

The Associations Between Attachment, Thought-Action Fusion, and Anxiety in Adolescents: Mediator Effect of Thought-Action Fusion

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ABSTRACT

Background: This study examined the relationship between attachment quality, thought-action fusion (TAF), and the anxiety levels and mediator effect of TAF-likelihood–self in this relationship in adolescents.

Methods: The participants consisted of 637 adolescents aged 12-17 (61.3% female, $n=391$; 38.7% male, $n=246$) obtained from 2 secondary schools in Istanbul. TAF was screened with Thought-Action Fusion-Child Version (TAFIC), and anxiety was assessed with the Trait Anxiety subscale of the State-Trait Anxiety Inventory for Children (STAIC). The short form of The Inventory of Parent and Peer Attachment-short version (s-IPPA) was used to determine the attachment quality of adolescents.

Results: Higher levels of TAF and lower levels of maternal attachment (MA) and paternal attachment (PA) quality were associated with higher levels of trait anxiety. In addition to this, TAF-likelihood–self had partial mediator role between attachment levels and anxiety symptoms.

Conclusion: The results of the present study suggested that low attachment quality can be a risk factor in terms of higher anxiety levels, and TAF problems may have an increasing effect on this association. It can be suggested that, in the clinical or academic field, interventions focusing on the differentiation between the thought and action may be beneficial in anxious adolescents with attachment problems.

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INTRODUCTION

Anxiety disorders are among the most common mental health disorders in adolescence.¹ An estimated 6.5% of children and adolescents globally suffer from an anxiety disorder, with a female preponderance of 2 : 1 to 3 : 1.^{2,3} Anxiety disorders are highly comorbid with other anxiety disorders and with numerous other psychiatric disorders, and are associated with poor academic performance and low interpersonal and social relationship quality.³ Thus, understanding the factors associated with the emergence of anxiety disorders is essential for the development of empirically based prevention and intervention programs.

Bowlby defined attachment as a stable and lasting emotional bond formed when the physical and emotional needs of the newborn are met at the optimum level by the primary caregiver, and he highlighted its importance in shaping the cognitive and emotional life of the individual. Ainsworth redefined the concept of

attachment by identifying secure and insecure attachment styles.⁴ Attachment is thought to have a significant role in all stages of life, and individuals who are securely attached tend to be more able to employ adaptive strategies when dealing with stress. In contrast, those who are insecurely attached tend to practice a negative type of coping strategy in stressful conditions.⁵ Research on attachment showed that the secure attachment style diminishes the risk of anxiety disorders, whereas insecure attachment styles are directly related with anxiety disorders across age groups and cultures.⁶⁻⁸ Colonesi et al.⁹ supported that insecure attachment styles are related to anxiety disorders, in their meta-analysis of 46 studies including more than 8000 participants. Insecure attachment styles are reported to cause beliefs that the world and social environment are dangerous and untrustworthy for individuals rather than supportive for themselves, and to

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cause the development of internal working models and cognitive structures indicating that they are too weak to cope with these stressful situations. Thus, insecure attachment is thought to be associated with high anxiety levels.⁹

A cognitive construct that is particularly likely to be related to high anxiety levels is thought-action fusion (TAF). TAF can be defined as a tendency to establish exact causal relations between thoughts and the external reality and to overvalue the possible consequences of thoughts.^{10,11} TAF consists of 2 components; Moral-TAF (TAF-M) and Likelihood-TAF (TAF-L). TAF-L is a mindset that the thoughts increase the likelihood of events that will occur in the life of the individual and of others.¹⁰ In addition to obsessive-compulsive disorder (OCD), TAF-L is thought to be associated with many other psychopathologies including anxiety disorders.¹² TAF-M, on the other hand, is a mindset that the thoughts that come to mind have negative consequences that are equivalent to immoral behaviors.¹⁰ In the literature, TAF-L is reported to be associated with problems related to high anxiety levels, whereas TAF-M is reported to be associated with depressive symptoms.¹³ People with anxiety disorders have been shown to believe that their thoughts and worries can influence external events.^{12,14}

Previous research suggests a consistent developmental pathway linking insecure attachment styles and anxiety disorders in adolescence.^{8,15} It is suggested that TAF-related beliefs can reflect a metacognitive system, which can play a role in the development of anxiety disorders by triggering pathological worry.^{12,13} Early relationships and quality of attachment may play a role in the development of cognitive flexibility and the formation of schemas of individuals. Given that these cognitive processes associated with attachment are associated with the development of TAF, and considering the relationship between TAF and attachment quality with anxiety problems,^{8,12,13,15} it can be considered that these 3 variables may be related to each other. Although there is a research study in which negative affect had mediator role between TAF and OCD,¹³ according to our literature research, there is no study investigating TAF as a mediator variable. We tested 3 hypotheses: (a) low attachment quality is associated with higher levels of anxiety symptoms, (b) higher TAF score is associated with higher levels of anxiety symptoms, and (c) TAF has

a mediator role in the relationship between attachment quality and anxiety levels.

METHODS

Study Design and Participants

In this cross-sectional study, participants were recruited at 2 secondary schools in Istanbul (61.3% female, $n=391$; 38.7% male, $n=246$). The schools selected were a private school and a public school from 2 different districts on the European side of Istanbul, in order to increase the possibility of having participants reflecting different sociocultural strata. Out of the questionnaires given to these 668 adolescents, we excluded the incomplete questionnaires and data from the final analysis ($n=30$), and one of the participants did not want to fill the scales for personal reasons. Six hundred thirty-seven adolescents were included in the final analyses. The mean age of the females was 15.2 ± 1.05 and the mean age of the males was 15.31 ± 1.13 . There was no significant difference between the mean age of genders ($t(288)=-1.137$; $P=.260$). All procedures of this study were approved by the Clinical Ethics Committee of Istanbul Rumeli University (E-53938333-050.06-2223). All procedures performed in this study were conducted in accordance with the guidelines in the Declaration of Helsinki regarding research on human participants. After giving participants the information about the study, informed consent was obtained from each participant and their families prior to the study. They were given the option of withdrawal from the survey at any time, without the need for an explanation. Prior to the start of the study, the targeted number of participants, the purpose, and the method of the study were explained to the school counselors. The questionnaires were administered under the supervision of a researcher and a school counselor in the classroom during a regular class period, and took approximately 45 minutes to complete.

Instruments

Socio-demographic data form: The demographic variables including gender, age, and class, and the educational status and monthly income of the parents, were gathered using the socio-demographic data form.

The Inventory of Parent and Peer Attachment-short version (s-IPPA): The s-IPPA is a self-report assessment which was developed by Raja, McGee, and Stanton,¹⁶ and adapted to the Turkish adolescent population by Günaydin et al.¹⁷ The Turkish s-IPPA is used to determine the attachment quality of adolescents to their parents. The 3 subscales of the questionnaire measures are trust, communication, and alienation. The trust and communication items indicate secure attachment, whereas the levels of alienation items indicate an insecure attachment style. The Turkish s-IPPA has maternal attachment (MA) and paternal attachment

MAIN POINTS

- Poor attachment quality and higher levels of thought-action fusion (TAF) were positively associated with the level of anxiety symptoms.
- TAF might have an increasing effect on the association between low attachment and higher anxiety levels.
- Interventions focusing on the differentiation between the thought and action may be beneficial in anxious adolescents with attachment problems.

(PA) subscales, and both have one factor solution. Both of them consist of 12 items which are rated on a 7-point Likert-type scale, from 1=never to 7=always. Higher scores indicate good attachment quality. Cronbach's α coefficient was found to be 0.88 for the maternal and 0.90 for the paternal subscale.

Thought-Action Fusion in Childhood (TAFIC): TAFIC is a self-report assessment which was developed by Evans et al.¹⁴ and adapted to the Turkish population by Tarakçioğlu et al.^{14,18} It consists of 19 yes/no items designed to assess among clinical and non-clinical youth samples. The 4 subscales of the TAFIC are: TAF-Likelihood-Other: Negative Events (TAF-NEG), TAF-Likelihood-Other: Positive Events (TAF-POS), TAF-Likelihood-Self (TAF-SELF), and TAF-Harm Avoidance (TAF-HARM). The TAFIC does not include any subscale about TAF-M.¹⁴ The higher scores in TAFIC indicate a high level of TAF problems. The internal reliability of the instrument was determined as being acceptable to excellent, with the Kuder-Richardson coefficients ranging from 0.70 to 0.89.

State-Trait Anxiety Inventory for Children (STAIC): The STAIC is a self-report assessment which was developed by Spielberger et al.,¹⁹ and adapted to the Turkish population by Özusta.²⁰ The trait anxiety part of the STAIC which was used in this study consists of 20 items, which are rated on a 3-point Likert-type scale as 1= almost never, 2=sometimes, and 3=often. The lowest total score that can be obtained from the Trait Anxiety Scale is 20, and the highest total score is 60. Higher scores indicate higher levels of trait anxiety. Cronbach's α value was found as 0.81 for the trait anxiety scale of the Turkish STAIC.

Statistical Analyses

The data were analyzed with Statistical Package for the Social Sciences (SPSS) version 24.0 (IBM SPSS Corp.; Armonk, NY, USA). According to skewness and kurtosis, the values were between ± 1.5 , so it was assumed that the data were normally distributed. The mean scale scores between genders were compared using the independent samples *t*-test. The correlation results between scale scores were analyzed by the Pearson-product moment correlation test. The predictive effect of MA, PA, and TAF scores on anxiety total scores were evaluated by multivariate linear regression. Mediation analyses were performed in order to investigate direct and indirect associations between the s-IPPA, TAF, and STAIC scores. Mediation analysis was conducted using Process macro for the SPSS program, following the criteria of Baron and Kenny.^{21,22} *P* values less than .05 were regarded as statistically significant.

RESULTS

There was no significant difference between females and males in terms of MA, PA, TAFIC total, and TAFIC subscale scores (*P* > .05). Trait anxiety scores were higher in female

adolescents compared to male adolescents (*P* < .001). The mean scale scores and statistical comparisons of the 2 groups are presented in Table 1.

Trait anxiety scores were negatively correlated with MA ($r = -0.303$, $P < .01$), and PA ($r = -0.295$, $P < .01$) scores; and positively correlated with TAF-NEG ($r = 0.144$, $P < .01$), TAF-SELF ($r = 0.218$, $P < .01$), and TAFIC total scores ($r = 0.145$, $P < .01$). TAFIC total scores were negatively correlated with MA ($r = -0.156$, $P < .01$) and MA ($r = -0.130$, $P < .01$) scores and positively correlated with trait anxiety scores ($r = 0.145$, $P < .01$). The results of the correlation analysis are presented in Table 2.

Trait anxiety level was included as a dependent variable, and the TAFIC total score, MA, and PA were included as independent variables in the multivariate linear stepwise regression analyses. Higher levels of TAFIC ($\beta = 0.092$, $P = .014$), MA ($\beta = -0.203$, $P < .001$), and PA ($\beta = -0.176$, $P < .001$) scores predicted higher STAIC scores, significantly. The results indicated that the model explained 12% of the total variance. The results of the multivariate linear regression analysis are presented in Table 3.

The TAF-SELF subscale was included as mediator variable, because it exhibited relatively high correlation values with trait anxiety levels (>0.2) compared to the other TAFIC subscales and the TAFIC total scores. Additionally, the TAF-SELF was also significantly correlated with the PA and MA scores. The first mediation model was analyzed to

Table 1. Comparison of Scale Scores Between Genders

| Scales | Gender | N | Mean | SD | <i>t</i> | <i>P</i> |
|---------------|--------|-----|-------|-------|----------|----------|
| TAFIC | Female | 398 | 3.31 | 4.22 | 0.549 | .583 |
| | Male | 254 | 3.11 | 4.63 | | |
| TAF-HARM | Female | 397 | 1.01 | 1.62 | 0.112 | .911 |
| | Male | 252 | 1.00 | 1.71 | | |
| TAF-SELF | Female | 397 | 0.89 | 1.22 | 0.889 | .374 |
| | Male | 252 | 0.80 | 1.19 | | |
| TAF-POS | Female | 397 | 0.75 | 1.09 | 1.035 | .301 |
| | Male | 251 | 0.66 | 1.12 | | |
| TAF-NEG | Female | 398 | 0.65 | 1.20 | -0.119 | .905 |
| | Male | 254 | 0.66 | 1.29 | | |
| MA | Female | 398 | 58.81 | 16.03 | -1.296 | .196 |
| | Male | 255 | 60.47 | 15.91 | | |
| PA | Female | 403 | 63.18 | 14.19 | 0.423 | .672 |
| | Male | 255 | 62.71 | 13.72 | | |
| Trait Anxiety | Female | 403 | 38.49 | 7.46 | 6.259 | <.001 |
| | Male | 255 | 34.66 | 7.79 | | |
| Age | Female | 391 | 15.20 | 1.05 | -1.249 | .212 |
| | Male | 246 | 15.31 | 1.13 | | |

t, Independent samples *t*-test, *N*, number; *SD*, standard deviation; *MA*, maternal attachment; *PA*, paternal attachment; *TAFIC*, thought-action fusion in childhood; *TAF-NEG*, TAF-likelihood-other: negative events; *TAF-POS*, TAF-likelihood-other: positive events; *TAF-SELF*, TAF-likelihood-self; *TAF-HARM*, TAF-Harm avoidance.

Table 2. Correlation Coefficients Between Mean Scale Scores

| | Trait anxiety | MA | PA | TAF-NEG | TAF-POS | TAF -SELF | TAF-HARM | TAFIC |
|---------------|---------------|----------|----------|---------|---------|-----------|----------|-------|
| Trait anxiety | 1 | | | | | | | |
| MA | -0.303** | 1 | | | | | | |
| PA | -0.295** | 0.559** | 1 | | | | | |
| TAF-NEG | 0.144** | -0.199** | -.197** | 1 | | | | |
| TAF-POS | 0.065 | -0.075 | -0.040 | 0.606** | 1 | | | |
| TAF-SELF | 0.218** | -0.170** | -0.145** | 0.542** | 0.535** | 1 | | |
| TAF-HARM | 0.074 | -0.095* | -0.063 | 0.629** | 0.731** | 0.577** | 1 | |
| TAFIC | 0.145** | -0.156** | -0.130** | 0.822** | 0.846** | 0.781** | 0.899** | 1 |

Pearson-product moment correlation test, MA, maternal attachment; PA, paternal attachment; TAFIC, thought-action fusion in childhood; TAF-NEG, TAF-likelihood–other: negative events; TAF-POS, TAF-likelihood–other: positive events; TAF-SELF, TAF-likelihood–self; TAF-HARM, TAF-Harm avoidance. ** $P < .01$, * $P < .05$.

Table 3. Predictive Effect of MA, PA, and TAFIC Levels on Trait Anxiety Levels

| Dependent Variable Trait anxiety | Adjusted R ² | β | T | P | 95% CI | |
|----------------------------------|-------------------------|--------|--------|-------|-------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| Model 1: MA | 0.097 | -0.314 | -8.412 | <.001 | -0.217 | -0.135 |
| Constant | | | 35.693 | <.001 | 45.435 | 50.725 |
| Model 2: MA | 0.119 | -0.214 | -4.837 | <.001 | -0.168 | -0.071 |
| PA | | -0.182 | -4.105 | <.001 | -0.131 | -0.046 |
| Constant | | | 35.648 | <.001 | 47.093 | 52.584 |
| Model 3: MA | 0.126 | -0.203 | -4.574 | <.001 | -0.162 | -0.065 |
| PA | | -0.176 | -3.997 | <.001 | -0.129 | -0.044 |
| TAFIC | | 0.092 | 2.470 | .014 | 0.033 | 0.292 |
| Constant | | | 33.394 | <.001 | 45.888 | 51.622 |

Multivariate linear regression analysis, MA, maternal attachment; PA, paternal attachment; TAFIC, thought-action fusion in childhood.

investigate the mediator role of TAF-SELF on the relation between MA and trait anxiety scores. The first step of the model indicated that MA predicted trait anxiety scores ($F=70.0666$, $P < .001$, $R^2=0.0976$, $B=-0.1749$, $SD=-0.0209$). Results of the second step indicated that MA scores predicted TAF-SELF scores ($F=18.7112$, $P < .001$, $R^2=0.0281$, $B=-0.0146$, $SH=0.0034$). The results of the third step indicated that the MA and TAF-SELF scores together predicted trait anxiety scores, significantly ($F=46.3743$, $P < .001$, $R^2=0.1254$). The results of the bootstrap test showed that the mediating effect was significant (BootLLCI=0.6398, BootULCI=1.5479) (Table 4).

The second mediation analysis was performed to investigate the mediator role of TAF-SELF on the relation between PA and trait anxiety scores. In this model, the results of the first step indicated that PA scores predicted trait anxiety scores ($F=63.1004$), $P < .001$, $R^2=0.0894$, $B=-0.1459$, $ST=0.0184$). The results of the second step indicated that TAF-SELF scores predicted trait anxiety scores ($F=12.9418$, $P=.003$, $R^2=0.0197$, $B=-0.0107$, $SH=0.0030$). The results of the third step indicated that PA and TAF-SELF scores together predicted trait anxiety scores significantly ($F=44.1221$, $P < .001$, $R^2=0.1208$). The results of the bootstrap test showed that the mediating effect was significant (BootLLCI=0.6779, BootULCI=1.6103) (Table 5).

DISCUSSION

Compatible with expectations, we found that low quality of attachment and high TAF levels were associated with higher levels of anxiety, and that TAF-SELF had a partial mediator role between the quality of attachment and anxiety levels. Consistent with the present study, previous research has revealed that the quality of attachment relationship plays

Table 4. Mediator Effect of TAF-Likelihood-Self Between MA and Trait Anxiety Levels

| Model 1 | B | SH | T |
|--------------------------------|---------|--------|---------|
| First Step | | | |
| MA → Trait Anxiety | -0.1749 | 0.0209 | -8.3706 |
| $R^2 = 0.0976$; $F = 70.0666$ | | | |
| Second Step | | | |
| MA → TAF-SELF | -0.0146 | 0.0034 | -4.3256 |
| $R^2 = 0.0281$; $F = 18.7112$ | | | |
| Third Step | | | |
| TAF-SELF → Trait Anxiety | 1.0875 | 0.2398 | 4.535 |
| MA → Trait Anxiety | -0.1591 | 0.0209 | -7.6162 |
| $R^2 = 0.1254$; $F = 46.3743$ | | | |

MA, maternal attachment; TAF-SELF, TAF-likelihood–self.

Table 5. Mediator Effect of TAF-Likelihood-Self Between PA and Trait Anxiety Levels

| Model 2 | B | SH | T |
|----------------------------|---------|--------|---------|
| First Step | | | |
| PA → Trait Anxiety | -0.1459 | 0.0184 | -7.9436 |
| $R^2=0.0894$; $F=63.1004$ | | | |
| Second Step | | | |
| PA → TAF-SELF | -0.0107 | 0.003 | -3.5975 |
| $R^2=0.0197$; $F=12.9418$ | | | |
| Third Step | | | |
| TAF-SELF → Trait Anxiety | 1.1484 | 0.2395 | 4.7944 |
| PA → Trait Anxiety | -0.1336 | 0.0182 | -7.3247 |
| $R^2=0.1208$; $F=44.1221$ | | | |

PA, paternal attachment; TAF-SELF, TAF-likelihood-self.

an important role in the development of anxiety disorders, and an insecure attachment style is a predictive factor for later anxiety disorders.^{23,24} The result of the present study, concerning the fact that anxiety levels are associated with poor attachment quality, can be explained in terms of the effects of secure attachments enabling children to perceive themselves as worthy of love and caring, which then will promote feelings of self-worth, self-competence, and emotional well-being.²⁵ Good attachment with parents is thus expected to be a protective factor from anxiety disorders by providing the child a sense of self-confidence that contributes to psychological adjustment and supports the individual's efforts at successful adaptation to stress.²⁶ As the quality of attachment to parents is thought to buffer the child from emotional stress and anxiety, adolescents with secure attachment might use the emotional stability offered by attachment relations to endure stressful situations.⁵ It can be suggested that individuals who have insecure attachment may experience intense fear of losing in interpersonal relationships and social interactions due to expectations of dislike and abandonment, and this might be a factor explaining the relationship between low attachment quality and high anxiety levels in our study.

The second main finding of this study indicating the association between higher levels of TAF and anxiety levels in adolescents is also fully in line with the findings of previous studies.^{27,28} The relationship between high TAF and anxiety symptoms follows the premise that anxiety generally originates from metacognitive beliefs that worrying can make feared and negative events less likely to happen (e.g., "If I worry that something bad is going to happen to my family, then it is going to be less likely to happen").²⁹ Similar to metacognitive mechanisms, the possible underlying mechanism of the TAF on the occurrence of anxiety symptoms can thus be explained by the belief that negative beliefs and thoughts make these events more likely to happen. For example, patients with generalized anxiety disorder have been

shown to believe that their worries can influence events in the world.³⁰ Thus, it can be suggested that the belief about one's thoughts can influence events, may increase anxiety levels and worrying. Consistently, it was suggested that metacognitive beliefs associated with anxiety may encompass the likelihood subtype of TAF.¹²

The final main finding of this study indicates the partial mediator effect of the TAF-SELF on the relationship between attachment quality and anxiety symptoms. Individuals with attachment problems generally think that they are weak and sensitive, and that people and the world are unreliable and dangerous.³¹ Bearing this in mind, it can be hypothesized that adolescents with high TAF levels may accept negative thoughts and beliefs about themselves caused by attachment problems as the exact equivalent of the truth, and this may play a role in increasing their anxiety levels. In previous studies, it was reported that the negative affect has mediator effect between OCD and TAF.¹³ In previous studies, emotional regulation processes such as emotional dysregulation and negative mood regulation expectancies,³² as well as cognitive flexibility,³³ repetitive thinking,³³ and cognitive reappraisal,³⁴ played a role in the relationship between attachment and anxiety problems. However, to the best of our knowledge, this is the first research indicating the mediator effect of TAF. However, it can be assumed that there may be a relationship between the role of cognitive flexibility and emotional regulation mediators reported in previous studies and the mediator role of the TAF-SELF variable in our study. It can be hypothesized that TAF-SELF may reduce cognitive flexibility and lead to emotional dysregulation. Further research is needed for better understanding about the associations of attachment, thought-action fusion and anxiety, and the mediator effect of TAF.

In addition to the characteristics of adolescents' attachment to parents during adolescence, the quality of attachment to their peers should be kept in mind, as it is important in terms of psychosocial development. In her meta-analysis, Gorrese³⁵ reported that secure peer attachment during adolescence was protective against the development of internalization problems including anxiety disorders. In our literature search, we did not find any research investigating the relationship between high levels of TAF and the quality of relationships in adolescence. Huan et al.³⁶ stated perfectionism associated with high TAF as an important factor for loneliness and the negative course in friend relationship quality.

In conclusion, the results of this study revealed that poor attachment quality and higher levels of TAF are positively associated with the level of anxiety symptoms; and TAF-SELF has a partial mediator role between attachment quality and anxiety levels. Thus, low attachment quality can be a factor in terms of higher anxiety levels, and

TAF problems may have an increasing effect on the risk. Further research is needed for a better understanding about the associations between attachment, TAF, and anxiety in adolescents. In the light of this information, it can be suggested that due to the possible associations highlighted in our research, investigating the presence of TAF in individuals with high anxiety levels associated with attachment problems, psychoeducation, and therapies focusing on the differentiation between the thought and action may be beneficial.

A potential limitation of our study is the cross-sectional design, which does not provide evidence for causality. Another potential limitation of our study is the lack of clinical evaluation limits assessment of psychiatric diagnosis and comorbid conditions, as this would have been difficult to perform in a school setting. Thus, it is proposed that longitudinal studies on different age groups and clinical samples, as well as studies to be applied in different regions and countries, would contribute to our knowledge on the subject.

Ethics Committee Approval: Ethical committee approval was received from the Istanbul Rumeli University Ethics Committee (E-53938333-050.06-2223).

Informed Consent: Written informed consent was obtained from each participants or their family for this study.

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