control, Social Skill, and Behavioral Observation and Record Form in Self-control, and 2) the instrument using in the experiment, consisted of The Parents' Training Program, Teachers' In-service Teaching Program, and Group Counseling Program.

5. Research Methodology: There were 5 Phases:

Phase 1: Documentary Study and Field Study in order to analyze important issues for intervention.

Phase 2: Develop the model for intervention by synthesizing data from field study and related approaches.

Phase 3: Develop the model by pilot study and improvement.

Phase 4: Try out the model with the samples by providing the training for parents and teachers, and group counseling for the children with Attention Deficit Hyperactivity Disorder. Then, they can apply their knowledge and skills in helping ADHD students by using Home Based Intervention and Classroom Based Intervention respectively.

Phase 5: Reflect the findings of application and improve for complete form.

6. Research Findings:

1. The developed model consisted of major components including: home and school; the parents applied their training knowledge with their children regarding to child rearing practice; the teachers applied their training knowledge in instructional context; the school counselors provided group counseling for the children with Attention Deficit Hyperactivity Disorder; and the teachers and parents had major role in providing intervention by 2 way communication by phone, verbal communication after school, and holding the weekly conference. It was supported by D' Alomzo's (1996) statement that the intervention for children with Attention Deficit Hyperactivity Disorder should include: counseling, training, behavior modification as well as modification of instruction with teamwork as educators and parents. Likewise, Diome (2000) found that the good intervention should include the parents as team leader, teachers as observer of classroom behavior as well as closely cooperate with students' parents. The model was illustrated in figure 1.

Figure 1: Home and School Based Intervention Model for Thai Children with Attention Deficit Hyperactivity Disorders
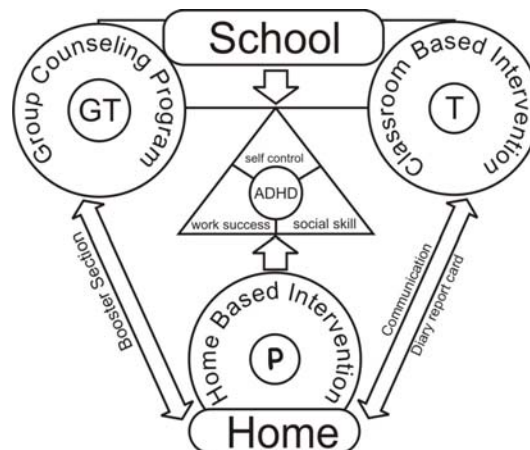
According to Figure 1, T referred to the teachers providing support in classroom. They appropriately selected the teaching techniques, media, learning activities, assignments, and teaching arrangement. They stimulated the students in paying attention to studying. The students' classmates were managed in helping the ADHD students in studying. In addition, the teachers collaborated with the students' parents in using behavior modification technique.

GT referred to the guidance teachers providing group counseling for ADHD students regarding to studying techniques, organization, problem solving, stress management, decision making, adjustment with their classmates, and self worth.

P referred to the parents provided helping by using Home Based Intervention by efficiently communicating with children, developing good relationship with the children, paying attention to appropriate behavior, inculcating disciplines, monitoring appropriate behavior in public, and collaborating with school in using behavior modification technique.

For the implementation as the above, it was performed by using 2 ways communication coordinated by school counselor in organizing conference so that they could collaborate in solving problems in order to shape 3 aspects of behavior: work success, self control, and social skill.

2. For the experimental group of children with Attention Deficit Hyperactivity Disorder children, they had their behavior in work success and self-control higher than those of the control group at .05 significant level. For their social skill, there was no significant difference. It was supported by Yehle and Wambold (1998), Alban-Metealfe and Alban-Metealfe, 2001), findings that the adequate instructional technique and instructional management relevant to the state of Attention Deficit Hyperactivity Disorder, would support the children to have their self-control until they could achieve their work success. For social skill, it was necessary to take time in inculcating and developing the skill. Consequently, the findings between the experimental group and control group, weren't clearly seen (Du Paul and Stonner, 1994).

3. For the experimental group of children with Attention Deficit Hyperactivity Disorder, they had their behavior of work success, self-control, and social skill higher than the pretest at .05 significant level. It was supported by Harris and others' (2005) findings that the samples as 6 Primary School Students taught by self-control, showed higher level of work responsibility. Likewise, Braswell and Bloomquist' (1991 cited in Webb and Myrick, 2003) viewpoint that the group counseling could be able to help the members to collaborate in shared learning which was a kind of social skill development. Besides, it was also found that the studying in problem solving, decision making, as well as the social skill, was practical. So, it was problem solving relevant to the issues and multi dimension related with each other (Erik, 2004). For this part, it might cause the experimental group to have better social skill, there was no significant difference between the experimental group and control group, though.

7. Guidelines for applying the findings:

1. For school level;
   1.1 The teachers could be developed in teaching the children with Attention Deficit Hyperactivity Disorder in inclusive classroom.
2. For institution level;

2.1 In-service teaching could be provided.
  3. For policy level;
    3.1 Service center could be provided for the students' parent who found some problems.

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Functional Assessment of children born prematurely using the Pediatric Evaluation of Disability Inventory

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Abstract. The objective of the study was to compare the functional assessment of children of age 5-7.5 years who were born preterm with the children born at term using the Pediatric Evaluation of Disability Inventory (PEDI). This was a cross sectional study based on a survey conducted in schools and the community. The validated PEDI questionnaire was administered on 255 children of age 5-7.5 years born at term and 52 children of the same age born preterm. Both the groups were compared using the Independent Sample 't' test and Pearson's chi square test for the Functional Skill Scale (FSS) and Caregiver Assistance Scale (CAS) of PEDI respectively. The results showed that there was significant difference in the scores of the FSS and CAS between the 2 groups where the normal children achieved higher scores as compared to the children born preterm. We concluded that Children of age 5-7.5 years who were born preterm were significantly low in the self care and social function skills and were more dependent on their caregiver when compared to their peers who were born at term.

Key words: Functional Assessment, Preterm, Paediatric Evaluation of Disability Inventory

1. Introduction

The overall perspective of health problems in India, the brunt of this strain is felt by the vulnerable groups, i.e. mothers and children. [1] Morbidity is common in children and frequently involves physical, developmental, psychological, emotional, or behavioural problems. Children's health could be substantially improved if vulnerable children who are 'at risk' are readily identified. It is especially important to monitor the health of these vulnerable populations to limit health care costs. [2]

There are several risk factors which contribute for developmental delay. There is now clear evidence that prematurity and low birth weight is the most important biological risk factors for developmental delay [3.] Significant advances in perinatology and neonatology in the last decade have resulted in increased survivors of extreme premature infants.[4] In an infant, born premature, body systems are often underdeveloped. The medical complications associated with prematurity often lead to CNS damage. The developmental outcomes of children born preterm remain a serious concern.[5]

Huddy et al have shown that preterm and low birth weight babies are at high risk for motor, sensory and neuro developmental problems, educational difficulties and behavioural disorders.[6] High incidence of learning, behavioural problems and early school failures even in pre term children who were neurologically normal has been reported by Gross et al. [7]

All the above factors may have long term implications on the child, causing impairments and limitation in functional activities and thus may precipitate disability. While research is focusing on neuro

motor, sensory, cognitive, & language skills, studies to date have rarely focused on application of these skills in everyday settings in children born preterm. Such skills have been called functional skills which is multi dimensional construct that includes daily living, socialization & communication.[5] Children growing, learn essential functional activities, and will be able to function more and more independently, guided by the parents or caregivers. [8]

A review of the measures indicated the comprehensiveness of the Paediatric Evaluation Disability Inventory (PEDI) developed by Haley et al, which is a parental report or structured-interview instrument used to assess the functional abilities of young children of age 6 months to 7.5 years. This instrument consists of 'Functional Skill Scale', 'Caregiver Assistance Scale' and 'Modification Scale'.[9,10]

The present study aimed to compare the functional status in children of age 5-7.5 years who were born preterm with that of children born at term using the Paediatric Evaluation of Disability Inventory.

2. Methodology.

2.1 Study Setting
The study was conducted within the limits of Mangalore City Corporation in the state of Karnataka, a city along the western coastal line of India and was based on house to house and community survey.

2.2 Study Design
Cross sectional study

2.3 Study Subjects
Group 1: Inclusion Criteria: Normal Children of age 5 to 7.5 years born at term as indicated by the medical records.

Group 2: Inclusion Criteria- Children of age group of 5-7.5 years with a history of Preterm birth <37 completed weeks of gestation as per the medical record

Exclusion Criteria- Children with diagnosed motor, sensory or musculoskeletal problems, Cerebral palsy, and history of deafness or use of hearing aid, severe visual acuity problems, diagnosed mental retardation and children diagnosed to have learning disability.

2.4 Sampling
Group 1: Simple random sampling and Group 2: Non random sampling

2.5 Data Collection
The content validity of original PEDI was established by a panel of experts after administration on a pilot sample of 23 non disabled children which showed that the cronbachs alpha and the Internal consistency ranged from 0.68-0.93 and 0.6-0.7 respectively denoting poor to moderate ICC values. Approval from the Institutional Research and Ethical Committee was obtained. Written Informed consent was taken from the parent/ caregiver prior to administration of validated PEDI.

Out of the total of 60 wards within the limits of Mangalore City Corporation (MCC), 14 wards were selected randomly. Normal Children between 5 to 7.5 years from the selected wards of MCC were recruited for the study and validated version of PEDI questionnaire was administered on the parents or caregivers in the language that they understood in the form of structured interview.

The validated PEDI was administered on 52 children aged 5-7.5 years who were born preterm. These children were identified through the medical records of the hospitals in Mangalore and through the schools in Mangalore.

2.6 Data Analysis

Data analysis was done using the SPSS version 15. The Mean and Standard Deviation (S.D) for the raw scores for the Self care domain, Mobility domain and Social function domain of the functional skill scale and Caregiver Assistance Scale was obtained for Group 1and Group 2,

Using the raw score mean of the functional skill scales, Group 1 and Group 2 was compared using the Independent Sample 't' test. Using the raw score mean of the Caregiver Assistance Scale, Group 1 and Group 2 was compared using the Pearson's chi square test.

3. Results

The purpose of the present study was to compare the children of age 5-7.5 years born preterm (Group 2) with the children of the same age born at term (Group 1) using the validated version of PEDI.

Table 1: Raw score mean and S.D of the 3 domains of Functional Skill Scale in Group 1 and 2

Age in yrs	Self Care		Mobility		social function	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
5-5.5 years	66.5±5.3	59.5±10.5	56.8±1.4	56.7±1.0	60.0±3.5	50.5±9.2
5.5-6 years	68.0±5.2	66.8±3.9	57.3±.7	57.6±.7	60.6±5.7	60.7±2.1
6-6.5 years	70.5±3.5	66.3±7.1	57.4±.7	56.0±3.8	62.5±1.9	58.4±7.7
6.5-7 years	70.4±3.8	67.5±4.3	57.5±.6	57.3±.9	62.2±2.4	61.0±1.4
7-7.5 years	71.7±2.6	62.8±6.3	57.7±.6	56.8±.9	63.2±1.9	53.5±12.1

Mean±S.D

Table 2: Comparison of the mean scores of FSS of Group 1 and Group 2

Domains	Group	N	Mean	S.D	Mean Diff	't' value	'p' value	95% CI of the difference	
								lower	Upper
Self Care	1	255	69.38	4.6	3.97	3.89	0.000	1.93	6.02
	2	52	65.4	7.1					
Mobility	1	255	57.35	0.922	0.83	2.07	0.044	0.24	1.64
	2	52	56.52	2.87					
Social function	1	255	61.69	3.61	3.92	3.58	0.001	1.73	6.12
	2	52	57.77	7.73					

The Raw score mean and S.D of the 3 domains of Functional Skill Scale in Group 1 and 2 is shown in Table 1. The raw score mean of the 3 domains of FSS was compared for the Group 1 and Group 2 using the independent sample t- test as shown in Table 2,. This showed that there is significant difference in the self care and social function domains between the 2 groups where the normal children achieved higher scores in these two domains as compared to the children born preterm. However, this difference may not be clinically significant.

Caregiver Assistance Scale:- The mean and SD for the scores for the 3 domains i.e. Self Care, Mobility & Social Function in the Caregiver Assistance Scale was obtained for the Group 1 and Group 2. There was a significant difference in the scores of the Caregiver Assistance Scale between both the groups in most of the items except 'Eating' and 'Bowel Training' of the self care function domain and 'Bathroom transfer' and 'Indoor locomotion' of mobility domain indicating that in the present study, children of age 5-7.5 years born at term were more independent and required less assistance from the caregivers in performing these activities when compared to the children of the same age born preterm.

4. Discussion

Functional status instruments measure functional skills which are practical behaviours that enable children to interact & live within their physical & social environments. Children's increasing functional skills becomes important as they enter formal schooling. It has been reported that teachers consider independence in functional skills as a critical component of school readiness. [2]

Comparison of the raw score mean of the two groups showed that there was significant difference in the self care domain and social function between the 2 groups where the normal children achieved higher scores in these two domains as compared to the children born preterm. Though this is statistically significant, a difference of score '2' may not be clinically significant considering the variations in score even in the normal children in group 1. This indicates that the preterm born children do lag behind in their functional skills especially the self care & social functions which is in agreement to the numerous studies done on preterm born children.

Comparison of the scores of the 3 domains in Caregiver Assistance Scale between Group 1 and Group 2 showed that the term born children were more independent and required less assistance from the caregivers in performing the activities when compared to the preterm born children.

The functional skills are dependent on many factors such as sensory, motor, behavior, emotional, parenting styles, child rearing practices, home & school environment etc. With so many factors contributing to the functional skills, a problem in any of these areas will affect the function of the child. Studies show that the preterm born children in spite of not having major neuro developmental problems have shown deficiency in many areas of development when compared to their peers.

Marlow performed a controlled study of motor skills on fifty three ELBW children aged 6 years old without cerebral palsy and receiving mainstream education. On the test of motor impairment, ELBW children had a wide range of minor abnormalities of motor, neurological, cognitive, and behavioral function than the controls. [11]

Jongmans et al showed a surprisingly high proportion of preterm children with minor neurological signs and / or perceptual motor difficulties in the absence of major neurological impairment. As the presence of these problems may affect the children's ability to function in everyday life, it is essential that they are comprehensively assessed so that meaningful intervention can be planned when necessary. [12]

Huddy et al concluded that preterm and low birth weight babies were at increased risk of motor and sensory neuro developmental problems, educational difficulties, and behavioral disorders and they may

have multiple area of hidden disability.[6] The Scottish low birth weight study group in their cohort study documented that at the age of 4-5 years, the study children were poor in tests of fine motor skills. [13]

All the above studies show evidence that preterm and low birth weight children may have subtle & minor deficits that may affect the children's ability to function in everyday life. This was evident in our study which showed that these children have poor functional skills which is very important for active participation in day to day life. It is thus very essential that these children are comprehensively assessed and observed into adolescent age so that meaningful intervention can be planned when necessary.

5. Conclusion

It was thus confirmed that children of age 5-7.5 years who were born preterm had lower scores in self care and social function skills when compared to the children of the same age who were born at term and they were more dependent on their caregiver for assistance in performing most of the activities in self care, mobility & social function skills.

Study Limitation: The present study did not consider the environment of the children which may have influenced the results. In addition, because PEDI depends on caregiver's reports regarding the behaviour of children, this assessment can be subject to the biases of the person supplying the information.

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Human Resource Management in India –Review and avenue for Behavioral Research from Technology and Business

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Abstract. India is emerging as a super power, slated to be among the world's five largest economies and viewed by international investors, business conglomerates and tertiary education providers as a land of opportunity. A database search since the opening up of the Indian economy in 1991 reveals a slowly increasing number of scholarly articles on Human Resources Management (HRM) with a steep rise from the year 2000 onwards. The structural adjustment program or liberalization initiated the process of the opening up of an otherwise closed economy of India. Liberalization created a hyper-competitive environment and to respond to this turbulence, Indian organizations adopted innovative changes in their HRM practices. Current research shows that HRM practices are important for enhanced corporate performance but little has been reported on the effect of HRM practices and corporate performance in the context of economic liberalization of India. While it is acknowledged that the field of HRM is a broad area, there is currently a dearth of research in specific HRM practices and policies in India to warrant a focus on only one area. This paper tried to understand the role of innovative HRM practices and specifically questions how HRM practices, like the role of HR department, recruitment; retraining & redeployment, Performance appraisal and compensation enhance corporate performance during the change process. Hence the primary objective of this article is to present a scholarly survey of important research literatures in the area of HRM in India, and to offer avenues for future research. To this end this article garners, integrates and discusses research on HRM in India with a focus primarily on the past fifteen years. It is within this complexity that research on India and its workforces is presented by illuminating HRM as embedded in the Indian environment with its intricate epistemologies and transitions in a period of dynamic change.

1. Introduction

Global work life needs assessment conducted by leading work life consultants Shapiro and Noble (2001) have identified three surprisingly consistent themes of what employees from around the world identify as being important barriers to reconciling their work and personal lives. The three issues identified included a lack of flexible work policies and practices, the availability of dependent health care, and the negative impact of work overload and long working hours.

In the last 20 Years, research has shown that the strategic use of human resource management is likely to be one of the most important determinants of organizational performance and Many Researchers have built evidence that links HRM practices with corporate performance (Schiller and MacMillan 1984)

This paper examines the effect of SHRM (strategic human resource management) practices on HRM performance, during significant macro-environment changes, this research study focuses on 3 issues.

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1. The paper considers the impact of western SHRM framework and provides empirical evidence from India.

2. It adds to the growing body of literature on management practices and HRM in India

3. Finally this research paper considers providing evidence from an important emerging economy where strategic role of HRM as a Key driver of firm performance has gained the value of currency in post liberal economic scenario.

2. The transforming Indian context:

India witnessed a spark of corporate activity fallowed by liberal economic policies of 1991. India's liberalization and economic restructuring programmed which was triggered as a response to serious Balance of Payment crisis when its foreign exchange reserves touched their all time low to mere billion dollars.

India approached IMF and World Bank & they agreed to help India to avert the crisis with the help of structural adjustment loans. As a result, opening of economy witnessed a large inflow of foreign capital with increasing no. of multinational commencing operations. This was the initial phase of liberalization.

During the second phase, Indians witnessed a turbulent era in the form of hyper-competition. Liberalization created intensive competition through easier entry and greater participation. It opened many opportunities for her growth and because of removal of artificial barriers on pricing and output decisions, investments, mergers and acquisition, technology imports etc.

3. Being important does mean that:

To think globally does not prelude attention to local environment and it is important that HR policy makers give attention to identifying and understanding strategic work life policy development at the national/local level as well as with in a wider global context and frame. Thomson and Richter(1988) refers to global HR strategies as those that accommodate national cultural differences while preserving work culture principles that encourage people to effectively execute the global strategy. The paradox of "think globally, act locally" is a dilemma facing HR professionals working in MNEs facing unprecedented levels of global mergers, acquisitions and international growth, Responsiveness. New HR strategies to be implemented across broad rang of culture. The challenge for MNEs when developing a global work/life strategy is to balance global integration and local growth. When a business become global, it means that the increasingly more complex set of business strategies require a better connectivity to diversity and an ability to achieve competitive advantage but not at the expense of human health, well-being and personal lives.

4. State of the body of knowledge:

Leading scholars in HRM have raised awareness of the constraints and challenges for HRM in a global context. However there has been little discussion amongst researchers regarding work/life balance as a concern for HRM in a global context where IHRM research has largely focused on Expatriate Management. Current researches investigating the increasing diversity of international work assignments have shown evidence of a trend towards flexible forms of international work, such as transnational project terms, short-term assignment, and virtual assignments. Such assignments are increasingly being undertaken by employee outside the senior levels of management (Harris & Brewster, 2003).

A critical issue for future research is the impact on that globalization has on work-family practices in multiple socioeconomic contexts. Such developments in international business present many important challenges, demands and opportunities for HR practitioners in MNEs (Losey, Meisinger & Ulrich, 2005; Roehling et al., 2005 ;).

In a thorough review of current work/family research and directions for future research (Bowes,2005) concludes that most of the research that appears in the literature derives from the United States and recommends that investigation of work/family issues in different countries is likely to identify issues that are not currently on the research agenda. In addition, Poelmans, O'Driscoll and Beham (2005) state that from a methodological perspective a salient criticism of the extant work/family research is the 'almost total reliance on quantitative, cross sectional research design's and they recommend additional qualitative research that focuses on different socio-cultural contexts.

5. Methodology:

Although liberalization in India started in 1991, with phased deregulation and changes in the industry, it was around the second phase in 1997-1999 that organizations started to restructure and adopt innovative practices to brace competition. Thus a 5-year period was opted for measuring the respondent's perception (from2002).

So in the context of liberalization, this study posits that for firms that are facing turbulent environment in India.

Hypothesis 1: Innovation of HRM practices (role of HRM, recruitment, retraining & redeployment, performance appraisal) will be positively related to organizational performance.

Hypothesis 2: HRM practice adopted in the post-liberalization era would be significantly more innovative than those followed in the pre-liberalization era.

Recent work has also argued that synergies among a firm's HRM practices can have an additional and positive effect on firm performance (Delaney & Huselid, 1996). The notion of synergies is intuitively appealing, but it is not easily measured. The paucity of empirical evidence on this subject, specifically during turbulent changes in the competitive environment, led to developing a rough measure of synergy among HRM practices for a set of sample firms. Accordingly,

Hypothesis 3: In the context of liberalization, synergies amongst innovative HRM practices would be positively related to organizational performance.

6. The sample:

The study sample covered a wide spectrum of organizations. In terms of sales revenue 35% organizations reported sale revenue of over 100 million USD, 2% in the range of 80 to 100 million USD, 9% in the range of 40 to 60 million USD, 28% in the range of 20 to 40 million USD and 17% below 20 million USD In terms of industry breakup, about 37% were from production sector, 22% were from the service sector, 13% from the capital goods sector, 11% each from the non-durable consumer goods and the industrial goods sector while 6% from the consumer durable goods sector. In terms of ownership, 56% or respondent organizations were public Limited. Companies, 26% were multinationals, 11% were Government /Semi Government owned while 7% were private limited organizations.

7. Analysis:

1. This study measured both independent and dependent variables from a single subject, aggregated and average over multiple responses. For this reason response bias may occur but might be limited due to deliberate use of the independent variables before the dependent variables

2. To address issues of possible common method variance reliabilities were checked which ranged from .73 to .89, which is satisfactory for a study of exploratory nature (Nunnally, 1978)

3. To address issues of possible common method variance reliabilities were checked which ranged from .73 to .89, which is satisfactory for a study of exploratory nature (Nunnally, 1978)

4. Scale validity was tested by confirmatory factor analysis in an effort to rule out the possibility of a single general factor and to establish the validity of the multiple scales posited. *Due to space limitations a full discussion cannot be done here*, but the data analysis was able to reject a single general factor measurement model that yielded six factors explaining 70.27% of the variance. Khandwalla (2002) in his study of 139 Indian firms found similar results.

5. Principal component factor analysis with varimax rotation was done on the individual HRM management practice items to form the innovative HRM practice variables. The examination of interrelatedness among the items with Cronbach's alpha suggests that the items for each construct were highly related and thus they were aggregated to create a scale by taking their means.

8. Results:

- Correlation between the dependent variable of perceived organizational performance (as measure "Now") and the independent variables of innovative HRM practices which are positive, ranging from .24 to .37 and significant.

- Associations among innovative HRM practices are all positive.

- The control variables of firm size and age of firm were not significantly related with perceived organizational performance.

9. Conclusion:

Studies of liberalization and de-regulation in an emerging context are very few. Within this context, this study examined the relationship between innovative HRM practices during the liberalization of one of the world's most populous emerging markets.

Study finds that Some HR practices are better or more important than others and these strategic (in this study "innovative") HR practices consistently lead to higher organizational performance, more dependent on the environment.

In total , this study finds support with recent studies vis-à-vis the work pattern in India is under transition with more innovative HRM practices, increased flexibility, competency based remuneration, benchmarking.

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The Comparison of Effectiveness Between Two Couple Therapies, CBCT and EFT on Marriage Satisfaction in Infertile, Male Factor Pairs

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Abstract. This research is a quasi-experimental design, and aimed to study the effectiveness of two couple therapies, Cognitive Behavioral Couple Therapy (CBCT) and Emotional Focused Couple Therapy (EFT), on marriage satisfaction of infertile male factor pairs. The sample includes of 30 volunteer pairs of among Kosar Infertility Clinic's infertile in 2007-2008 which in matched position replaced in two experimental and a control group. By the applying Enriching and Nurturing Relationship Issues, Communication and Happiness questionnaire (ENRICH) and the Mann-Whitney U test, the results showed that marriage satisfaction in CBCT group had significant differences in comparison with the control group. The results also showed that the effect of two approaches on men and women were the same.

Keywords: Cognitive Behavior Couple Therapy, Emotional Focused Couple Therapy, marriage satisfaction, Infertility.

1. Introduction

According to the research findings 15% of couples, in spite of their own willingness, don't have children and the other 10% have fewer number of children than they wish(Sadri Ardekani, Arabi and Servati ,2001) .The World Health Organization (WHO) says 50 to 80 million people have primary or secondary infertility all over the world. (Seyed Fatemi and Mehdi Hosseini, 2000).

Infertility and its treatment create a major and prolonged crisis for the couples and is a stressful condition that creates a heavy psychological trauma for the couples tension. (Seyed Fatemi, Mehdi Hosseini 2000).

Therefore this research focuses on the impact and comparison of the two couple therapies Cognitive Behavioral Couple Therapy (CBCT) and Emotional Focused Couple Therapy (EFT) on marriage satisfaction of male infertile pairs. A question which has risen in this regard is as follows: "Do the cognitive behavioral couple therapy and emotional focused couple therapy have an influence on increasing the marriage satisfaction of male infertile couples? Which one has a priority? Are the impacts of these methods related with sexuality? This research explains these issues based on the extensive studies that the researcher has done in this regard.

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2. Research Background and Theoretical Framework

Generally speaking, the psychological problems of infertile couples range between 25% to 60 %(Seibel and Timore, 1982 quoted Baby center.com). Some researches have paid considerable attention to the fact that problems such as lack of self-esteem, sense of bereavement, threat (menace), side pressures, depression, feeling of guilt, anxiety and frustration, emotional pressures and matrimonial (sexual) problems are common among infertile couples. Also Ramazanzadeh states that during the first three years of married life, infertility is accompanied with the symptoms such as depression, anxiety, lack of self esteem, sexual impotency and marriage maladjustment (Ramazanzadeh et al, 2004).

Do the emotional- psychological problems lead to infertility? Or does the infertility lead to emotional – psychological problems? In both cases, it is obvious that infertility is a crisis that leads to a psychological imbalance, especially when a possible and quick solution is not found for it. (Saki et al, 2005). The psychological Reactions of the individual are in the form of despair, sadness, denial (Hemati Gorgani ,2001)sense of guilt(Saki 2005, Hemati Gorgani 2001, Garmaz Nejad 2001) , Depression (Hemati Gorgani 2001, Shariat Nejad 2001, Garmaz Nejad 2001), anxiety(Eugster et al 1999 , Pergali et al 1995, Reed 2001, Garmaz Nejad 2001, Rayka 2001), disappointment and hopelessness (Sardari Sayer 2005, connoly et al 1985, Saki 2005, Garmaz Nejad 2005, Dehghanpoor 2001, and Seif 2001), grief reaction (Yekta Talab et al , Parsanejad, Jahanmiri 2001), reduction of self esteem (Cleveland Infertility Clinic Website 2005, Dehghanpoor 2001, Mirzamani 2001) , changing in the individual's mental picture and feeling a change in the self identity comparing with healthy persons(Younesi et al 2005), losing life control(Nilforooshan et al 2005, Dehghanpoor 2001, Cleveland Infertility Clinic web site 2005), changing in sexual identity(Khooshabi 2001) marriage maladjustment (Dehghanpoor 2001, Mirzamani 2001, Rayka 2001, Dadfar 2001) sense of disqualification (Garmaz nejad 2001) , life dissatisfaction (Gontinze et al 1992 and Chang 1994 quoted by Seif 2001) , suicide(Dehghanpoor 2001) , suspicion (Mirzamani 2001).

It is obvious that infertility diagnosis has an impact on marriage relation. One of the most important problems that couples face, is the reduction of important sexual relationship. In most cases, the infertile side fears that the other side will leave him/her and will look for a fertile wife/husband. Sometimes the infertile side encourages his/her wife/husband to get a divorce, supposing that he/she will have a better life. When the infertility treatment starts, because of some stresses one of the sides condemns the other of laziness and lack of enthusiasm. In this case the other side gets very angry. Unfortunately sometimes the pressure of having sexual intercourse is so high that the infertile side starts to have sexual relation with some other persons in order to prove his/ her self merit and fertile capabilities. (Key et al, 1995).

Moreover, the literature background of the comparison of couple therapy of EFT and CBCT (Baucome, Shoham, Mueser, Dayto and Estikel 1998, Donne and Shobel 1995, Halok and Markam 1988, Wesky and Warring 1996, quoted by Byrne, et al 2004) shows that : 1. Cognitive Behavioral therapy were effective for the treatment of the majority of average to high level stresses and couple problems (anxiety, depression, helplessness and marriage disagreement) of the sample group, but the post treatment consequences show that some couples show signs of relapse. 2. The

effectiveness of CBCT of the statistical samples doesn't integrate with adding or compiling of the techniques of cognitive therapy. 3. EFT is effective in reducing mild to average couple problems (anxiety, helplessness, and marriage disagreements) while the desire for continuing and following of the therapy procedures in the couples after the end of therapy is still powerful and growing.

3. Results

- The findings of Mann-Whitney U test show the influence of Cognitive Behavioral Couple Therapy in increasing the marriage satisfaction among male-factor infertile in statistical sample. ($p<0.01$) (Table 1).
- The research findings of Mann-Whitney U test shows that the application of EFT approach didn't have any meaningful change in the marriage satisfaction of male infertile. ($p>0.05$) (Table 2).
- The findings of Mann-Whitney U test revealed that the Emotional Focused Therapy and the Cognitive Behavioral Couple Therapy didn't have any difference in meaningful effect on increasing the marriage satisfaction of the males and females ($p>0.05$)
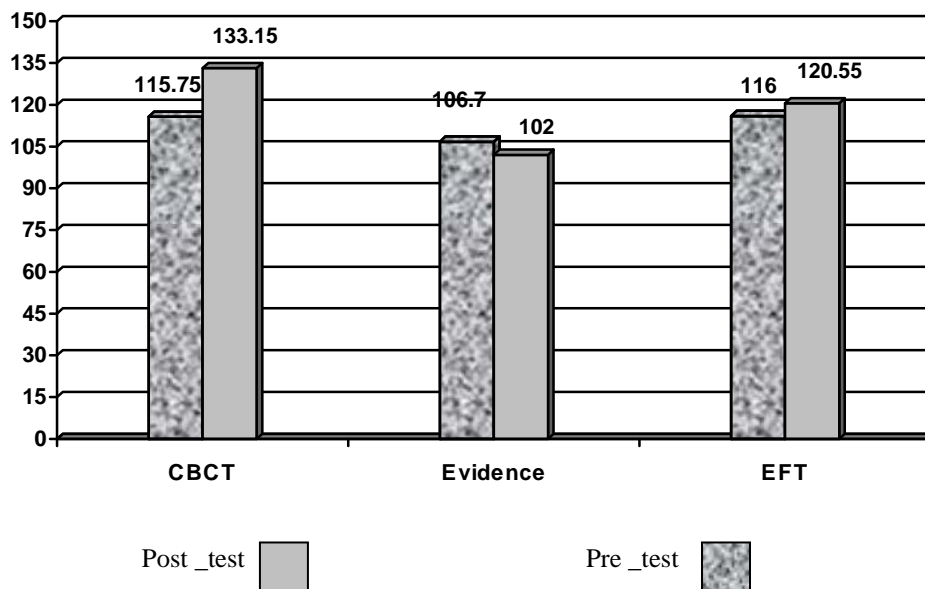
Tables and statistical graph

Fig. 1: The comparison of the average scores of marriage satisfaction of pre _test post test of the three studied groups

Sig. (2-tailed)	Z	Mann - Whitney U	Mean Rank	Sum of Ranks	Groups
.004	-2.882	93.500	15.18	303.50	**CBCT**
			25.83	516.50	Evidence group

Table 1: Mann-Whitney U test results of the effect of CBCT on increasing marriage satisfaction of male infertile couples

Sig. (2-tailed)	Z	Mann - Whitney U	Mean Rank	Sum of Ranks	Groups
.133	-1.503	144.500	23.28	465.50	**EFT**
			17.73	354.50	Evidence group

Table 2: Mann-Whitney U test results of the effect of EFT on increasing marriage satisfaction of male infertile couples

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Psychological disorders as consequences of a failed learning process – a hypothesis

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Abstract. We propose, that inappropriate input signals in early childhood interfere with learning how to see. Due to this interference, fundamental routines of visual signal processing, visual interpretation and signal integration will not get established, or will get established at the expense of other capabilities. The resulting wiring of the brain will differ from that resulting from evolutionary selection, and manifests itself in psychological disorders. A survey of physical differences between present day and evolutionarily experienced visual inputs points to factors that potentially disrupt the acquisition of normal visual processing skills.

Keywords: autism, evolutionary psychology, neural self organisation, visual construction, incompatible input.

1. Introduction

Psychological, cognitive and behavioral impairments (autism, learning disabilities, attention deficit disorder) seem to be spreading in society. While the disorders are actively researched [1], the root causes remain elusive [2], consequently the proposed interventions are partially effective [3] at best. Here we formulate a hypothesis how the disorders emerge, and suggest a new approach to understand and to prevent the occurrence of these conditions.

From two dimensional projections on the retina, we build three dimensional images in our minds, we construct mental representations about the objects that surround us. To do the construction, we use a hierarchy of fundamental rules about edge detection, up-down orientation, direction, connectivity, depth, surface topology, shape, texture, color, luminance, movement, etc. [4]. Individuals learn the rules in early childhood [5], and this learning is being repeated generation after generation. During primate evolution, the brain and its capabilities evolved in an environment, and this environment provided the learning patterns and learning conditions. Recent inventions create drastically different conditions, and projection patterns that have never been seen before appear on the retina. These interfere with the million year old learning processes, disrupt the self-organization of neural circuits, and inhibit the establishment and consolidation of visual construction rules. Specifically, illumination by fluorescent lights (and by lights where photons are electronically generated, as LEDs, and also some television phosphor combinations), 2D television imagery, fast moving light sources, non-stationary observer positions present experiences that confuse learning.

2. Extra-evolutionary Factors in Visual Input

2.1 Monochromatic illumination and its effect on color perception

Color constancy, assigning stable colors to objects in shifting light conditions is a basic capability of the mind [6]. Until recently, our environment has been illuminated by white light, which consists of a wide spectrum of thermally generated photons. We have become adapted to shifts in the spectral distribution of such illumination, we compensate for the changes in lighting by employing a transfer function, that is computed with some neuron circuitry. In contrast, the spectrum of today's fluorescent illumination is

dominated by a couple of sharp spectral lines [7], and changes in illumination are not gradual and smooth anymore, but rather abrupt. A simple transfer function can't handle transitions, and a more complex neural network is needed to compute true color, and to achieve color constancy.

2.2 Monochromatic illumination and chromatic aberration

Use of fluorescent lights presents another problem. Different wavelengths diffract differently in the optical system of the eye. Due to this chromatic aberration [8], in white light, objects will have thicker outlines on the retina, but in illumination with two-three sharply distinct wavelengths, two-three sharply distinct outlines of the same object appear on the retina. This image would be similar to an anaglyph, the red-blue imagery devised for stereo viewing, which is almost impossible to interpret without the special goggles. Every aspect of visual construction (edge detection, connectivity, etc) will be challenged by such images.

2.3 Two dimensional imagery and simulated motion

Correlation between autism and television watching has been suggested previously [9]. Phosphors used to generate colors on the screen can have very narrow spectra, in which case the problems with color constancy and chromatic aberration both arise.

Beyond these, television watching has additional ways to interfere with our currently evolved learning process. Television images are 2D, depth is only added by the observer. While people with established collection of mental images can reconstruct 3D environments, learning the essentials of 3D construction from 2D images may be impossible. In natural surroundings we learn about depth by merging inputs from both eyes, and by generating further clues through slight tilts of our head. These methods cannot help when looking at images on flat monitor surfaces: both eyes receive the same input, and peeking behind objects on the projected scene is not possible. The acquisition of objects' 3D mental image library will not progress.

Furthermore, televisions give the illusion of movement by projecting a series of still images. The deception, that cleverly tricks observers with settled visual perception (set sampling/refresh rates for example) can be an incomprehensible stroboscopic experience for the hyper-aware, yet–to-be-organized young brain.

2.4 Moving light sources

When watching the movement of an object and its shadow, as simple optical illusion patterns demonstrate, we construct a scenario with the assumption that the light source is mostly stationary (Hoffman's rule #35 [4]). This is quite reasonable, since for millions of years, the only available light sources (the Sun and the Moon) have been essentially stationary. Judging from the "deer in the headlight" phenomenon, from the mesmerizing effect of a dancing fire, and from the popularity of light-shadow art installations, mobile light sources have powerful psychological effects. In modern urban settings, lights and shadows from fast moving cars are unavoidable experiences, and create the possibility of influencing the developing mind in an adverse, inhibitory manner.

2.5 Fast moving observers, moving large objects

Being in a fast moving observer position, or seeing very large objects move are also situations without evolutionary precedents, and indeed, processing images under such circumstances challenges all of us [10, 11, 12]. While driving faster and faster, our field of vision narrows on the axis of movement, where images are more or less stationary, and we notice less and less from the surroundings. People fail in correctly estimating the speeds of larger objects, and drive into the path of trains. We get confused whether our train started to move, or the one on the parallel track. Driven in cars, children with immature visual perception are exposed to such confusing, and potentially un-learnable impressions.

3. Discussion and Conclusions

Artificially created patterns, optical illusions can deceive the mind. Our visual intelligence does not have much in reserve, and cannot function far beyond the boundaries of evolutionarily experienced domains. Extra-evolutionary experiences, that confuse the trained mind, can overwhelm the ones in the process of learning the fundamentals. To interpret the additional complexity in input, the self-organizing brain reaches

into regions normally assigned to other tasks (processing sensory input, parsing social cues, doing arithmetic), and recruits additional neurons for visual processing. Normally separate regions, that process different tasks, can conceivably overlap. This would lead to deficiencies, to crosstalk, to problems in perception and cognition, which in turn can manifest in psychological disorders, occasionally in synaesthesia, or in savant condition.

We propose a new pathway to mental disease. It is the interference with established learning processes that prevents the acquisition of normal visual processing skills, and leads to disorder, even when the neurons are healthy, and gene alleles are normal. We do not preclude however the possible compounding role of other (genetic, or environmental) factors. Minimizing, and perhaps even eliminating the adversely effecting input may prevent the emergence of disease, or stop its progression.

4. Acknowledgements

5. References

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Disease related variables and psychological problems among chronically ill children in Malaysia

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Abstract. *Aims*: The study examines disease related variables that may exacerbate psychological problems among children with chronic illness in Malaysia. *Methods:* Parents' ratings of children behavioral and emotional problems (i.e. Child Behavior Checklist – CBCL), disease-related and socio-demographic information were obtained from 63 parents of children suffering from cancer, epilepsy, and asthma seen in Institute of Pediatrics, Kuala Lumpur General Hospital. *Results:* The results showed positive and significant relationship between frequency of hospitalization and a later onset of illness and psychological problems in children. Children in the age group of 7-11 years were reported to have the highest number of problems as compared to other age groups. There were no significant relationships between duration of illness, children's gender, number of siblings, and number of years attending school and psychological problems in children. Recurrent hospitalization and the onset of disease in the later childhood are amongst the most potent factors contributing toward the psychological problems of chronically ill children. There is an urgent need to further develop existing children and adolescent health facilities in Malaysian hospitals by directly involve mental health experts and promoting their services to both medical practitioners and service recipients.

Keywords: children, chronic illness, hospitalization, behavioural problems.

1. Introduction

In Malaysia, a nation-wide population based prevalence of childhood chronic illnesses is yet to be adequately reported. However, some survey studies indicate an increasing trend in the chronic illness among children including cancer which is estimated to be 77.4% per million Malaysian children [1]. The finding from the National Psychiatric Morbidity survey indicates that chronically ill children contributes a significantly higher proportion in the 13% of the overall adjusted prevalence of psychiatric morbidity in Malaysian children [2]. This is not surprising because many large-scale epidemiological surveys indicate that chronically ill children are at a greater risk of psychological problems than children without such conditions [3, 4, 5, 6, 7]. Some studies suggested they were thrice more at risk for psychiatric disorder and 'considerable' risk for social maladjustment, impairment in self care, communication and learning as compared to healthy children [8, 9]. Evidence suggested they experience anxiety and depression [3, 10], difficulties in peer group relationships [11], excessive usage of denials, recurring themes of feelings of inadequacy and insecurity, and general confusion in over 70% of their projective drawings [12, 13, 14].

Disease-related and demographic variables are the psychosocial and circumstantial conditions that may mitigate or exacerbate the sufferings of the chronically ill child. Lots of research has showing that hospital admission can, at least in the short-term period, cause serious adverse effects on the child's well-being. Hospital admission exposes a child to stressors such as separation from the family, school and friends, pain of treatment, unfamiliarity with the surroundings, and fear of the unknown [15]. Hospitalized children are expected to adjust to a fear-producing hospital environment characterized by a state of helpless dependency, immobilization, and a limited freedom of movement [16]. Most children showed an increase in negative behavior for about two weeks after being discharged from the hospital, regardless of their age or medical condition [17]. Children who were not well prepared for hospital admission and who were subjected to invasive procedures showed increased verbal and physical aggression, behavioral regression, and greater anxiety [18]. A retrospective study on the effects of hospitalisation found a disturbing association between

long or repeated stays in hospital before the age of five and increased behavior disturbances in children [19]. The separation anxiety and a lack of special care to mitigate the vulnerability of sick children in the hospital may be some of the factors leading to the psychological problems [20]. Vernon [21] listed five potential negative consequences of hospitalization which were general anxiety and regression, separation anxiety, sleep-related anxiety, eating disturbances, and aggression. This means that majority of children experience mild to extreme stress reactions and demonstrates behavioral problems during and following hospitalisation.

Another factor related to the illness is the duration of disease. Following a group of chronically-ill children into adolescence, researchers reported that adjustment problems were most likely to occur when illness persisted into adolescence [22]. Other studies have reported similar findings, suggesting that the results may be the function of the duration of the illness, as well as the age of the patient [23]. Some studies have examined the impact of insulin-dependent diabetes mellitus (IDDM) on patients as they transit from adolescence into young adulthood [24]. They found that the general well-being of IDDM patients was lower as compared to the age-matched healthy control subjects. Similarly, Jacobson et al., [25] who have followed 19 - 26 year old IDDM patients and a similar aged control group (patients with acute illness) over a 10-year period since diagnosis, found that IDDM patients had lower scores on the global self-worth, sociability, physical appearance, and humor subscales as compared to the control group.

Children's age at the onset of illness is another factor that affects their well-being. As children become older, there are changes in their physical, social, and cognitive aspects. These developmental changes interact with the nature of the disease, and affect the children's well-being. Children with later onsets of illness have greater psychological problems as compared to children with earlier onsets of illness, and the behaviors and the reactions of newly diagnosed children might be different from those who have lived with the disease for some time [26]. Individuals who were diagnosed for a chronic illness in the young adolescence had more difficulties to adjusting to their disease compared to their younger counterpart [27]; and youths with later disease onsets evidenced greater internalizing and externalizing problems as reported by their teachers [28]. A longitudinal study by Kovacs et al., [29] found that anxiety and depression may be heightened at the time of disease diagnosis but may dissipate thereafter. The impact of certain disease processes may be particularly powerful at certain developmental periods. For example, disease-related interference with normal processes may place a youngster at increased risk of social, emotional, or behavioral problems.

Chronological age of the children is also a crucial factor affecting children's adjustment to their illness as the children's level of cognitive development has important implications on their experience of pain, concepts of pain, and selection of coping strategies. Older children are generally more knowledgeable and more skillful at carrying out disease management tasks than younger children. Some observational data on children's distress behavior suggested strong developmental effects. Children younger than 7 years old exhibit more distress behaviors and differ in types of distress behavior than their older counterparts, e.g., they are more likely to cry, scream, and require physical restraint [30]. Adolescents were also found to use cognitive strategies more than younger children who used wishful thinking. Cognitive strategies which are considered as more adaptive coping skills than wishful thinking would then have different effects on children's well being. As regard to gender differences and psychological problems, males have been found to be physically more vulnerable than females [31], and boys showed more adverse psychological response than the girls [32]. Parents may also treat sick boys and girls differently; for example, traditional parents are more nurturing towards the girls than the boys, whereas in other cases no statistically significant predictive relationship was observed between children's gender and psychopathology [20].

Generally, factors influencing the psychological well-being of chronically-ill children include the type of illness, variables related to the illnesses, parenting styles, as well as personality and demographic characteristics of the children. Our study examined the impact of several disease-related factors on the psychological problems among chronically ill children. It hypothesized positive relationships between (i) frequency of hospitalization; (ii) duration of illness; (iii) later age of onset; (iv) chronological age; and (v) being a boy and psychological problems among chronically ill children.

2. Method

2.1. Participants

The study is based on an incidental sample of 63 parents of chronically ill children seen in the Institute of Pediatric, General Hospital Kuala Lumpur (GHKL) which includes 51 mothers and 12 fathers, ages ranged from 20- 51 years old. Majority were housewives (58%) while others were working in the government (31.7%) or private sectors (7.9%). A total of 68 parents were contacted but one parent refused to

participate whereas 4 parents were excluded from the sample because of their children's age. The children were 39 males and 24 females in the age range of 4-17 years. Except for 2 children, all have attended school during data collection. There were 22 children suffering from cancer (34.9%), 21 children were treated for epilepsy (33.3%) and 29 children were suffering from asthma (31.8%).Thirty-four children came to the clinic for the follow-up while 29 were hospitalized for the treatment.

2.2. Measures

Child Behavior Checklist – CBCL [38] — a 118-item parent-report checklist, was used to obtain information about children's psychological problems such as anxiety, withdrawal, aggressiveness, delinquency, attention and thought problems. Responses are scored using a 3-point scale from "0" through "2" (0 = "not true of the child"; 1 = "sometimes true of the child"; and 2 = "very true or often true of the child") during the past six months. Clinical cut-off points on the scale were shown to discriminate significantly between demographically matched referred and non-referred children [38]. A demographic questionnaire gathered information about the children's age, gender, number of siblings, years of schooling, diagnosis of disease, age at the onset of illness, duration of illness, frequency of hospitalization, and current treatment. Information about the respondents consisted of their gender, age, occupation, and relationship with the child.

2.3. Procedure

Parents of children receiving treatment for cancer, epilepsy or asthma in GHKL were invited to participate in the study and their consent was obtained. If both the parents were present, the mother was requested to fill out the questionnaire. Most of the parents preferred to be interviewed rather than completing the questionnaires themselves. Each interview took approximately 25 to 40 minutes.

2.4. Analyses

A multiple regression analysis was used to find out relationship of disease-related variables and demographic variables to the psychological problems of children. An independent t-test was calculated to examine the differences of the psychological problems between male and female children. One way between subject analysis of variance (ANOVA) was performed on the psychological problem scores of children of different age groups to find out the difference in the extent of psychological problems faced by them.

3. Results

First, the results of multiple regression analysis show a highly significant contribution of predictors toward the criterion $F_{(7, 55)} = 23.13$, $p < .001$. The results indicate that 74% of the variance of the criterion variable (psychological problems) was explained by the predictor variables, namely frequency of hospitalization, age of the children at the onset of illness, the duration of illness, the children's ages, gender, number of siblings, and number of years attending schools. Table 1 illustrates specific figures of correlations, unstandardized and standardized coefficients, and t- values for multiple regression analysis of disease related variables, children's demographic variables, and the psychological problems of children.

Table 1: Correlations, unstandardized and standardized coefficients, and t- values for multiple regression analysis of disease related variables, children's demographic variables, and the psychological problems of children.

Variables	r	B (Un-standardized Coefficients)	β (Standardized Coefficients)	t
(Constant)		-9.66		-0.69
Freq. hospitalization	0.80**	6.23	0.81	10.74**
Age at illness onset	0.20*	-1.19	-1.92	-1.26
Duration of illness	0.06	-1.27	-1.73	-1.35
Children's ages	0.28*	1.60	2.37	1.68
Number of siblings	0.01	2.33	0.18	2.31
Years of schooling	0.20	-3.41	-0.40	-1.22
Gender	-0.13	3.93	0.07	0.95

Particularly, there is a highly significant relationship of frequency of hospitalization with the psychological problems of children (r = 0.80; β = 0.81; t = 10.7; p < .001). There are significant relationships between the children's chronological ages (r = 0.28, p < 0.05; β = 2.37, t = 1.68, p > 0.05) and the age at the onset of illness (r = 0.20, p < 0.05; β = -1.92; t = -1.26; p > 0.05) and their psychological problems. No significant relationships were found for other variables. Second, there is no significant difference of psychological problems in male (M = 58.3, SD = 27.2) and female children (M = 51.0, SD = 29.0), t (61) = 1.01, p = 0.32. Third, the results show a significant difference in the psychological problems of children of different ages; F (2, 60) = 12.85, p < .001. The children in the ages ranged from 7—11 years reported the highest problems, (M = 73.2; S.D. = 23.2), followed 11—17 years (M = 61.4; SD = 21.0) and 4 – 7 years (M = 37.0; SD = 26.0).

4. Discussion

This study examined the relationship of particular disease-related variables to the psychological problems among chronically ill children. The first hypothesis was supported, which implies that the more frequently the children are admitted to the hospital the more psychological problems they exhibit. Our findings suggest that frequency of hospitalization is an important predictor of psychological problems among chronically ill children. Frequent hospitalisation of sick children has been found to be associated with psychological dysfunctions, secondary to illness [19]. As regards to specific psychological problems, an increased number of hospitalisation was associated with depression [34] anxiety, behavioral disturbances, and aggression in children [19, 20, 21]. Experience of receiving unfamiliar nursing care in a hospital instead of the care of parents may cause feelings of helplessness, embarrassment and irritation in some children. A bedridden child, who is unable to dress and feed him/herself without help, resents the loss of independence. This state of hopelessness and dependency results in feelings of anxiety, humiliation, withdrawal, apathetic, and depressed mood in the sick child and regression to babyish behavior [16]. Repeated or prolonged hospitalization decreases children's involvement in social activities which may lead to inadequate, inferior and depressed feelings. Malaysian children are accustomed to live in a wide and diverse social circle. They frequently socialize with their relatives and neighbours. Most children go out or visit others' homes after school hours in order to play together rather than playing alone. Frequent and long hospital stay makes them feel lonely and bored. They miss their homes and friends. The ensuing feelings may predispose them to show emotional and behavioural problems towards their parents and hospital staff.

The results of the correlational findings showing a positive relationship between the age of the children at the onset of illness and the psychological problems support our second hypothesis. The later the age of the children when they are diagnosed with the illness, the more psychological problems they tend to face. The findings of regression analysis also support the later age of onset of illness as one of the predictors of psychological problems in children. Children with later age of onset of illness refer to the children who are diagnosed for the illness during their late childhood as compared to children with earlier age of onset of illness, who are normally diagnosed for the illness during their infancy. Children with later age of onset of illness have experienced a normal childhood for quite some time. The diagnosis of chronic illness in the later stage of childhood forces the children to adapt to a new sick role. Thus, the feeling of anxiety and aggression may be heightened at this particular time.

A comparison of the psychological problems of children in different age groups showed that children in the age of 7 -11 years had most problems. Indeed, a national survey found that the same age group of children reported the highest incidence of mental health and psychological problems [2]. At middle childhood stage, children show increasing need for autonomy, initiative, and mastery of new skills [35]. They involve more in peer relationship. Chronic illness limits children's physical activity, social interaction and freedom. It deprives the children from experiences that lead to the normal development of self-esteem and sense of mastery and to have a sense of control over their environment that are critical for the normal development at this age [36].

5. Conclusion & Recommendations

Our study shows that recurrent hospitalization and the onset of disease in the later childhood are the most potent factors contributing toward the psychological problems of chronically ill children. It is recommended

to minimize repeated or prolonged hospitalization of children, if possible. Otherwise, the paediatric wards should have a "live in" basis. It may involve allowing frequent visits and promoting home atmosphere in the ward through ingenious decoration, lively wall colours, toys, and books [37]. The hospital may also consider operating a school program that will give them a chance to gain basic knowledge, interact with the teachers and other children to enhance their social skills. Parental and family visits should be encouraged. It is advisable to take care of physical and psychological needs of the children falling sick in the middle stage of their childhood, as this group is most vulnerable to the negative impact of illness. There is an urgent need to further develop existing children and adolescent health facilities by including mental health services and its promotion among parents, children and adolescents.

6. Acknowledgement

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The Types of Perfectionism suggested by Sorotzkin:
Validation and Extension

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Abstract. The purpose of this study is to investigate if perfectionism is classified into narcissistic perfectionism, neurotic perfectionism, and healthy perfectionism along the degrees of personality development, integrating the suggestion by Sorotzkin and the recent findings. To do this, we used cluster analysis entering clustering variables such as shame, guilt, healthy grandiose self, and defensive grandiose self in order to analyze the data of 452 Korean undergraduates. As a result, it was revealed that there are three perfectionism groups and their characteristics correspond to our hypothesized three perfectionisms. In addition, it was presented that three perfectionism groups are closely linked to personality development. This study suggests that perfectionism is regarded as a concept on the continuity of the personality development rather than a concept with dichotomous category such as adaptive and maladaptive perfectionism.

Keywords: perfectionism, shame, guilt, healthy grandiose self, defensive grandiose self

1. Introduction

In the early 1990s, two multi-dimensional perfectionism scales were developed by Frost, Marten, Lahart, and Rosenblate (1990), and by Hewitt and Flett (1991). Researchers have used factor analysis so as to use the two scales complementarily. Subsequently, it has been reported that perfectionism is categorized as adaptive perfectionism and maladaptive perfectionism.

On the other hand, a series of study (Rice & Dellwo, 2002; Trumpeter, Watson, & O'Leary, 2006; Watson, Varnell &Morris, 1999) showed perfectionism is not a concept with category but one with dimension from the perspective of self-development (or narcissism). Although these studies presented the importance of considering perfectionism as a dimensional concept, they failed to support the complete accordance between perfectionism and self-development. One of the reasons for this result may be caused by the perspective of self-development which happens in early development. Accordingly, it is reasonable to explore the perfectionism in terms of psychodynamic personality development which includes longer period of time than self-development.

From the viewpoint of psychodynamic personality development, Sorotzkin (1985) suggested perfectionism was divided into narcissistic perfectionism and neurotic perfectionism using factors shame, guilt, and grandiose self which reflect the degrees of development. The two perfectionisms by Sorotzkin fall into maladaptive perfectionism. Accordingly, we examine the assumption that perfectionism is classified into narcissistic perfectionism, neurotic perfectionism, and healthy perfectionism, using cluster analysis, which is integrating the results of factor analysis on the two multi-dimensional perfectionism scales and the suggestion by Sorotzkin. Moreover, we investigate what differences on the indicators of mental health (i.e., self-esteem, depression, and covert narcissism) by groups from the cluster analysis are revealed.

2. Method

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2.1. Participants

Participants were 452 undergraduates (255 males and 197 females). The average age of them was 22.3 (SD=6.65)

2.2. Instruments

Participants administered a questionnaire booklet that contained Korean version of Multi-dimensional Perfectionism Scale by Hewitt and Flett (1991) (its Cronbach α was .82), Test of Self-conscious Affect by Tangney, Dearing, Wagner and Gramzow (2000) (each Cronbach α for shame and guilt was .79 and .67), Inventory of Self Psychology by Slyter (1989) to measure healthy grandiose self and defensive grandiose self (each Cronbach α for healthy grandiose self and defensive grandiose self was .88 and .71), Self Esteem Scale by Rosenberg (1965) (its Cronbach α was .89), Depression Scale by Radloff (1977) (its Cronbach α was .88), Covert Narcissism Scale by Gang and Chung (2002) (its Cronbach α was .91).

2.3. Statistical Analyses

We carried out cluster analysis and ANOVA using SPSS 11.5 program.

3. Result and Discussion

The result of the hierarchical cluster analysis employing Ward's method with the cases classified into perfectionists. This yielded 119 students (55.3%) in Group 1, 37 students (17.2%) in Group 2, and 59 students (27.4%) in Group 3.

For the sake of labeling each group, we converted raw scores of clustering variables by groups into standardized scores and presented the result in figure 1. Group1 was named neurotic perfectionism because the characteristics of Group 1 accords with those of neurotic perfectionism suggested by Sorotzkin (1985). Group 2 was named narcissistic perfectionism because the characteristics of Group 2 accords with those of narcissistic perfectionism suggested by Sorotzkin (1985). Finally, Group 3 was named healthy perfectionism because the characteristics of Group 2 reflect the highest level of personality development among three groups. Our results show perfectionism is classified into narcissistic perfectionism, neurotic perfectionism, and healthy perfectionism according to the degrees of personality development.
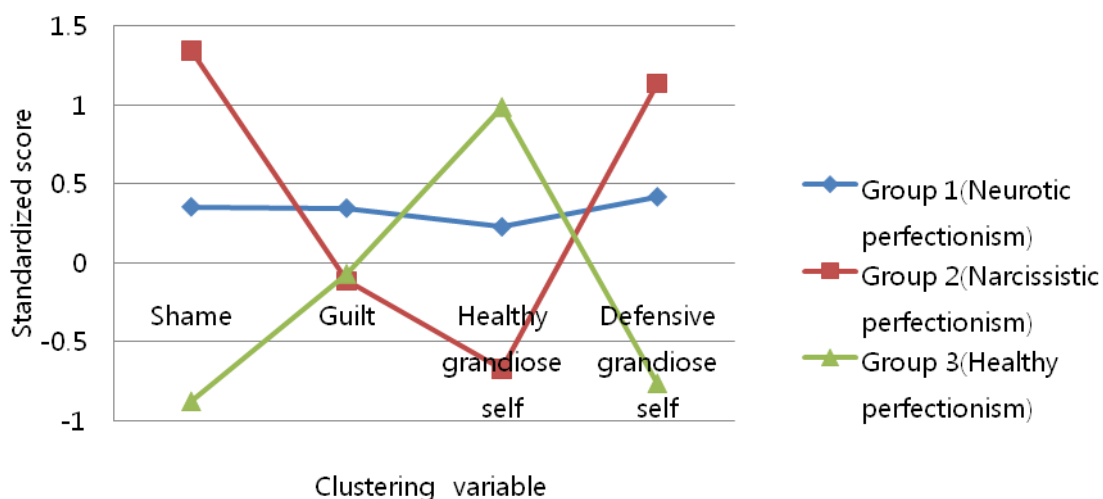

Figure 1. Groups by shame, guilt, healthy grandiose self, and defensive grandiose self

We conducted ANOVA to examine if there were significant differences on the mean scores of mental health indicators (self-esteem, depression, covert narcissism) by perfectionism groups and showed the result in figure 2. The results indicate that perfectionism groups are closely related to the degrees of personality development.

Table 1. The score means (standard deviations) on self-esteem, depression, and covert narcissism by cluster group

	Group 1	Group 2	Group 3	F	p
Self-esteem	37.49(4.32)	32.78(5.95)	41.76(6.09)	35.24[abc]	.000
Depression	21.53(6.88)	28.54(5.97)	15.97(6.27)	41.96[abc]	.000
Covert narcissism	130.85(18.72)	148.97(14.49)	113.15(16.17)	45.59[abc]	.000

Note. N=215(Group 1, n=119, Group 2, n=37, Group 3, n=59); F tests df=2,212; significant Tukey pairs: a = Groups 1 and 2, b = Groups 1 and 3, c = Groups 2 and 3.

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Effect of Group Cognitive-Behavioral Therapy on Controlling Diabetes type I

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Abstract: The present research study will respond this question that "Can group cognitive-behavioral therapy play an effective role in controlling diabetes type1? Methodology*:* A number of 30 patients, suffering from diabetes type I, have been randomly selected and then were classified in two groups of experimental and control group. The experimental group was put for a period of 10 sessions under cognitive-behavioral intervention and control croup did not receive these intervention. In the same direction, HbAlc rate of control and experimental group individuals was tested before and after execution of intervention. Result*:* The results shows that the average marks of two control and test groups in pre- and post-test has a meaningful difference and with 99 percent confidence, the difference has been focused on experimental group has been imposed on it.

Key word: Diabetes, Psychosomatic, Cognitive-Behavioral Therapy

1. Introduction

Diabetes is a metabolism and vascular system disorder which is diagnosed with disorder at body organism coupled with fat and protein sugar materials. This disorder is resulted from malfunctioning of secretion and/or insulin procedure (Kaplan and Sadock , 2003).

Diabetes is a chronic disease which has not actual treatment. In other words, diabetes is not treated completely. Avoiding being affiliated to secondary disease at the longest time possible as well as preserving blood sugar in optimal level is the main objective behind treatment of patients suffering from diabetes problem (Rose and et al, 2002)

According to the statistics made in this regard in global level, presently, over 246 million patients are suffering from diabetes problem in the world.

With the studies made in this regard, it has been envisioned that the number of patients suffering from diabetes in 2025 will hit over 380 million at large. In Iran, 4.5 million people of total population of country are suffering from diabetes problem. It should be noted that one people, affiliated with diabetes disease, dies per each 10 seconds and two people are affiliated with this disease as well. Each year, seven million people are added to the world diabetes statistics' list. With the studies made in this regard, 80 percent (80%) of individuals, affiliated with diabetes, up by 2025 at Asian Continent will belong to the countries whose their economic situation is average and on the backwardness.(Rajab and Navaserzadeh, 2006)

Diabetes is of clinical situations which can be emerged or intensified under effect of psychological symptoms. Such type of diseases can be called entitled "Psycho-Somatic Disorders".

The term "Psycho-Somatic Disorders" has not been used at Diagnosis Statistical Manual of Disorder and in return, the manual describes psychological factors effective on clinical disorders which will leave unpleasant and remarkable effect on the evolution of general clinical disorder and/or will increase danger of unpleasant consequences remarkably. (Kaplan and Sadock, 2003)

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The psychological factors, which seem are of paramount importance in outbreak of diabetes, include as follows: Stress and psychic pressure, depression, eating disorder, fears specific to diabetes (Winkley and et al, 2006), perceptions, and suppositions of patients to their diseases (Elllice and et al, 2005), difficulty in changing lifestyle (diet and exercise (sports), self-care skills (caring on signs, blood sugar measurement and taking medicine) (Keogh and et al, 2007)

Clinical psychologists have placed special emphasis on the significance of psychological factors in outbreak and continuity of disorders such as respiratory, cardio-vascular, abdominal and intestinal, urinary, Cutaneous (skin) and cancer diseases. (Daryaye La'l, 2006) Diabetes is of the diseases which can be intensified or appeared as a result of psychological factors. Diabetes is a chronic disease which can be controlled or monitored to a great extent. The degree of diabetes can be reduced through limited diet, insulin injection, and medicine. In other words, the disease can be controlled through limited diet, insulin and medicine, aimed at easing natural life for patients suffering from this disease.

Avoiding being affiliated to secondary disease through preserving level of blood sugar in optimal level and safeguarding quality of life of patients in normal range are the main objectives behind treating patients suffering from the disease.

Both regulation of blood sugar and quality of life among patients are affected by various individual factors, some of which are related to corporal or physical diseases clearly but a small number of them have been accepted in medical interferences. (Rose and et al, 2002)The research studies show that diabetic patients, who have blood sugar control, enjoy mental health.(Daryaye La'l, 2006)

Primarily, mental problems of patients, suffering from diabetes problem, are within the framework of emotional, cognitive and behavioral problems. Evidences show that effect of psychological treatments on amelioration and improvement of diabetes results is weak.

Most research studies have been made on studying and treating specific psychological specifications of individuals, affiliated with diabetes, like stress, depression, etc. individually.

Thanks to the major psychological specifications among individuals, suffering from diabetes problem, including depression, stress, specific fear to disease and negative perceptions on being affiliated to chronic disease, it seems that Cognitive Behavioral Approach is an appropriate alternative and choice for psychological interferences at this group.

Research studies show that this method of treatment has been effective in treating psychological problems such as mood disorders, anxiety disorders and anger control, etc.

2. Methodology

All patients, afflicted with diabetes Type 1, as member of Eslamshahr Diabetes Association, constitute community of the present research study.

These patients were of 17 to 26 years of old. Total number of these patients, studied at the present research, stood at 120. Statistical sample of the present research includes 30 patients, affiliated with diabetes problem Type 1.In the same direction, selection of sample group members has been made randomly.

For this reason, list of specifications of all patients, suffering from diabetes Type 1, who were members of Iranian Diabetes Society, Eslamshahr Branch, were extracted. Randomly and through the application of drawing lot, the number of 30 patients were selected as test standard, as old as 17 to 27 years, from among individuals, undergoing the diseases at least for a period of 6 months.

Then, the selected individuals were substituted as randomly within the evidence and experimental groups.

A number of 10 treatment sessions was made for a period of 90 minutes and twice a week on experimental group. For this reason, blood sugar level of all sample group members, including experimental group and control group, was measured before inception of interferences and treatment sessions

Also, situation of blood sugar of sample group was measured four weeks after being treated.

With the aim of obtaining data on changes of degree of blood sugar among patients, suffering from diabetes problem, HbA1c parameter was used which indicated blood sugar average over the previous 2 to 3 months with Cut Point No. 7.

3. Findings

Table No. 1: Statistical Parameters Related to Pre-Test Marks of Experimental and Control Group

Parameters . . . . Groups	QTY	Average	Minimum	Maximum	Variance	Standard Deviation
Pre-Test Marks of Experimental Group	15	7.8	7.2	9	0/35	0/59
Pre-Test Marks of control Group	15	7.8	7	9	0/37	0/61

This table indicates that there is not any difference between standard average and deviation of HbA1c level of both control and experimental group at pre-test.
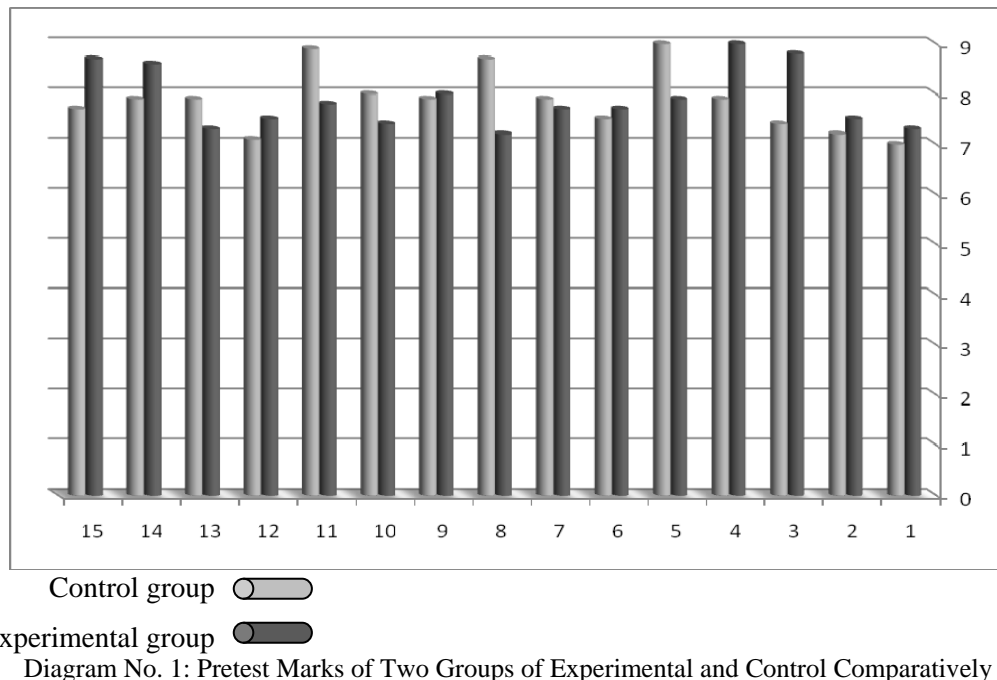

Control group
Experimental group

Diagram No. 1: Pretest Marks of Two Groups of Experimental and Control Comparatively

Table No. 2: Statistical parameters Related to Post-Test Marks of Experimental and Control Group

Parameters . . . . Groups	N	Average	Minimum	Maximum	Variance	Standard Deviation
Post-Test Marks of Experimental Group	12	7.3	6.8	8.4	0/19	0/44
Post-Test Marks of Control Group	14	7.7	7	9	0/30	0/60

Table No. 2: Indicates existence of difference at average and deviation of standard of two control and experimental groups in post test. It indicates that there is not any difference between average of post-test marks of both control and experimental groups with pretest marks but experimental group shows reduction in average of posttest marks as compared with average of posttest marks.
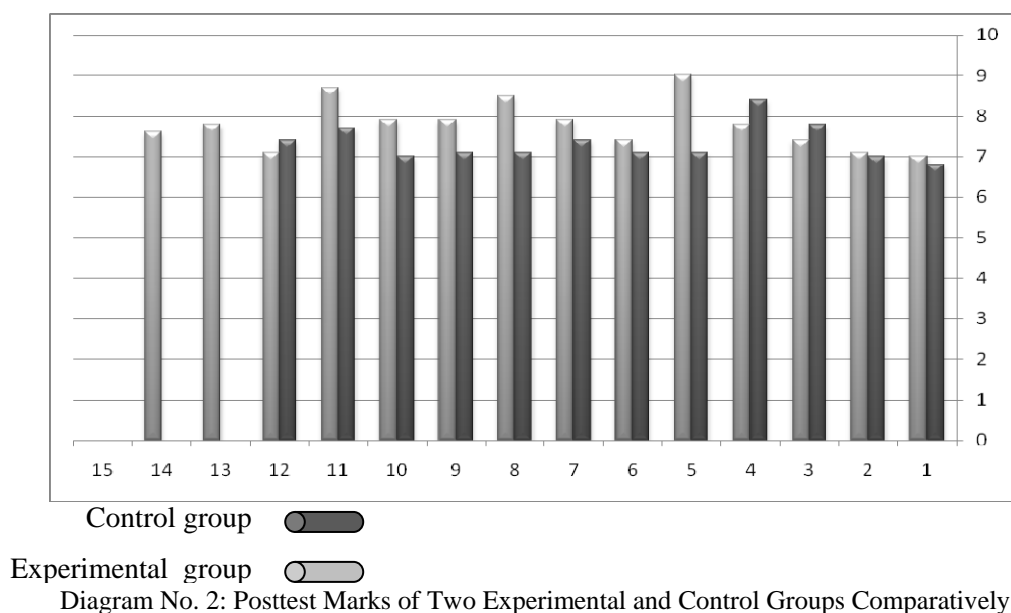
Control group ⬤

Experimental group ⬤

Diagram No. 2: Posttest Marks of Two Experimental and Control Groups Comparatively

Table 3: hypothesis examination: group cognitive -behavioral therapy are effective in controlling Diabetes.

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8.846	14	.632	4.344	.004
Intercept	1278.320	1	1278.320	8789.061	.000
PRE.EXP	8.846	14	.632	4.344	.004
Error	2.182	15	.145		
Total	1689.540	30			
	11.028	29			

In dedicational methods section, for surveying how effectiveness are the group cognitive -behavioral therapy, the covariance analysis were used, that their results are in table 3 and 4. According to the results, F

Quantity for HbA1c unit is meaningful for two groups of experimental and control after keeping stable the affects of pretest marks. In conclusion ,with keeping stable the affects of pretest ,there is a meaningful differences between the posttest average scores in experimental and control groups .According to the comparison between adjusted averages in these two groups , the average disorders in experimental group is lower than control group .Therefore group cognitive -behavioral therapy in experimental group cause improvement in comparison with control group which didn't receive this treatment .

4. Conclusion:

Findings of the present research synchronize with the findings of the previous research activities.

Findings obtained by Heidari in 2001 indicate that cognitive – behavioral treatment has been effective in reduction of emotional disorder and consequently, better control of diabetes. The present research approves its findings as well. Hence, the following difference exits between present research with the research made by Heidari that interferences have been presented individually in Heidari's research but interferences have been presented as group at the preset research activity.

In the same direction, findings of the present research activity are not synchronized with the findings made by Georgiades's and Colleagues (2007). At the present research activity, studying effect of reduction of depression symptoms has been handled through cognitive – behavioral treatment in amelioration and improvement of diabetes control.

The results showed that changes at depression symptoms with the changes at HbA1c level or blood sugar level after period of one year has not any relation with each other whether at Diabetes Type 1 or Diabetes Type 2.

Maybe, the main difference observed between results of the present research with the results of research made by Georgia's and Colleagues is this that in Georgia's and Colleagues' research, necessary follows up was made after 12 months while necessary follows up was made at the present research for a period of one month and it can show that cognitive – behavioral treatment in the short span can leave a fruitful and constructive effect in controlling diabetes.

Consequently, it is possible that result of research may be reduced by process of time.

Generally, most research activities made in this regard on the effect of cognitive – behavioral treatment on diabetes, whether treatment of emotional disorders, affiliated with diabetes, or controlling blood sugar, have demonstrated positive effects of such interferences.

Supra-analysis of psychological treatments and studying their effect on controlling blood sugar of patients, suffering from diabetes Type 1, which was made by Vinkli and Colleagues in 2006, shows that average percentage of hemoglobin has reduced meaningfully among individuals who had received psychological interferences as compared with those individuals who were categorized in control group at 10 research studies made on children and young adults.

For this reason, and since psychic problems of patients, affiliated with diabetes, are primarily related to emotional, cognitive and behavioral disorders, it seems that this treatment can leave a very effective impact both at mental health of individuals, affiliated with diabetes, and contributing better control of their blood sugar as well. Therefore, it is possible that selective psychological treatment can be considered for the individuals, suffering from diabetes problem.

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Signs of Existential I-Thou Communication in Luminous Matrimony

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Abstract. Lately, consolers and psychotherapists have shown a great concern in the Existential Thought. Undoubtedly, the existence of potentials and possibilities in this kind of thought, specifically during therapeutic processes, can result in modern and new models in psychology and counselling. One of the essential elements in Existential Thought is being in different communicational situations based on I-Thou relationship and I-It relationship. It seems that these kinds of existential communications can form a communicative model in matrimony. Accordingly, couples can find brilliant communications for their lives and consequently continue their marital lives successfully and at the same time with love. Therefore, in the light of the mentioned issues, the main objective of the following paper is to show that Existential Thought has possibilities to build an effective interaction in marital life.

Keywords: Existentialism, Communication, I-Thou relationship, Matrimony

1. Introduction

Spouses, in marital communication, demand some especial issues which are completely different in usual communication. Therefore, finding and giving positive and useful communication models are always known as fundamental concerns among psychologists and counsellors. They have outlined some communication skills as useful approaches for matrimony. Indeed, patterns of couples' communication have an important role in matrimony. Communication skills are considered as treatment ways to prevent marital distress(Cornelius, Alessi, & Shorey, 2007). Lewis and Spanier(1979) have stated that high marital quality and happiness are related to high level of communication. Communication is described as necessary component of marital adjustment (Ammons & Stinnett, 1980; Landis, 1965). Elliott (1982) recommends that it is vital to develop new technique for teaching spouses to communicate more effectively. Furthermore, in his research, he found that there is a significant relationship between communication and marital adjustment.

On the one hand, inability to have or manage an effective communication is a critical issue which influences the romantic quality of partners' relationship. On the other hand , struggling to have a better mutual understanding helps spouses feel closer to each other (Eğeci & Gençöz, 2006). Additionally, many research studies emphasize this point that whenever communication problems increase, satisfaction decreases (Bradbury, Cohan, & Karney, 1998; Eğeci & Gençöz, 2006; Kiecolt-Glaser & Newton, 2001). Therefore, one of the crucial duties of marital counsellors is finding and teaching modern communication skills to increase quality of life in matrimony. Majority of family therapists tend to place a great emphasis on family conditions that each of the spouses had when they were living (Becvar & Becvar, 2006). It means that past preferred compared to the present. However, from an existential approach, present conditions should not be ignored because change comes whenever individuals demand it (J. Sartre, 2003).

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Consequently, presenting a new communication model, which notices present as well, is essential. To achieve this aim, it seems that existential I-Thou relationship recognized by Buber (1958) who is considered as an existentialist, has a fundamental role to play in this regard.

2. Marital communication

Whether the main reason for getting married is physical attractiveness, fear of loneliness, rebound or any other thing, the main issue is spouse's interactions and expectations of her partner. These expectations and interactions usually show themselves in form of several communications. Indeed, communication is the principal area of marital quality.

The vital point to be noted is that in the modern world, human being is at risk of bad interrelationship because s/he rests on advanced tools and then s/he feels that s/he does not need to the other person. In addition, there is a greater potential for conflict in the modern couples due to lack of implicit agreement about sex roles, the demand for role flexibility and interchangeable ability, and the changing assumptions about how to make family decisions (Fitzpaatrick & Noller, 1993). Matters such as directness, presence, honesty and reciprocity play an important role in marital communication. Comparing couples who are not distressed, in some researches, with couples who are under the treatment in relationship skills and couples who are divorcing, has indicated that there is a significant relation between lower mutual constructive communication and distress or divorce (Christensen & Shenk, 1991; Resnick, 2007; Sher, Baucom, & Larus, 1990). Mayer (2000)points out that unsuccessful communication causes more conflict situations. Marital communication is generally divided into two kinds. First, positive communication in which partners' interaction are in form of solving the problems together, and understanding one another, communication of assent, approval and caring, empathy, humour, smiling, kind physical touch, and laughing (Epstein & Baucom, 2002). It is believed that cornerstone of marital quality is positive effective communication (Eckstein & Goldman, 2001) so that the positive communication is associated with high satisfaction. The second one is negative communication. In fact, relations such as adversarial, conflictive, avoidant, contempt communication of hostility, and criticism, come from negative communication. The commonly noted "demand/withdraw" interaction pattern is also a form of negative interaction as it likely serves to maintain a sense of power or control over a situation (Epstein & Baucom, 2002). It is indicated that the negative communication results in low satisfaction (Resnick, 2007). It would be fair to say that communication and relationship are regarded as vital matters for individuals. However, Uebelacker and Courtnage et al (2003) emphasize that the communication and relationship are more involved in dependence among females rather than males. This condition causes women more than men to stand precariously on the edge of precipice of inauthentisity. On the other hand, the sense of independence among men can shake matrimony.

3. Existentialism

3.1. What is Existentialism?

Existential thought is a call for a consideration of man in his concrete situation, including his culture, history, relationship with others, and additionally, the meaning of personal existence. Insofar as one can define existentialism, it is a progress from the abstract and the general to the specific and the tangible experience (Hanscomb, 2006; Macquarrie, 1972). Existentialists who believe in second approach, in contrast, emphasize the precedence existence over essence (J. Sartre, 2003). It means that, in order to understand human being, we must pay attention to him as a particular and concrete being rather than as a universal and abstract one. In other words, existential philosophers have argued that, to rigorous understanding of human being, we need to ignore abstract hypotheses and philosophical theories and focus solely on concrete existence of a human being as s/he has actually lived. The vital point to be noted is that the word 'exist'

originates from the Latin verb *existere*, which means to stand out or emerge (Heidegger, 1962; Macquarrie, 1972). Indeed, existence is an upsurge (J. Sartre, 2003): a doing, becoming in the world out of willing and freedom. The objects of the world, unlike human beings, are being which means that they are fixed, static and substance. An object in the world is full of itself, and no more total plenitude can be imagined, no more perfect equivalence of content to container and then it is static. As human beings, we are constantly making sense of ourselves and understanding who we are. It means that our future depends on nothing but on our decision-making.

3.2. The Existence of Existential Potentials for Matrimony

There are some important concrete concepts such as communication, responsibility, and decision making in matrimony which are discoursed in existential thought. Indeed, although existential thought is a philosophical theory, its paramount concerns are the main concerns of matrimony. Therefore, one of the best solutions for giving and applying communication model can be made of existential thought. From an existential perspective, human existence is always meaningful considering another human. This consideration can be highlighted when a person is in the position of choosing other as spouse. On the other hand, there is a meaningful relationship between human beings which is I – Thou so that couples are not allowed to reduce human relation to animal relation that is I- It. As a result, it seems that existential thought has enough potential to form and create a communication model in the hope of having a brilliant marital communication in wedlock.

3.3. Existential I-Thou Relationship

Martin Buber (1958), known as the existential philosopher of dialogue, believes that the world of human being has two kinds of communications: I–Thou communication and I – It communication . I-You relationship is an interaction between two human beings and I-It relationship is between human being and animal, or human being and an object. When a man says 'I', he refers to It or Thou. There is never doubt that I is meaningless if we do not pay attention to what is in front of I. Therefore, when he says Thou or It, the I is one of the two primary words which presents (ibid). From an Existential attitude, 'It' has only essence but 'you' as 'I' exists which creates his essence during his life when makes communication with others (Heidegger, 1962; Macquarrie, 1972; J. P. Sartre, 1953). Moreover, 'You' and 'I' are unique, singular and irreplaceable but "It" is replaceable and is not singular or unique (ibid). For instance, it can be said two apples are the same without any differences but we cannot consider two individuals the same. In fact , it is impossible to replace one person with another. Furthermore, matters which are referred by 'It', unlike human beings, are without aspiration. They cannot try, or hope, or wish, or long to be other than they are. Indeed, they are solid (Warnock, 1967). Hence, they never expect human beings to pay attention to them because they do not have any fallings like human beings. Additionally, I-You relationship always depends on dialogue which is impossible in I-It relationship. Furthermore, characteristics such as to be present for each other, lack of looking at each other proprietary, believe in other individual's freedom, and admitting others' ideas are outlined in I-Thou construct. Buber (1958) states that:

> "The moments of relation are here, and only here, bound together by means of the element of the speech in which they are immersed…. Here alone, then, as reality that cannot be lost, are gazing and being gazed upon, knowing and being known, loving and being loved" (p. 103).

In the I-It domain, by contrast, 'you' values 'It' only insofar as 'It' benefits or serves 'you's purposes. As a matter of fact, in I-Thou relationship, Buber(1958) exposes the essential attitude that human being takes towards another, a relationship of respect in which the other person is viewed as having natural value. Each person has immense value and capable of experiencing a fulfilled life (M Friedman, 1993). Thus, we

must never value people only for what they can do for us. We need to value each other for humanness, regardless of what we can or cannot do for each other. It is important to know that human being needs to do and act in a manner to prevent I-Thou relationship to be reduced to I-It relationship. Indeed, whenever 'I' takes a communication with 'It', this is because of using It, but a communication between I - Thou transcended using communication. To be fully human, we are obliged to open ourselves for I-Thou interrelating. Significantly, Freud made a similar claim. As he wisely said, a truly healthy person is able "to love and to work" (Adams, 2007). Undoubtedly, the high level of work and love visualize through I- Thou relationship. In I - Thou relationship, each person is fully present and open to the other. That relationship involves the recognition of the other as s/he presents him/herself and is characterized by mutuality, directness, presence, honesty and reciprocity (Buber, 1958).

4. Appearance of Existential I-Thou Relationship as a Positive Model for Marital Communication

It is necessary to remind that sometimes I-Thou relationship reduces to I -It. I-It relationship depends on using of human being sideways rather than mutuality. Nevertheless, marriage will never give new life except by that out of which true marriage always arises, the revealing by two people of the thou to one another (Buber, 1958). Marriage is a living life if it depends on mutual life. It means that, each spouse should not give life to marriage from the other spouse but s/ he must give life to it from his / her own self. In this condition, each of them does not have an undue expectation from the other. Buber (1958) points out that a person who gives life to marriage for other spouse is not different from the one who wants to" abolish it"(p. 46). Indeed, this person merely enjoys spouse without opening to the spouse. How can we regard thus life as I-Thou relationship? The person has ignored the vital factor in marriage that is love accompaniment. Buber (1958) adds eloquently:

> " In every situation in which the one is not present to the other but merely enjoys itself in the other what then would be left?" (p.46).

Such a person is a self-willed individual who wants to use the spouse: When this person says Thou, he means "O my ability to use" (ibid, p. 60). This person considers individuals around himself as machines, capable of various achievements, which taken into account and utilized for his purpose. Couples who institute an I-It relationship in their life degrade their spouse because that relationship motivates them to ignore their lovely relationships. From an existential point of view, love is only between I - Thou relationship so that someone who does not care about that relationship , does not understand love (Buber, 1958). As a matter of fact, in that situation two rude issues happened: losing freedom and ignoring responsibility for spouse; whereas lovely relationship, that is I-Thou relationship, comes into a responsibility (ibid) as well as it depends on freedom. Inevitably, those issues cause getting divorce because by ignoring freedom and responsibility, there is no meaning for their humanity as well as matrimony. The responsibility for marital life is nothing but good relationship, namely, I-Thou relationship. Each person in the dialogue becomes a Thou for the other if each is committed to an honest interfacing. At the same time, neither person is objectified by the other nor he is controlled or defined as something (Ventimiglia, 2008).

In short, this line of thought opens a new door to future research considering existential communication model to apply for couples. Undoubtedly, these aforementioned possibilities in existential thought can lead to make an effective communication model in matrimony. Nevertheless, some counsellors and psychologists used these possibilities for other purposes (Cooper, 2003; Etzioni, 1999; Maurice Friedman, 2002; Sloan, 2002; Ventimiglia, 2008), rather than communication model in matrimony. That is why more research studies about the communication are needed to be done.

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Analysis of School Teachers' Perceptions of Quality Enhancing Factors at Secondary Schools

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Abstract. The study examined teachers' perceptions of quality enhancing factors at secondary schools. One hundred and ninety six school teachers from three districts, Bahawalpur, Okara and Faisalabad of the Punjab province of Pakistan, participated in the study. The questionnaire was developed and after making it valid and reliable, the data was collected and analyzed by using simple mean score. Findings showed that teachers' perceptions of quality enhancing factors in classroom are better than their perceptions of quality enhancing factors out of classroom. The study therefore, recommended that teachers should be made aware of the modern concepts of quality education through refresher courses, seminars and conferences. Training sessions should be conducted to update teachers' knowledge and to make their vision bright about quality education. After discussion and analysis, further interesting results are presented and based on the findings, appropriate recommendations are suggested for improving the quality of education at secondary level in Pakistan.

1. Introduction

The quality of education appears globally the most prioritized area in education sector. Various international forums and declarations are aimed to improve the quality of education. Provision of quality education is one of the six goals and targets set by The World Education Forum in Dakar (2000). Quality education was declared as a priority area in the meeting of South Asian Ministers in Katmandu in April (2001). Following the international concern, the Government of Pakistan is also committed to enhance the quality of education. Quality of education has also been a focused area and a major concern in all the educational policies and plans. Education policy (1998-2010), lays a great emphasis on the quality of education and Education Sector Reforms (2001-2005), designed the different strategies for the improvement of quality in education through better teachers, reformed curriculum and efficient examination system. Directorate of Staff Development (2008) described that quality of education is the attainment of required standards of resourcing and their provision and the achievements or outputs of an institution or system. According to Jatoi (2004) quality in the field of education in Pakistan is owing to the best utilization of available resources. Shami and Hussain (2006) added that availability of physical facilities casts very significant influence on the performance of students at school level. According to New Education Policy (2009) there are five-six basic pillars of quality. These are curriculum, textbooks, assessments, teachers, the learning environment in an institution and relevance of education to practical life.

Thus, the quality of education is directly owing to the quality of teacher and the quality of teacher with some other factors is owing to his or her conceptions, perceptions and vision about quality and his or her activities in class as well as in the institution. According to Anees (2005) teacher is considered one of the most crucial factors for implementation of all educational reforms at gross root level. So, teacher's perception about quality education seems to have a positive and pragmatic effect on quality assurance and enhancement. What is perception? It is according to Winstanley (2006) a process or act by which an individual may be able to translate information from the external world into the experience of events, objects, sound, and conversation and so on. The idea and concept is supported by Daft (2003) that perception is the

cognitive process that people use to make sense out of the environment by selecting, organizing, and interpreting information from the environment.

According to Blake and Sekuler (2006) there are some reasons to study perception which may be divided into two broad categories. One is practical while the other is intellectual in nature. Practical reasons for studying perception stand for the solution of problems with the help of perception and intellectual reasons to study perception satisfy the intellectual curiosity. Thus, the perception plays very important role in life whether due to practical reasons or intellectual.

As for as teacher's perceptions are concerned it appears as if they are a vital ingredient of not only pedagogical environment but also of the whole system of education. It seems a fact that teachers are to perceive at every step, in the classroom as well as outside of the classroom. Thus, without perception of quality enhancing factors, it would not be possible to realize the dream of attaining quality in education. The present study targeted to evaluate teachers' perceptions of quality enhancing factors for the attainment of quality education.

2. The Objectives

The objectives of the study were:
- ➢ to study the quality enhancing factors at secondary schools,
- ➢ to find out teachers' perceptions of quality enhancing factors in classroom and out of classroom at secondary schools,
- ➢ to compare the perceptions of male and female secondary school teachers about quality enhancing factors,
- ➢ to suggest some measures to improve teachers' concepts about quality education at secondary level.

3. Methodology

School Teachers of all secondary schools including boys and girls situated at urban and rural areas in the Punjab, Pakistan was the population of the present study. The study was delimited to: School Teachers male and female, urban and rural, permanent and contractual, teaching 10th class science group students in public secondary schools. The study was also delimited to only public secondary schools situated at urban and rural areas including boys' and girls' schools.

The Punjab province of Pakistan is divided into nine administrative divisions, and three out of the nine divisions Sahiwal, Faisalabad and Bahawalpur, were randomly selected for the study. Three districts, Bahawalpur, Faisalabad and Okara, out of the nine selected districts from the three divisions were also randomly selected for the study. The sixteen schools equal in number urban and rural, male and female were randomly selected. Four teachers teaching 10th class science group per school were included in the study. Thus, 192 teachers from 48 secondary schools was the sample of the study. The study was a survey type and questionnaire was chosen as a research tool to collect data. The questionnaire was pilot tested to make it valid and reliable. The experts, teachers and researchers at the Education Department of The Islamia University of Bahawalpur, Pakistan gave suggestions to improve it and then it was administered at 8 urban secondary schools (4 male, 4 female) in Bahawalpur city. The responses of teachers were analyzed using SPSS software version 16 and Cronbach Alpha (reliability of questionnaire internal consistency) value was found to be 0.891 of the questionnaire. After this, the questionnaire was launched in the field for collection of the data. Thus, the results were drawn by using simple mean and upon the basis of results, suggestions and recommendations were made.

4. The Results and Discussion

There were two categories of the questions equal in number dealing with teachers' perceptions of quality enhancing factors in the classroom and teachers' perceptions of quality enhancing factors out of the classroom. The teachers' classroom perceptions of quality enhancing factors were about the effective teaching methods, fruitful classroom activities, teachers' regularity in classroom, teachers' comprehensive communication skills, self confidence of teachers in classroom, teachers' problem solving skills in classroom and teacher-student cooperation. Teachers' out of classroom perceptions of quality enhancing factors were about teachers' satisfactory working conditions, teachers' job satisfaction, headteacher-teacher cooperation, school's pleasant environment and clear perception of teachers about quality education. The teachers were also asked whether quality means to achieve 100% results in examinations and whether learning by rote enhances the quality of education. The following tables show the comparison of teachers' perceptions with respect to gender, as well as quality enhancing factors in classroom and out of classroom.

Table 1: Teachers' perceptions in classroom and out of classroom

Respondents	Frequency	Perceptions in classroom (Mean)	Perceptions out of classroom (Mean)
Teachers	196	22.79	21.50

The table-1 shows that the mean score of teachers' perceptions in classroom about quality enhancing factors is 22.79 which is better than the mean score 21.50 of teachers' perceptions of quality enhancing factors out of classroom. So, it is found that teachers' perceptions in classroom are better than their perceptions out of classroom about quality enhancing factors in the institution.

Table 2: Overall Perceptions (Gender wise)

Gender	Frequency	Overall Perceptions (Mean)
Male	98	45.70
Female	98	42.87

The table-2 shows that mean score of male teachers' overall perceptions about quality enhancing factors is 45.70 which is better than 42.87 mean score of female teachers' overall perceptions. So, it is found that male teachers' perceptions are better than female teachers' perceptions about quality enhancing factors.

5. Findings

The analysis of the data presents a clear picture of the present situation of teachers' perceptions about quality enhancing factors at secondary level. Teachers' perceptions were divided into two main categories: perceptions about quality enhancing factors in classroom and perceptions outside the classroom. The findings are as follows:

- The analysis of the perceptions of teachers indicates that the perceptions of both male as well as female teachers in classroom are better than out of classroom perceptions.
- Male teachers' perceptions of both categories in class and out of classroom are better than female teachers' perceptions.
- It is found that all teachers' perceptions in classroom are better than their perceptions out of classroom about quality enhancing factors in the institution.
- It is found that male teachers' perceptions are better than female teachers' perceptions about quality enhancing factors.

6. Conclusion and Recommendations

It is concluded that teachers' perceptions in classroom are better than their perceptions out of classroom about quality enhancing factors in the institution. Male teachers' perceptions are better than female teachers' perceptions about quality enhancing factors in the secondary schools. On the basis of the analysis and findings of this study and the suggestions by the respondents, following important measures have been recommended:

- There is a need of making teachers' perceptions more clear about quality enhancing factors in classroom and especially out of the classroom.
- Teachers must be made aware of the modern concepts of quality of education.
- Special refresher courses, seminars, and workshops are needed for making teachers' perceptions clear about quality enhancing factors in the institution.
- Training sessions should be conducted to update teachers' knowledge and to make their understanding better about quality education.
- Teachers' perceptions should be practicable and there is a need to focus on all the factors related to quality education rather than focus on only result percentage.
- Teachers should be well equipped with instructional material required in the classroom so that they might be able to practice their perceptions of quality enhancing factors in the institution.
- Teachers should be made well equipped with the modern concepts and approaches of quality education in global perspective.

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Volunteer Behaviour: A Study of Youth Expedition Projects on Civic Attitudes & Competence Skills

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Abstract. This paper presents a study of 428 youths who participated in service learning projects in developing countries in South-East Asia, China and India. Using mixed-method approach, this study examined the reasons for their participation in the Youth Expedition Projects and the impact of their service-learning experiences on their civic attitudes and competence skills. Results showed that participants (38.1%) cited fostering personal learning such as strengthening self, developing interpersonal and leadership skills as reasons for participating in the expeditions. Positive outcomes in terms of civic engagement, competence skills, development of sense of self are discussed. Participants scored moderately high mean scores for Civic Attitudes and Competence Skills total ($M = 3.66$, $SD = .29$) as a result of the expedition experience. The author concludes that it is important to make service-learning an explicit training and educational goal in order for educators to facilitate the building of capacities in youths such that they can appreciate the value that service-learning can bring in character development and in shaping early commitment to civic involvement.

Keywords: service-learning, civic attitudes, competence skills, character development

1. Introduction

The Singapore International Foundation organises overseas volunteer programmes through launching and implementing the national youth expedition projects since February 2000 as a learning programme. It encourages participants between the age of 17-25 years old to join the Youth Expedition Projects although the younger and the older age group may volunteer in the expedition. Through participation in the Youth Expedition Projects, it aims to inspire youth through meaningful participation in service-learning to make a difference to the lives of others. It is hoped that through the Youth Expedition Projects, opportunities will be given to youths to help them develop civic attitudes and competence skills as a result of the service-learning experience (Singapore International Foundation, 2002).

Training programmes and courses were provided for the participants prior to their overseas service-learning expedition. The leaders and facilitators had undergone both internal and external training programmes to be well equipped with the skills and knowledge before they led the Youth Expedition Project expeditions. Leaders and facilitators were given the Expeditionary Service-Learning Leadership course (40 hours) to enable them to manage the team and to facilitate guided reflection and in the expedition. Along with the facilitation aspects, team leaders and facilitators were also taught to apply risk assessment and emergency management in case of emergencies during the expedition. In other words, youth manage the entire project from conception till the execution.

This study sought to explore the different reasons that participants were contemplating about before going on the overseas community service-learning expedition. Positive outcomes in terms of civic engagement and competence skills were also discussed. This study may add significance to the importance

of overseas community service-learning experience in positive development in youth. The results of this study may help organisation, specifically the Singapore International Foundation that sponsored the YEP, to ascertain whether service-learning is an explicit training in building youth capacities and character development.

2. Community Service-Learning Outcomes

Several studies have examined the effectiveness of community service-learning outcomes. Understanding the potential learning and development outcomes of community service-learning enables educators to shape desired outcomes and design service and reflection experiences to achieve them (McEwen, 1996). Some of the positive outcomes that have been linked to students' participation include personal (Giles & Eyler, 1994), attitudinal (Ikeda, 1999), moral (Weglarz, 2000), social (Moely et al., 2002; Mullins, 2003), and cognitive outcomes (Eyler, Root & Giles, 1998; Lund, 1998).

Gallini and Moely (2003) reported that service-learning created opportunities for youths to interact with their peers and develop friendships as well as increased their ability to interact with others in a positive ways. Gallini and Moely conducted a study on 142 students who participated in service-learning and 171 who did not participate (N = 313). Interpersonal relationships accounted for 7% of the variance in scores. Respondents evaluated the course's influence on their ability to work with others effectively, communicate with other students, and make friends. Service-learners cited that reflections sessions, participation in orientations and training, and travel together to service sites all provided opportunities for peer interaction. In short, findings suggest that building upon people's strengths in their community can promote feelings of efficaciousness and competence.

3. A Study of the Youth Expedition Projects on Civic Attitudes and Competence Skills

Two questions were used to guide this study. Firstly, prior to the expedition, what were the reasons for participating in the Youth Expedition Projects? Secondly, after the expedition, what was the impact of the Youth Expedition Projects experience on civic attitudes and competence skills of the participants?

This study employed a mixed-method approach using both quantitative and qualitative methods. The participants selected comprised youths (N = 428), age 16 – 25 years, was part of the 3,979 participants of the Youth Expedition Projects (YEP) that were sent out in cohorts by the Singapore International Foundation in year 2004 to the Association of Southeast Asia Nations or ASEAN in short, China, and India.

The Civic Attitudes and Skills Questionnaire (CASQ) was used to measure the impact of the Youth Expedition Projects on the participants. The CASQ yields scores on six scales developed through factor analysis (Moely et al., 2002). The subscales measure civic action, political awareness, social justice attitudes, and diversity attitudes. These subscales make up the civic attitudes scale. Interpersonal and problem-solving skills, leadership skills, and sensitivity constitute the personal competence skills. Items are scored on a five-point Likert-type scale, ranging from one (strongly disagree) to five (strongly agree). Coefficient alpha reliability for the full measure was .87.

The structured interview schedules for the participants consisted of seven main open-ended questions that elicited their reflections and evaluations on the following: their expedition activities, their contributions to service learning, the achievement of their objectives, and their personal growth and insights in service-learning. The questions also asked about their critical evaluations of the extent to which the expedition made a difference in their lives, in the lives of the community that they served, and in their relationships with

friends, families, and program leaders, as well as their plans for future community volunteerism. All interviews were guided by structured interviews, tape recorded, transcribed, and analyzed.

4. Results

Table 1 shows the reasons of youth participation in the overseas community service-learning expeditions. Participants' responses are tabulated according to the order of frequency of responses of the three categories.

Table 1
List of Youths' Reasons for Participating in the Overseas' Community Service-Learning Expeditions (N = 428)

Category n (%)	Reasons	n (%)	Samples of Verbatim Responses
Shaping Civic Attitude 328 (76.6)	Serving the community	130 (30.4)	"(We want) to build a kindergarten for the kids over there." (ID 19)
		66 (15.4)	"(I want) to help the less fortunate and make at least a difference in their lives." (ID8)
		51 (11.9)	"I would like to contribute what I can to the society and help the people in need." (ID 253)
	Understanding socio-cultural issues	81 (18.9)	"(I want) to experience other culture and to understand the country better." (ID 38)
			"I want to understand issues street kids are facing in India..." (ID 205)
Developing Competence Skills 56 (13.1)	Developing interpersonal skill	40 (9.3)	"I want to make new friends and interact, ..." (ID 264)
			"(I want) to get the feel of team spirit." (ID 321)
	Developing leadership Skill	16 (3.7)	"I want to learn to lead a team and develop people management skills." (ID 152)
			"(I would like) to expand my capacity as a leader." (ID 224)
Building Self Capacity 107 (25)	Strengthening self	92 (21.5)	"...it will also toughen/strengthen me ..." (ID 35)
			"(It is) to ...develop personal character, ...being humble, ..." (ID 178)
	Pursuing academic goal	15 (3.5)	"(I need)...to complete my compulsory community service hours." (ID 146)
			"(I want) to gain wider knowledge on society through humanitarian and to be able to apply in my research later." (ID 320)

The table shows that although slightly more than half of the participants (n = 247 or 57.7%) knew that they were there to serve the community before they embarked on the trip, only about three out of every ten participants (n = 117 or 27.3%) indicated that they wanted to make a difference in the lives of the people in the community and to contribute to society. In other words, civic action, that is, the altruistic involvement in community service among the participants was not so distinct before the service-learning expedition. Before the overseas community service-learning expedition, only about two out of every ten participants (n = 81 or 18.9%) indicated their interest in understanding the socio-cultural issues of other countries which were different from Singapore. Thus, before embarking on the overseas community service-learning expedition, the level of civic engagement such as making a difference and contributing to community was not so developed in the majority of the participants.

As the Youth Expedition Projects was a "first time" experience to the majority of the participants, "to learn" (ID 185 & ID 315) appeared to be a personal highlight to the reason given. Thus, the findings appear to partially correspond with the very essence of service-learning, that is, "learn to serve and serve to learn" (Eyler & Giles, 1999). It appears that at least eight out of every ten participants were indeed "learning to serve" in their first Youth Expedition Projects. The Singapore International Foundation only sponsored participants who went for the expeditions for the first time. Being first-timers, this may account for their priority in fostering personal development rather than in serving the community. Nevertheless, this finding was in line with the intention of the Singapore International Foundation, that is, to place an equal emphasis on service and learning, and to ensure that there are both service and learning goals on the project. Therefore, it was not surprising that participants expected to learn more than serve before embarking on their trip.

Table 2
Score Ranges, Mean, and Standard Deviations for Civic Attitudes and Competence Skills Measure of Participants (N = 347)

Variable	Min.	Max.	*Mean*	*SD*
Scale/Subscale				
CIVIC ATTITUDES	**2.78**	**5.00**	**3.68**	**.34**
Civic Action	2.63	5.00	3.95	.51
Political Awareness	1.67	5.00	3.35	.58
Social Justice	2.38	5.00	3.63	.44
Diversity Attitude	2.60	5.00	3.70	.53
COMPETENCE SKILLS	**2.62**	**4.55**	**3.63**	**.32**
Interpersonal and Problem-Solving Skills	2.92	5.00	4.01	.41
Leadership Skills	1.80	4.80	3.36	.56
Sensitivity	1.83	4.58	3.37	.37
CIVIC ATTITUDES AND SKILLS QUESTIONNAIRE (CASQ) [c]	**2.89**	**4.55**	**3.66**	**.29**

*Note: *p < .05. **p < .01. ***p < .001.*

Table 2 shows the mean scores of Civic Attitudes and Competence Skills Measure of the participants (N = 347) after the expedition. Quantitative analyses indicated moderately high overall mean scores for civic attitudes and competence skills as a whole (M = 3.66, SD = .29). In other words, the findings show that the Youth Expedition Project participants seem to show a moderately high level of development of civic attitudes and competence skills. Participants seem to reflect some changes in attitudes toward diversity, political and social issues, and even had plans for future civic action. Larson (2000) describes it as youths' development of initiative, which is closely related to capacity for agency or for autonomous action. Through the overseas community service-learning experience, youths seem quite motivated from within to direct attention and effort towards personal competencies and at the same time may likely to engage in some form of civic responsibilities. While some participants seem to achieve more personal benefits, other participants seem to gain an understanding far more than just themselves, that is, to help others.

In the qualitative analysis, participants showed better understanding socio-cultural issues, social justice (poverty) awareness, and understanding strength in character of the community people. Findings show that there was an increase of 7.7% of participants who responded that their relationships were positive and very positive with their team leaders and an increase of 16.8% of participants who responded that their relationship was positive or very positive with their team members after the expedition. Participants had learnt to work with others, developed interpersonal skills, and enhanced social competencies. In terms of positive sense of self, the findings revealed that the overseas community service-learning positively impacted their confidence (66%), sensitivity to others (56.5%), appreciation (30%), resiliency (25.9%), and maturity

(12.1%). The results also suggest that there seemed to be a change in the participants' perspective towards life. The results suggest that the participants not only wanted to accomplish something meaningful for themselves but also wished to help others (n =105 or 30.3%). In sum, the participants' belief in future appeared to have extended from personal to matters larger than the self, that is, the desire to contribute to the community after the service-learning experience.

5. Conclusion

Overall, the findings seem to suggest that youths need opportunities, such as the Youth Expedition Project, for development of civic attitudes and competence skills. Thus, the results seem to imply that given the learning opportunity to be involved in the overseas community service-learning expedition, youths may have the potential to increase their level of competencies. In conclusion, the Youth Expedition Project programme in Singapore is one such programme to build on youth's civic attitudes and competence skills.

6. References

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