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RESEARCH ARTICLE

Association Between Anticipatory Thinking and Adolescent Depression, Anxiety and Stress

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ABSTRACT

This is a quantitative study examining the association between secondary school students' anticipatory thinking and their mental health status. The increasing number of mental health cases such as depression, anxiety and stress among these vulnerable groups has demonstrated that mental health literacy intervention to promote better mental health outcome, remain inadequate to cope with the challenges. To address the issue, 320 secondary school students were randomly selected among form four students of rural and urban areas attending public schools across several states of Peninsular Malaysia to participate in the study. Self-administered Anticipatory Thinking Skill Scales (ATSS) and Depression, Anxiety, Stress Scale (DASS-21) were employed to measure participants' anticipatory thinking skill and their mental health status. The findings revealed that student participants reported moderate levels of both anticipatory thinking skills and mental health symptoms. This suggests that the students generally possess a functional capacity for engaging in future-oriented cognitive processes. This inverse relationship strongly implies that adolescents with higher proficiency in these cognitive skills are likely to experience better mental well-being.

Contribution/Originality: This study is one of very few studies which have documented the functional aspect of anticipatory thinking skills in reducing adolescents' risk in developing mental health challenges.

1. Introduction

Mental health issues among secondary school students have become a growing public health concern. The increased rates of depression, anxiety and stress among this vulnerable group were reported across various studies (National Health and Morbidity Survey, 2022). It was reported that approximately 39.7% of secondary school students in Malaysia experienced anxiety (Taufik et. al, 2022), while nearly 20% of adolescents would exhibit several depressive symptoms by the age of 18 (Singh et. al, 2021). These mental health challenges not only affect individual students' well-being but also have severe consequences including heightened dropout rates and an increased likelihood of substance use as coping mechanism (Kaur et. al, 2014; Ahmad et al., 2014).

Despite of mental health literacy is widely recognised as an important protective factor for mental illness (Zakaria, et. al, 2022) and correlated with mental well-being and physical health (Lee et. al, 2023), mental health literacy among adolescents remains inadequate, as many struggle to recognise and address their own mental health challenges. Factors such as gender, family environment, and experiences of bullying significantly impact their ability to identify and seek help for mental health issues (Singh et al., 2022). Stigma and lack of mental health awareness had hindered students from accessing necessary support and seeking professional help (Sarwar et al., 2022; Lee et. al, 2023). Consequently, these unaddressed mental health crises have been linked to social problems such school dropout, as observed in various intervention studies (Hart et al., 2016). Therefore, identifying and cultivating cognitive skills that can serve as protective factors against these adverse outcomes is a critical area for intervention.

2. Literature Review

There is substantial empirical evidence supporting the beneficial aspects of anticipatory thinking (AT) for maintaining good mental health. AT is a cognitive process that enables individuals to forecast potential future scenarios, encompassing both positive and negative outcomes. This cognitive ability plays a critical role in maintaining good mental health as it can significantly influence emotional regulation, coping mechanism and overall psychological resilience. Individuals with enhanced anticipatory thinking skills (ATS) exhibited strong psychological resilience, emotional regulation, and adaptive coping strategies. Similarly, individuals with higher levels of anticipatory competence tend to report lower levels of stress and anxiety (Amos-Binks & Dannenhauer, 2019). This form of anticipatory thinking enables individuals to visualize successful outcomes, which can inspire enhanced motivation and hope, thereby promoting better mental health.

AT involves the ability to project oneself into the future, imaginatively rehearsing different scenarios and their emotional consequences. It encompasses cognitive components such as prediction, planning, and emotion regulation. A well-developed ATS enables individuals to prepare for future events, thereby mitigating anxiety and enhancing their problem-solving capabilities. In contrast, maladaptive anticipatory

thinking can lead to excessive worry or rumination, contributing to mental health disorders like anxiety and depression.

Cognitive theorists have distinguished between two types of anticipatory thinking namely proactive and reactive AT. Proactive AT involves foreseeing potential challenges and developing strategies to address them before they arise. As for reactive AT, it occurs when individuals respond to imminent complications or uncertainties. An effective balance between these types of AT is crucial for maintaining psychological balance and resilience (Hiatt, 2023). Cognitive Behavioural Therapy (CBT) often incorporates AT exercises that encourage clients to envision future situations positively. Such practices facilitate clients in reframing their thoughts towards future events, reducing feelings of dread and encouraging proactive behaviour (Geden et al., 2019). Moreover, Hallford et al. (2020) indicate that guiding clients in episodic future thinking can be particularly effective in treating depression and anxiety by fostering anticipated positive experiences (Niziurski & Schaper, 2021).

While AT can be a powerful asset, it can also have negative repercussions when it becomes maladaptive. Excessive worry about future possibilities, often referred to as anticipatory anxiety, can impede an individual's capacity to function effectively in the present condition (Hallford et al., 2022). Individuals who become trapped in negative anticipatory cycles may engage in rumination, leading to heightened feelings of helplessness and contributing to mental health disorders such as generalized anxiety disorder and major depressive disorder (Hope et al., 2021). A notable case study is that of socially anxious individuals, who often exhibit a style of AT that involves catastrophic scenarios and self-criticism. Wong and Moulds (2012) found that such negative anticipatory processing fortified maladaptive self-beliefs, exacerbating symptoms of social anxiety (Wong & Moulds, 2012). In these contexts, AT shifts from a constructive tool to a source of ongoing distress, highlighting the dual-edged nature of cognitive forecasting.

Anticipatory thinking skills (ATS) are important for mental health as they help individuals manage future uncertainties with resilience and foresight. These skills, developed through education, can improve emotional well-being and psychological resilience. Understanding both positive and negative aspects of anticipatory thinking allows for more precise approaches to mental health care, highlighting the importance of providing individuals with cognitive tools for effective future planning. In this context, enhancing ATS among adolescents emerges as a promising strategy to address mental health challenges. ATS encompasses the ability to predict, adapt, and plan for future situations, fostering resilience and proactive coping strategies. This is mainly because ATS, which include abilities such as forecasting, adaptability, and scenario planning, have been associated with improved coping strategies and increase resilience in facing mental health challenges.

The cultivation of anticipatory thinking skills (ATS)—encompassing forecasting, adaptability, and scenario planning—is paramount for fostering mental resilience, as it can reduce anxiety and enhance proactive coping. Despite its importance, a significant research gap exists regarding the relationship between ATS and mental health among Malaysian secondary school students. There is limited empirical evidence exploring how these future-oriented cognitive skills specifically influence adolescent well-being within the unique cultural and educational contexts of Malaysia. Therefore, this study aims to bridge this gap by determining the mental health status of secondary school students.

Specifically, this study seeks to examine the relationship between their ATS and mental health outcomes across diverse urban and rural settings. Understanding this connection is crucial for informing the development of targeted educational interventions that leverage cognitive skills training to bolster youth mental well-being.

2.1. Hypotheses

H_1 There is a positive relationship between adolescents' ATS and their depression level.
H_2 There is a positive relationship between adolescents' ATS and their anxiety level.
H_3 There is a positive relationship between adolescents' ATS and their stress level.

3. Research Methods

3.1. Research Design

This study employed a quantitative correlational research design to examine the relationship between anticipatory thinking skills (ATS) and mental health (MH) status among secondary school students.

3.2. Participants

A sample of 320, 16-year-old adolescents, consisted of 119 (37.2%) secondary school male students, and 201 (62.8%) female students were recruited for the present study. Participants were randomly selected among form four students of rural and urban areas attending public schools across several states of Peninsular Malaysia i.e. Kuala Lumpur, Putrajaya, Selangor, Negeri Sembilan, Perak, Penang, Kedah and Terengganu. These Form four students are in the first year of upper secondary school, characterised by a transition from a general curriculum into Science or Arts streams. Majority of participants (69.1%) were urban students, encompasses a group of individuals with several challenges and opportunities shaped by their urban environment. School location plays a pivotal role in fostering participants' critical thinking and problem-solving skills as well as provide opportunity to develop social and emotional skills and resilience.

3.3. Instruments

3.3.1. Independent variable

Anticipatory Thinking Skills Scales (ATSS) was developed from the evaluative dimensions of The Anticipatory Thinking Assessment (ANTA) of Geden et al. (2019). This ATSS was then validated by the subject matter experts and used to measure participants' level of anticipatory thinking skill through eight dimensions: awareness (e.g. "I am aware that my actions today will have an impact on the future"), adaptability (e.g. " I am comfortable stepping out of my usual routine to face changes"), opportunity recognition (e.g. "I can identify opportunities even in challenging situations"), risk assessment (e.g. "I am able to assess a risk before making a decision"), scenario planning, forecasting, skill development and engagement. Participants indicate the extent to which they agree with each subscale item on a 5-point Likert scale from 1(strongly disagree) to 5 (strongly agree). The mean scores were calculated for each subscale to measure the level of anticipatory thinking skills among participants.

3.3.2. Dependent variable

Depression, Anxiety and Stress Scale (DASS-21) was used to measure participants' mental health status over the seven days (a week) through three subscales: depression (e.g. "I lack motivation to do anything"), anxiety (e.g. "I experience difficulty breathing - rapid breathing, feeling breathless even without physical exertion") and stress (e.g. "I find myself becoming increasingly restless when feeling anxious") over the seven days (a week). Each item was responded to on a 4-point Likert scale with responses ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). The mean scores for each subscale were calculated to determine the level of stress, anxiety and depression among participants.

3.5. Procedures

Written permission from Ministry of Education was obtained prior to the data collection The data collection process involved self-administering the questionnaires during the scheduled sessions in each of participating school. Participants were briefed about the purpose of the study and instructions on how to complete the questionnaires. They were supervised by trained facilitators through the entire process, assisting participants when needed and ensuring the responses were completed independently and without external influence. This was done to maintain accuracy and reliability. The data were collected as a snapshot of participants' anticipatory thinking skills and mental health status at that specific point of time. This cross-sectional approach allowed the study to capture the current state of participants' cognitive skills and their mental health status, providing valuable insights into their well-being at the time of data collection.

3.6. Data Analysis

The collected data were analysed using SPSS version 28. Descriptive statistics, including means, standard deviations, minimum and maximum values, were calculated for each item within the ATSS and DASS-21. Additionally, Pearson's correlation coefficient was employed to examine the relationship between ATS and MH status. The analysis aimed to identify the direction and strength of the association between the two variables.

3.7. Ethical Consideration

The study adhered to ethical standards for research involving human subjects. Ethical approval was obtained from the IIUM Research Ethics Committee (IREC No. IREC 2024-311). Informed consent form was obtained from participants and their guardians prior to participation in the study, ensuring ethical compliance and voluntary participation. Participants were assured of the confidentiality and anonymity of their responses.

4. Results

4.1. Demographic Characteristics

The demographic characteristics of the 320 participants are summarized in Table 1. The sample consisted of 201 female students (62.8%) and 119 male students (37.2%). Regarding school location, most of the participants were from urban schools (n = 221, 69.1%), while the remaining 30.9% (n = 99) were from rural schools.

Table 1: Participants' Demographic Characteristics

Characteristics	Frequency (N)	Percentage (%)
Gender		
Male	119	37.2
Female	201	62.8
School Location		
Rural	99	30.9
Urban	221	69.1

4.2. Descriptive Statistics and Pearson Product-Moment Correlation

Descriptive statistics were conducted to examine participants' scores on the Anticipatory Thinking Skills Questionnaire (ATQS) and the Depression, Anxiety and Stress Scale (DASS-21). The results indicated an overall mean score for the ATQS of 3.75 (SD = .48). The mean scores for its subscales were: Awareness (M = 3.93, SD = .53), Adaptability (M = 3.67, SD = .58), Opportunity Recognition (M = 3.72, SD = .56), Risk Assessment (M = 3.70, SD = .53), Scenario Planning (M = 3.62, SD = .59), Forecasting (M = 3.73, SD = .59), Skill Development (M = 3.71, SD = .59), and Engagement (M = 3.94, SD = .63). For the DASS-21, the overall mean score was 1.09 (SD = .65), with subscale scores for Depression (M = 1.10, SD = .70), Anxiety (M = 1.04, SD = .67), and Stress (M = 1.14, SD =.70). Collectively, these findings suggest that the 16-year-old secondary students in the study reported moderate levels of anticipatory thinking skills and a low risk of mental health issues.

4.3. Correlation Analysis

A Pearson product-moment correlation analysis revealed significant positive inter-correlations among the subscales of both the Anticipatory Thinking Skills Scale (ATSS) and the Depression, Anxiety and Stress Scale (DASS-21), confirming the internal consistency of each measure (see Table 2). The primary analysis examining the relationship between ATS and mental health identified specific patterns of association. The Adaptability subscale demonstrated the most robust negative correlation across all three mental health indicators: Depression (r=−.24, p<0.01), Anxiety (r=−.21, p<0.01), and Stress (r=−.22, p<0.01). Furthermore, Opportunity Recognition and Engagement were also significantly, albeit weakly, negatively correlated with all three DASS-21 subscales. These results suggest that higher proficiency in these skills is associated with lower reported symptoms of depression, anxiety, and stress. A more nuanced finding emerged for the Awareness subscale, which was significantly negatively correlated with Anxiety (r=−.14, p<0.05) but not with Depression or Stress. In contrast, the remaining ATS subscales—Risk Assessment, Scenario Planning, Forecasting, and Skill Development—showed no significant correlation with any of the mental health measures. Collectively, these findings indicate that while various facets of anticipatory thinking are interrelated, adaptability, opportunity recognition, and engagement appear to be the most salient skills associated with positive mental health outcomes in this adolescent sample.

Table 2: Descriptive Statistics and Pearson Product-Moment Correlation (N = 320)

Variables	Min	Max	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Overall DASS	0.00	2.76	1.09	.65	1.00	.93**	.94**	.94**	-.13	-.10	-.24**	-.14**	-.05	-.052	-.062	-.052	-.14**
2. DASS-Depression	0.00	3.00	1.10	.70		1.00	.82**	.81**	-.12*	-.06	-.24**	-.14*	-.03	-.05	-.07	-.06	-.14*
3. DASS-Anxiety	0.00	2.86	1.04	.67			1.00	.83*	-.13*	-.14*	-.21**	-.13*	-.06	-.04	-.07	-.03	-.14**
4. DASS -Stress	0.00	3.00	1.14	.70				1.00	-.11*	-.09	-.22**	-.13*	-.06	-.03	-.02	-.04	-.13*
5. Overall ATS*	1.03	5.0	3.75	.48					1.00	.74**	.79**	.87**	.81**	.84**	.87**	.83**	.82**
6. ATS -Awareness	1	5	3.93	.53						1.00	.50**	.62**	.57**	.56**	.58**	.55**	.55**
7. ATS -Adaptability	1	5	3.67	.58							1.00	.74**	.54**	.58**	.63**	.54**	.65**
8.ATS -Opportunity Recognition	1	5	3.72	.56								1.00	.68**	.72**	.65**	.64**	.59**
9. ATS -Risk Assessment	1	5	3.70	.53									1.00	.72**	.65**	.64**	.59**
10. ATS -Scenario planning	1	5	3.62	.59										1.00	.73**	.71**	.59**
11. ATS -Forecasting	1	5	3.73	.59											1.00	.74**	.66**
12. ATS -Skill_Development	1.25	5	3.71	.59												1.00	.66**
13. ATS -Engagement	1	5	3.94	.63													1.00

*Anticipatory Thinking Scale (ATS); ** $p < 0.01$;

The findings of this study indicate a significant relationship between specific anticipatory thinking skills and mental well-being among secondary school students. A key result was the significant negative correlation between overall mental distress and the anticipatory thinking subscales of Adaptability (r = -.240), Opportunity Recognition (r = -.148), and Engagement (r = -.148). This suggests that students with higher proficiency in these cognitive skills tend to report fewer symptoms of depression, anxiety, and stress. This aligns with cognitive-behavioral theories, which posit that psychological well-being supports the cognitive flexibility and emotional regulation necessary for effective future-oriented thinking.

The link between these specific skills and better mental health is noteworthy. Opportunity recognition may act as a cognitive asset, fostering a sense of purpose and hope that buffers against stress, particularly during academic transitions. This proactive focus on potential gains rather than threats could enhance optimism and resilience. Similarly, students who are more cognitively and emotionally engaged in planning for the future may develop greater psychological resilience by constructively facing uncertainty instead of avoiding it.

This proactive mental involvement appears to be a protective factor against anxiety. These results build on previous research that links anticipatory thinking with resilience and proactive coping, empirically demonstrating this connection in a student population vulnerable to stress (Hiatt, 2023; Amos-Binks & Dannenhauer, 2019).

4.5. Implications for Educational Practice

These findings have practical implications for mental health and well-being programs within educational settings. The results suggest a potentially bidirectional relationship: interventions aimed at improving students' psychological well-being could indirectly enhance their anticipatory thinking, leading to better academic planning. Conversely, incorporating training on anticipatory skills—such as adaptability, scenario planning, and opportunity recognition could represent a novel and valuable component of school-based mental health support.

4.6. Limitations and Future Directions

While this study provides valuable insights, its limitations must be acknowledged. The correlational design establishes an association but does not imply causation. Further research using longitudinal methods and larger, more diverse samples is necessary to validate these findings and explore the predictive nature of the relationships between anticipatory thinking and mental health over time.

5. Conclusion

This study aimed to address the underexplored relationship between anticipatory thinking skills (ATS) and mental health among Malaysian adolescents. The findings revealed that, on average, student participants reported moderate levels of both anticipatory thinking skills and mental health symptoms. This suggests that the students generally possess a functional capacity for engaging in future-oriented cognitive processes. The core finding of this research is the significant negative correlation between specific ATS—namely adaptability, opportunity recognition, and engagement—and the overall scores for depression, anxiety, and stress. This inverse relationship

strongly implies that adolescents with higher proficiency in these cognitive skills are likely to experience better mental well-being. Consequently, enhancing these specific facets of anticipatory thinking in adolescents could be a promising strategy to reduce their risk for developing mental health challenges.

Ethics Approval and Consent to Participate

Ethical approval was obtained from the IIUM Research Ethics Committee (IREC No. IREC 2024-311).

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Conflict of Interest

The authors declare no conflict of interest.

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