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Trait anxiety, dispositional hope and mental well-being: examining longitudinal mediation

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Abstract

The associations among trait anxiety, dispositional hope, and mental well-being have been examined in cross-sectional studies. However, no longitudinal research has examined the relationships between these variables, creating a significant gap in the literature. This study collected data at two-time points (T1–T2) at six-month intervals. The study's participants were 297 adolescents. This study employed a longitudinal design to investigate whether trait anxiety (T2) and dispositional hope (T2) mediate the association between trait anxiety (T1) and mental well-being (T2) in a sample of Turkish adolescents. A cross-lagged panel model was used in this study for a half-longitudinal design to test mediation. The results showed that dispositional hope (T2) had a longitudinal mediating role in the relationship between trait anxiety (T1) and mental well-being (T2). Additionally, it was found that trait anxiety (T2) had a longitudinal mediating role in the relationship between trait anxiety (T1) and mental well-being (T2). Based on the findings of this study, mental health professionals may utilize hope-oriented interventions in the prevention of trait anxiety among adolescents.

Keywords Trait anxiety, Dispositional hope, Mental well-being, Longitudinal study

Mental well-being means being aware of one's potential and abilities and being able to cope effectively with challenging life events [1]. Mental well-being is an important determinant of an individual's ability to lead a quality life and be satisfied with life [2]. The World Health Organization has stated that mental well-being is related to mental health [3]. However, it is also known that mental well-being can be used instead of mental health [4]. It is stated that mental well-being is a complex concept that includes psychological and subjective well-being [5, 6].

Maintaining a high level of mental well-being can reduce the risk of contracting physical diseases [7]. A decrease in mental well-being is a risk factor for physical

and psychological problems [8–11]. An individual's mental well-being level can vary depending on life events. For instance, if an individual experiences anxiety, it can decrease their mental well-being. Studies have shown that anxiety can reduce an individual's well-being [12, 13]. In conclusion, the research findings suggest that trait anxiety may be linked to mental well-being.

Adolescence is a critical period that has a lasting impact on mental well-being. During this time, individuals are highly sensitive to environmental factors that can affect their mental health [14]. Identifying the factors that have a negative impact on mental well-being during adolescence is crucial for developing preventive interventions that can safeguard mental health throughout life. Cross-sectional studies have examined the relationship between trait anxiety and mental well-being [2, 15]. However, there is a need for studies examining the relationship between trait anxiety and mental well-being using a longitudinal method. Additionally, chronic anxiety

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can lead to negative social relationships, academic failure, and developmental problems, all of which can harm mental well-being [16]. Therefore, the study aimed to investigate the mediating role of trait anxiety (T2) in the relationship between trait anxiety at time 1 (T1) and mental well-being at time 2 (T2).

Another factor affecting mental well-being is hope [17]. Hope is one of the important resilience factors to maintain an individual's mental well-being [18]. It has been revealed that hope is positively correlated with variables such as gratitude, self-efficacy, optimism, grit, and life satisfaction that can increase the level of mental well-being [19]. Research has shown that hope is negatively correlated with various types of anxiety, including state anxiety, trait anxiety [20], and social anxiety [21]. Considering that trait anxiety damages individuals' mental well-being, dispositional hope may have a protective role in coping with trait anxiety to protect individuals' mental well-being. Therefore, the current study examined the mediating role of dispositional hope (T2) in the relationship between trait anxiety (T1) and mental well-being (T2).

Trait anxiety and mental wellbeing

Anxiety is among the commonly experienced psychological challenges in adolescents. Upon examination of the literature, it becomes apparent that anxiety is classified into various types, including social anxiety [22], and separation anxiety disorder [23]. However, state and trait anxiety are also among the types in which anxiety is widely examined [24]. State anxiety is a temporary emotional state, whereas trait anxiety refers to an individual's tendency to react anxiously to events or situations [25]. Trait anxiety is considered a risk factor for mental health. Every individual may experience occasional symptoms of anxiety, but these are typically short-term and not severe. Therefore, these anxiety symptoms do not impair functioning in social, personal, or academic areas [26]. However, persistent and severe anxiety symptoms can impair functioning in various areas.

Research has demonstrated that trait anxiety is linked to negative social relationships and reduced life satisfaction [27]. These negative conditions linked to trait anxiety may harm individuals' mental well-being. Furthermore, trait anxiety can impair cognitive skills, resulting in decreased functionality for individuals [26]. Individuals with high trait anxiety do not have enough cognitive flexibility to cope with challenging life events [28]. Therefore, individuals with high trait anxiety have difficulty adapting to changing life conditions.

Trait anxiety has been shown to harm an individual's mental well-being in hedonic and eudaimonic dimensions [29; 26]. Research findings also reveal this situation. For example, in a study conducted with university

students, a negative relationship was found between anxiety and emotional well-being [30]. Similarly, another study found a significant and negative relationship between trait anxiety and well-being [15]. Previous longitudinal studies have also shown a correlation between trait anxiety and mental well-being in adolescents. For instance, a study found that trait anxiety negatively impacted well-being a few months later [31]. Trait anxiety can lead to destructive psychological effects and harm individuals' mental well-being in the following years. However, the literature has not sufficiently examined the relationship between trait anxiety and future mental well-being.

Mediating role dispositional hope

Dispositional hope is a variable that may influence the longitudinal relationship between trait anxiety and mental well-being. Anxiety and hope can be seen as emotional and cognitive characteristics towards the future [32]. Anxiety involves anticipating potential threats, dangers, and negative events in the future. Individuals with high levels of anxiety experience a strong sense of lack of control over potential future problems [33]. Hope, on the other hand, involves motivation to find solutions to potential future problems and a sense of control [32]. Therefore, hope can act as a buffer against anxiety and disturbing thoughts and feelings in individuals.

Hope is defined as an individual setting goals in life and having strategies to achieve them [34]. It contributes to an individual's mental well-being in the face of anxiety-inducing life events. Individuals with high levels of hope possess coping strategies to deal with challenging life events and the resilience to adapt to stressful situations [34]. Thus, hope may play a preventive role in mitigating the damage caused by anxiety on mental well-being.

When examining the relevant literature, it becomes clear that there are research findings indicating that increasing the level of hope can reduce anxiety. For instance, a study found a negative correlation between hope and trait anxiety in adolescents [35]. Furthermore, in addition to reducing anxiety, hope also has a positive impact on mental well-being. Individuals with high levels of hope exhibit characteristics such as openness to new experiences, recognition of opportunities, and perseverance in achieving their goals. Therefore, individuals with high levels of hope are successful in various fields such as social and academic are satisfied with their lives [36].

Since hope strengthens individuals' psychological health, it can be said that there is a relationship between hope and mental well-being. Researchers have also revealed a positive relationship between hope and psychological well-being and social well-being [37]. As a result, it has been revealed through research and theoretical knowledge that the variables of dispositional

hope, trait anxiety and mental well-being are related to each other. However, it is seen that there are not enough longitudinal studies in which these three variables are considered together and the time factor is taken into consideration. Considering that hope and anxiety contain opposite cognitions and feelings towards the future [32], it is extremely important to address the prediction of these two variables on mental well-being with a longitudinal study. Examining mental well-being during adolescence is crucial as it supports positive development in later years [38] and some psychological problems may persist into adulthood [39].

Mediating role of trait anxiety (T2)

Adolescents with anxiety problems may experience difficulties in various areas, including school, social life, personal life, and family relationships [40]. These difficulties can harm their mental well-being. Previous studies have demonstrated that anxiety can be transmitted longitudinally. For instance, a study investigated the transmission of generalized anxiety in adults over three-time points [41]. The study found that anxiety at time one was associated with anxiety at both time two (one month after time one) and time three (two months after time one). A study conducted with university students revealed that anxiety measured at time one was highly and positively correlated with anxiety at time two (five months after time one) and time three (four months after time two). Additionally, anxiety at time one positively predicted anxiety at time two, and anxiety at time two positively predicted anxiety at time three [42]. Therefore, longitudinal studies suggest that trait anxiety at time two may have a mediating role.

Longitudinal studies have revealed a relationship between anxiety and various psychological problems in the future. McPherson and colleagues found a positive correlation between anxiety at time one and depression at time two and time three [41]. Similarly, Zhang and colleagues reported positive correlations between anxiety score at time one and insomnia score at time two months later, as well as insomnia score one and a half years after time one [43]. Another study also found that anxiety was associated with mental health problems three months later [44]. These findings suggest that anxiety may be a precursor to future psychological problems and may harm mental health.

The present study

Previous studies have examined the relationships between trait anxiety, dispositional hope, and mental well-being using cross-sectional methods. Cross-sectional studies have limitations in revealing causal relationships and determining the direction of the relationship between variables. In addition, cross-sectional

studies have limitations in determining the difference in the relationship over time [45]. Therefore, this study uses structural equation modeling based on data collected at two different time points with a longitudinal design. Thus, this study aims to explain the causal relationships between trait anxiety, dispositional hope, and mental well-being with minimized limitations. The hypotheses of this study are as follows:

H₁ Trait anxiety at T1 is positively associated with adolescents' mental well-being at T2.

H₂ The mediating role of dispositional hope at T2 in the relationship between trait anxiety at T1 and mental well-being at T2 is significant in adolescents.

H₃ Trait anxiety at T2 plays a significant mediating role in the relationship between trait anxiety at T1 and mental well-being at T2 in adolescents.

Method

Participants

The study sample comprises adolescents residing in a city in the Eastern Anatolia Region of Turkey. Data were collected twice, six months apart, and participants were asked to provide code names to match their responses across both waves. The first wave had 312 participants, while the second wave had 297 (48.8% girls; 51.2% boys). The study's final sample group consisted of participants aged between 12 and 17. Of the 297 participants, 17 were 12 years old (5.7%), 16 were 13 years old (5.4%), 50 were 14 years old (16.8%), 89 were 15 years old (30.0%), 101 were 16 years old (34.0%), and 24 were 17 years old (8.1%).

Materials

Trait anxiety scale

Spielberger and colleagues developed the scale to measure individuals' trait anxiety levels [46]. The Trait Anxiety Scale was adapted into Turkish by Öner ve La Compte [47]. The scale comprises of 20 items (e.g. I worry about trivial things), with one dimension, and uses a 4-point Likert scale (1 = Almost never; 4 = Almost always). The score obtained from the scale indicates the participant's level of trait anxiety, with higher scores indicating higher levels of anxiety. The Cronbach's alpha coefficient of the Trait Anxiety Scale in this study was 0.86 for T1 and T2.

Warwick-Edinburgh mental Well-Being Scale- short form

The scale was developed to measure the mental well-being of individuals [48]. The Warwick-Edinburgh Mental Well-Being Scale Short Form was adapted into Turkish by Demirtaş and Baytemir [49]. The scale comprises seven items (e.g. 'I think healthy') and uses a

5-point Likert scale (1 = never; 5 = always). An increase in the score indicates an increase in the participant's mental well-being level. The Cronbach's alpha coefficient of the Warwick-Edinburgh Mental Well-Being Scale - Short Form in this study was 0.84 for T1 and 0.85 for T2.

Dispositional hope scale

The scale was developed to determine the hope tendency levels of individuals [34]. The Dispositional Hope Scale was adapted into Turkish by Tarhan and Bacanlı [50]. The scale is an 8-point Likert type (1 = Absolutely false; 8 = Absolutely true) and consists of 12 items. The score increase on the scale indicates a rise in the participant's level of sustained hope. The scale measures Alternative Ways of Thinking (e.g. 'I can think of many ways to get out of a troublesome situation') and Actuating Thinking (e.g. 'I will achieve the goals I set for myself') sub-dimensions. However, a total score can also be obtained from the scale. The study conducted analyses by using the total score from the scale. The Cronbach's alpha coefficient of the Dispositional Hope Scale in this study was 0.88 for T1 and 0.91 for T2.

Procedure and data analysis

This study was approved by the Social and Human Sciences Ethics Committee of the University of Karamanoglu Mehmetbey University with reference code (decision date: 28.11.2023; no: 276/16). This study was conducted following the ethical principles outlined in the Declaration of Helsinki. Informed consent to participate was obtained from all participants and, in the case of individuals under the age of 16, consent was obtained from their parents or legal guardians.

Participants were informed that the study was longitudinal and that they would be recontacted for a second wave of data collection six months later. Therefore, they were asked to use a code name to enable the matching of data from the first and second waves. No compensation was provided for participation. Participation in the study was entirely voluntary.

In this study, the descriptive statistics reliability and correlation coefficients of the variables were tested using SPSS 25. In this study, a network analysis was conducted

using JASP to describe the relationships between variables. The preconditions were examined before conducting the mediation analysis within the scope of the research hypothesis. The results show that the skewness and kurtosis coefficients of the variables are between ± 1.5 . Therefore, the data has univariate normality [51]. It was determined that the correlations between the variables were lower than 0.90, so there was no multicollinearity problem [52]. As a result, it was determined that the data set provided the necessary prerequisites for mediation analysis. To overcome the limitations of studies with cross-sectional data, the mediating roles of trait anxiety T1 and dispositional hope T2 in the relationship between longitudinal data and trait anxiety T2 and mental well-being T2 were examined. Model 4 was used in Process Macro for parallel mediation analysis [53]. This study was conducted using a semi-longitudinal design.

Results

Descriptive statistics, reliabilities and correlations

The variables were measured at T1 and T2. Table 1 presents the skewness, kurtosis, mean, and correlation values of the variables at T1 and T2, as well as the Cronbach alpha values for their reliability. The variables' Cronbach alpha values ranged from 0.84 to 0.91. Trait anxiety at T1-T2 was negatively associated with hope at T1-T2, and mental well-being at T1-T2 significantly. Mental well-being at T1-T2 was negatively correlated with trait anxiety at T1-2. Mental well-being at T1-T2 was positively correlated with hope at T1-T2. Table 1 presents the descriptive statistics, reliabilities, and correlation values for all variables.

The results of the network analysis performed to reveal the relationships of all variables are given in Fig. 1. Besides, Fig. 2 presents the findings on the prediction of mental well-being at T2 by trait anxiety at T2, dispositional hope at T2, and trait anxiety at T1.

Table 2 presents the findings on the prediction of mental well-being at T2 by trait anxiety at T2, dispositional hope at T2, and trait anxiety at T1. Table 2 shows that trait anxiety at T1 is a positive predictor of trait anxiety at T2 ($b = 0.63^{**}$; $LB = 0.55$; $UB = 0.72$). Besides, trait anxiety at T1 explained 66% of the trait anxiety at T2. In addition,

Table 1 Descriptive statistics, reliability and correlation values of the variables

Variables	Descriptive and reliabilities statistics					Correlations				
	Skewness	Kurtosis	Mean	α	1	2	3	4	5	6
1. Trait Anxiety T1	0.02	-0.45	2.33	0.86	-					
2. Trait Anxiety T2	0.12	-0.06	2.37	0.86	0.66**	-				
3. Hope T1	-0.62	-0.02	5.98	0.88	-0.46**	-0.40**	-			
4. Hope T2	-0.31	-0.53	5.48	0.91	-0.39**	-0.51**	0.56**	-		
5. Mental Wellbeing T1	-0.63	0.00	3.60	0.84	-0.58**	-0.54**	0.66**	0.50**	-	
6. Mental Wellbeing T2	-0.26	-0.53	3.34	0.85	-0.49**	-0.59**	0.42**	0.67**	0.55**	-

Note. ** $p < .01$

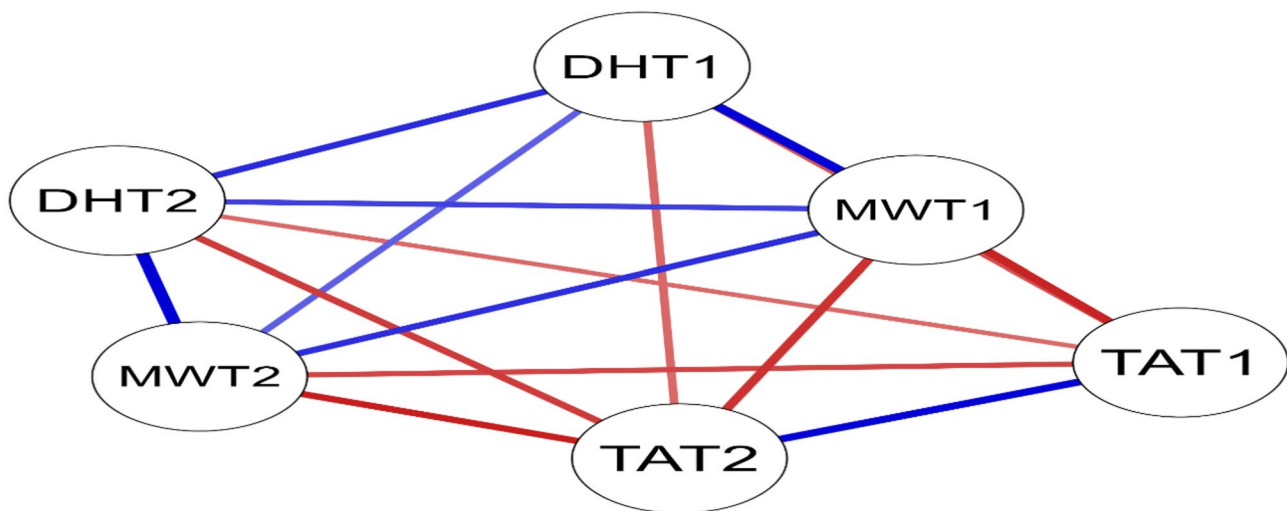


Fig. 1 The results of the network analysis performed to reveal the relationships of all **Note.** Blue lines represent positive correlations and red lines represent negative correlations. DHT1 = Dispositional hope T1, DHT2 = Dispositional Hope T2, TAT1 = Trait anxiety T1, TAT2 = Trait anxiety T2, MWT1 = Mental well-being T1, MWT2 = Mental well-being T2

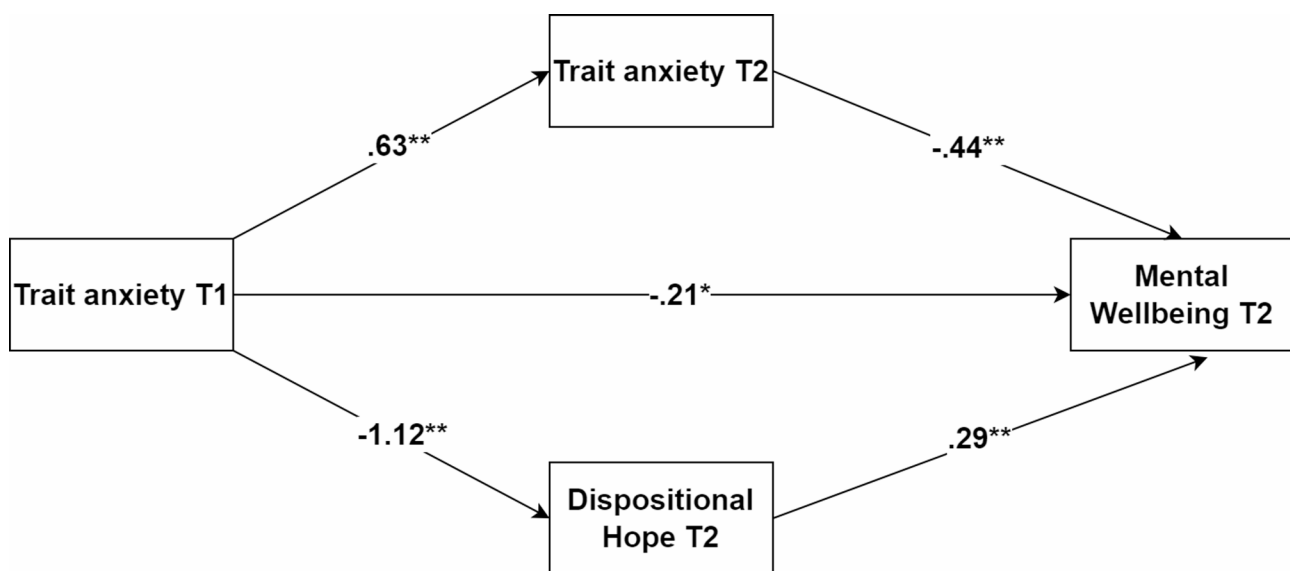


Fig. 2 Longitudinal parallel mediation model (Note. * $p < .05$; ** $p < .01$)

trait anxiety at T1 negatively predicts dispositional hope at T2 ($b = -1.12^{**}$; $LB = -1.42$; $UB = -0.82$). Trait anxiety in T1 explains 15% of dispositional hope in T2. According to Table 2, trait anxiety at T1 ($b = -0.21^{**}$; $LB = 0.39$; $UB = 0.04$) and trait anxiety at T2 ($b = -0.44^{**}$; $LB = -0.63$; $UB = -0.25$) negatively predicted mental well-being at T2. Dispositional hope at T2 positively predicts mental well-being at T2 ($b = 0.29^{**}$; $LB = 0.24$; $UB = 0.34$). Finally, the results showed that trait anxiety at T1, trait anxiety at T2, and dispositional hope at T2 predicted 54% of the variance in spiritual well-being at T2. Table 3 shows the mediating effects, direct effect and total effect.

The results showed that trait anxiety T2 significantly mediates the relationship between trait anxiety T1 and

mental well-being T2 ($b = -0.28$, $LB = -0.42$, $UB = -0.13$). The results showed that dispositional hope T2 significantly mediates the relationship between trait anxiety T1 and mental well-being T2 ($b = -0.32$, $LB = -0.44$, $UB = -0.21$). This finding suggests that dispositional hope could be effective in reducing the adverse impact of trait anxiety on the mental well-being of adolescents. The direct effect of trait anxiety T1 on mental well-being T2 is significant and negatively ($b = -0.21^{*}$, $LB = -.0.39$, $UB = -0.04$). The total effect of trait anxiety T1 on mental well-being T2 is significant and negatively ($b = -0.81^{*}$, $LB = -.0.98$, $UB = -0.65$).

Table 2 Unstandardized coefficient

Variables	Trait Anxiety T2			Dispositional Hope T2			Mental Wellbeing T2		
	U.E.	S.E.	L.B.	U.B.	U.E.	S.E.	L.B.	U.B.	U.B.
TA T1	0.63**	0.04	0.55	0.72	-1.12**	0.15	-1.42	-0.82	-0.21*
TA T2									-0.44**
DHT2									0.29**
									R ² =0.54
									R ² =0.66

Note. U.E.=Unstandardize Estimate; S.E.= standart error; * $p < .05$, ** $p < .01$

Discussion

Studies on mental well-being are increasing, in line with the positive psychology approach [54]. However, the use of cross-sectional methods in these studies prevents the establishment of a cause-effect relationship between the variables considered alongside mental well-being. This study examines the relationships between mental well-being, dispositional hope, and trait anxiety using a longitudinal method. The findings provide longitudinal evidence that trait anxiety predicts mental well-being in adolescents. It was found that trait anxiety in adolescents negatively predicted mental well-being six months later. Thus, it was revealed that trait anxiety is a longitudinal risk factor for mental well-being in adolescents. The findings of the present study also provide evidence for the longitudinal mediating role of trait anxiety (T1) and mental well-being (T2) based on the data collected over a six-month period. Finally, the findings of the current study provide evidence for the longitudinal mediating role of dispositional hope (T2) in the relationship between trait anxiety (T1) and mental well-being (T2) based on the data collected over a six-month period. Thus, the study revealed the preventive role of dispositional hope (T2) in the relationship between trait anxiety (T1) and mental well-being (T2).

Firstly, the hypothesis that trait anxiety predicts mental well-being is discussed. This finding of the study means that individuals with high levels of trait anxiety will have low mental well-being in the future. There are theoretical explanations and research findings that support this finding of the study. For instance, Theoretical knowledge suggests that long-term anxiety can have negative consequences on individuals. Researchers revealed that anxiety was negatively related to mental well-being [55]. They also found that anxiety was negatively related to social well-being, emotional well-being, and psychological well-being. In another study, it was stated that high anxiety decreases psychological well-being [56]. Many research findings have also reported that anxiety is a risk factor for individuals' mental well-being [15, 57].

Individuals with high levels of trait anxiety are in the risk group for psychological problems [25, 58]. Comorbidity of trait anxiety with psychological problems such as family conflict, aggression, and depression may contribute to declines in mental well-being [59, 60]. Individuals with high levels of trait anxiety perceive stimuli in the environment as threatening [61]. For this reason, these individuals are often in a state of alertness [62]. Therefore, individuals with trait anxiety problems experience emotional [63], cognitive [64] and behavioral [65] problems. Trait anxiety can harm mental well-being due to the problems it causes in various areas of development. Mental well-being comprises psychological and

Table 3 Direct, indirect, and total effects

	U.E.	Standart Error	L.B.	U.B.	S.E.
Trait anxiety T1 → Trait anxiety T2 → Mental wellbeing T2	− 0.28**	0.07	− 0.42	− 0.13	− 0.17**
Trait anxiety T1 → Dispositional hope T2 → Mental wellbeing T2	− 0.32**	0.06	− 0.44	− 0.21	− 0.19**
Direct effect	− 0.21*	0.09	− 0.39	− 0.04	− 0.13*
Total effect	− 0.81**	0.08	− 0.98	− 0.65	− 0.49**

Note. * $p < .05$; ** $p < .01$

social well-being [55]. Trait anxiety has a negative correlation with both psychological and subjective well-being [66, 67]. In summary, trait anxiety can harm mental well-being by reducing psychological and subjective well-being.

The study found a significant longitudinal mediating role of trait anxiety (T2) in the relationship between trait anxiety (T1) and mental well-being (T2) within the scope of the second hypothesis. This means that while trait anxiety increases adolescents' trait anxiety levels six months later, it decreases their mental well-being. Anxiety is a prevalent psychological issue among adolescents that can harm their mental health. However, anxiety has comorbidity with psychosocial problems such as depression [68] and school refusal [69]. The comorbidity of anxiety with psychological problems may lead to a long-term decline in mental well-being.

The result of the study's second hypothesis is consistent with previous research. Longitudinal studies show that anxiety is transmitted over long periods of time. For example, in a study of more than 1000 adolescents aged 12 to 18, the relationship between anxiety scores was examined using three waves (Time 1-Time 2-Time 3) of data over a six-month period [70]. The study found positive relationships between anxiety scores at T1 and anxiety scores at T2 and T3. In a longitudinal study of university students, positive correlations were found between anxiety at T1 and anxiety at T2, measured approximately six months later, and anxiety scores measured approximately one and a half years after T1. It was also concluded that anxiety at T1 positively predicted anxiety at T2 [43]. It can be said that anxiety impairs an individual's functionality in many areas. Therefore, the mediating role of trait anxiety at T2 in the relationship between trait anxiety at T1 and mental well-being at T2 may have been significant.

Within the scope of the third hypothesis of the study, the longitudinal mediating role of dispositional hope (T2) in the relationship between trait anxiety (T1) and mental well-being (T2) was found to be significant. Hope can provide resilience to psychological problems such as anxiety. Hope can also help people cope with life events that cause anxiety [71]. Positive psychology and prevention researchers have found that hope is a force against mental health problems [54]. Hope supports the individual's ability to self-regulate and provides a sense of emotional

control [72]. This shows that the feeling of being constantly alert and losing control, which are symptoms of trait anxiety, can be reduced by hope.

In addition to theoretical explanations, research has confirmed that hope is a protective factor in terms of mental well-being. For instance, Yıldırım and Arslan found that maintaining hope can increase individuals' mental well-being levels by enhancing psychological resilience [73]. Similarly, in a study conducted on a sample of university students, it was concluded that dispositional hope positively predicted subjective well-being [74]. Previous longitudinal studies also have suggested that dispositional hope may mediate the relationship between trait anxiety and mental well-being in adolescents. For instance, a study investigated the correlation between adults' hope levels and their anxiety and well-being levels approximately one month later. The research revealed a negative correlation between the participants' hope levels and their anxiety scores approximately one month later. Additionally, a positive correlation was found between the participants' hope levels and their well-being levels [71]. Similarly, a study found a positive relationship between hope and psychological adjustment, both prospectively and concurrently [75]. Researchers have also proven that hope positively predicts psychological adjustment several months later. As a result, researchers stated that those with high levels of hope also have high mental health. Both cross-sectional and longitudinal studies suggest that increasing hope levels can support mental well-being. Considering the negative relationship between trait anxiety and hope, it can be said that hope can prevent the damage caused by trait anxiety to mental well-being, in parallel with the findings of this study.

Limitations and suggestions

The research has both strengths and limitations. Firstly, the research data was collected in a school in the Eastern Anatolia Region of Türkiye. This limitation should be considered when examining the study's findings. In the future, researchers can examine the relationship between these variables by obtaining data from different cities, regions, and countries. The second limitation of this study is that the data were collected using self-report scales. The use of self-report scales may lead to social desirability errors. Future studies can study the variables

in this study using different data collection methods. The third limitation of this study is that the data were obtained using a convenience sampling method. In future studies, it may be recommended to use random sampling methods. The fourth limitation of this study is that only trait anxiety was examined with dispositional hope and mental well-being. State anxiety was not examined with related variables in this study. State anxiety may show different relationships with dispositional hope and mental well-being. It is recommended that the relationship between state anxiety and trait hope and mental well-being be examined in future studies. Finally, although the longitudinal design strengthens causal inferences, future studies are recommended to employ experimental designs to more robustly examine the effects of trait anxiety and dispositional hope on adolescents' mental well-being. Incorporating such methodologies would provide stronger evidence for causality and enhance the applicability of the findings.

Conclusion

The present study showed that trait anxiety negatively predicted dispositional hope and mental well-being six months later. In this context, developing school-based intervention programs to support adolescents' mental well-being appears to be important. Specifically for students with high levels of anxiety, school-based psycho-educational programs may contribute significantly to preventive and protective mental health services. Moreover, it was concluded that dispositional hope in adolescents positively predicted trait anxiety six months later. In line with the findings of the study, mental health professionals should utilize hope-based interventions to prevent and treat trait anxiety in adolescents. The current study also showed that trait anxiety (T2) had a significant mediating role in the relationship between trait anxiety (T1) and mental well-being (T2). Additionally, the study found a significant mediating role of dispositional hope (T2) in the same relationship. Accordingly, the use of hope-based approaches in psychological interventions with adolescents may serve as an effective strategy to enhance individuals' mental well-being. Therefore, it is recommended that mental health professionals integrate structured intervention programs aimed at increasing levels of hope in adolescents into both preventive and protective mental health services.

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Author contributions

M.A. conceptualized the study, collected, and curated the data, analyzed, and interpreted the data, and wrote the main manuscript. The author has read and approved the final manuscript.

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Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Social and Human Sciences Ethics Committee of the University of Karamanoglu Mehmetbey University with reference code (decision date: 28.11.2023; no: 276/16). This study was conducted following the ethical principles outlined in the Declaration of Helsinki. Informed consent to participate was obtained from all participants and, in the case of individuals under the age of 16, consent was obtained from their parents or legal guardians.

Consent for publication

No applicable.

Competing interests

The authors declare no competing interests.

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