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Reflective Functioning Questionnaire (RFQ): Psychometric Properties of the Persian Translation and Exploration of Its Mediating Role in the Relationship between Attachment to Parents and Internalizing and Externalizing Problems in Adolescents

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ABSTRACT

The aim of this study was to adapt the Reflective Functioning Questionnaire (RFQ) into Persian and to test the mediating role of Reflective Functioning (RF) in the relationship between attachment to parents and internalizing and externalizing problems in adolescents. 369 adolescents completed a Persian-translation of the RFQ, the Relationship Structures questionnaire of the Experiences in Close Relationships Revised (ECR-RS), a battery of scales that assess constructs related to RF, and the Youth Self Report questionnaire (YSR). Confirmatory factor analysis supported the two-factor model consisting of certainty and uncertainty about mental states. Construct validity was examined by the correlation between RFQ and related constructs and maladaptive psychological functioning. Structural equation modeling showed that uncertainty and certainty about mental states both mediated the positive relationship between attachment anxiety and internalizing and externalizing problems. This mediating effect was not found in the relationship between attachment avoidance and internalizing or externalizing problems. These findings provide support for the notion that the Persian-translation of the RFQ can be an applicable and reliable tool to assess RF in non-clinical adolescents. In conclusion, this questionnaire represents a valid measure for Persian-speaking clinicians and researchers.

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Introduction

Reflective Functioning (RF) is the operational term for mentalization, the ability to understand and reflect on oneself and others' thoughts and feelings and their connections with behaviors (Fonagy et al., 1991). Behaviors are expressions of underlying mental states, including thoughts, feelings, and intentions (Fonagy et al., 2002). According to the mentalization theory, early attachment and RF are closely related, as RF develops as the result of early interactions between the child and parent/caregiver. A parent with a high capacity for RF who is capable of sensitive and responsive parenting, becomes a secure base for the child (Fonagy et al., 2002). In the context of responsive parenting and secure attachment, children learn to identify and represent their own emotions through observing the caregiver's interest in their mental state, which, in turn, facilitates their ability to better understand those emotions. Previous research on RF have shown that low RF could be linked to childhood adversities like childhood trauma and abuse (Dauphin et al., 2013; Ensink et al., 2016) and insecure and disorganized attachment styles (Bouchard et al., 2008; Fonagy et al., 2002; Fonagy & Target, 1997; Humfress et al., 2002). Secure attachment is shaped when a child's needs are met consistently and adequately by the caregiver, so the child can explore the world while relying on his/her caregiver as a secure base in times of distress. These children know themselves as accepted and worthy of love. However, the caregiver's inability or unwillingness to respond consistently to the child's attachment behavior can lead to the three types of insecure attachment relationships (avoidant, anxious and disorganized). The insecure-avoidant child does not seek comfort or proximity from the caregiver to avoid rejection from the unresponsive caregiver, while the insecure-anxious child constantly seeks the attention and reassurance of the inconsistent caregiver. These children know themselves as unaccepted and undeserving. The insecure-disorganized child seems to have a collapsed coping strategy, behaving inconsistent in times of distress (Breinholst et al., 2018). It can be concluded that adolescents and adults with secure attachment are more likely to display higher RF than those with insecure attachment.

Moreover, RF contributes to meaning making, managing, and predicting one's and other's behaviors (Fonagy & Target, 1997). The role of RF is therefore particularly important during adolescence because it is during this time that early signs of psychological disorders in adulthood are first observed (Braehler & Schwannauer, 2012). Difficulties in RF can be linked to various psychological problems during adolescence including borderline personality symptoms (Ha et al., 2013), conduct problems (Morosan et al., 2020), aggression (Taubner et al., 2013), internalizing problems (Chow et al., 2017), and externalizing problems (Cropp et al., 2019; Sharp et al., 2020). A study has also revealed that 75% of young offenders have low RF (Möller et al., 2014).

It is in the context of a secure attachment that adolescents may feel free to express their thoughts, desires and emotions and carry conversations with their parents that deepen their understanding of their own and other's inner worlds. Through this secure relational context, adolescents would be able to reflect on their own and other's mental states and display higher levels of RF (Gambin et al., 2021). Additionally, previous studies have demonstrated secure attachment to be linked to more adaptive psychological functioning in adolescents. Several studies have shown a strong relationship between insecure attachment styles, and internalizing (e.g., anxiety, depression) and externalizing problems (e.g., aggression, oppositional behavior) in adolescents. Adolescents who are classified as avoidantly or anxiously attached to their parents, display higher levels of both internalizing and externalizing problems, than adolescents who are classified as having secure attachment (Brumariu & Kerns, 2010; Lacasa et al., 2015; Muris et al., 2003). Moreover, attachment security to parents has been shown to be related to better mentalizing abilities in adolescence (Sharp et al., 2016), and as studies have shown higher levels of RF in adolescents is linked to less internalizing and externalizing behaviors (Chow et al., 2017; Morosan et al., 2020). Therefore, this study expected RF to mediate the relationship between attachment to parents and externalizing and internalizing problems in adolescents.

Few studies have investigated the importance of RF as a protective factor to decrease aggression and bullying among adolescents (Twemlow & Fonagy, 2006; Twemlow et al., 2011). The mentalization

capacity has been theorized to act as a protective factor against maladaptive outcomes such as insecure attachment and psychopathology. Some studies showed that RF could mediate the relationship between attachment and aggressive behavior/violence in adolescents with a history of abuse and maltreatment (Taubner & Curth, 2013; Taubner et al., 2016). Adults with severe maltreatment are less likely to be diagnosed with borderline personality disorder, if they have high RF (Fonagy et al., 1996). Therefore, it seems that RF can act as a protective factor against negative outcomes in adolescents, such as negative effects of insecure attachment. Based on previous findings, this research aimed to investigate if RF mediates the relationship between attachment to parents and internalizing and externalizing problems in adolescents.

Although some findings have linked low RF to some pathologies in adolescence, research on RF in adolescence is still scarce. According to Chow et al. (2017), this lack of data is partially due to the lack of appropriate measures to evaluate RF in this age group. Currently, most studies have used the following semi-structured interviews to assess RF: The Working Model of the Child Interview (WMCI) (Zeanah & Benoit, 1995), the Parent Development Interview (PDI) (Aber et al., 1985), and the Adult Attachment Interview (AAI) (Fonagy et al., 1998; Schechter et al., 2005). Although time consuming, semi-structured and structured interviews are considered to be beneficial for a lot of research. However, the time and money needed to conduct and code interviews make them unsuitable for most research.

In order to address these limitations, some researchers use scales that measure related constructs to RF, such as empathy and metacognition. RF, however, could be distinguished from empathy and metacognition. Empathy, for example, refers to the understanding of mental states in others, but RF refers to understanding mental states in self as well as others (Choi-Kain & Gunderson, 2008). Metacognition can also be distinguished from RF by its expanded scopes (Smith et al., 2003). Therefore, Fonagy and Bateman (2016) created the Reflective Functioning Questionnaire (RFQ) to measure RF and provide a specific and reliable measure. RFQ is a self-report questionnaire that has revealed adequate validity and reliability in both clinical and non-clinical samples (Perkins, 2009). According to the validation studies, the best factorial structure would be the two-dimension model: Certainty (RFQc) and Uncertainty (RFQu) about the mentalistic attributes (Fonagy et al., 2016). These two subscales have shown good psychometric properties in different studies (Badoud et al., 2015; Fonagy et al., 2016).

Most studies have used the original English version of the RFQ, but there are adapted versions of the RFQ and its administration in the adolescent population, in other languages, for example, in French and Polish. In the French version, 130 adolescents and 253 adults completed the translation of RFQ and some self-report questionnaires assessing alexithymia, borderline traits, internalizing and externalizing traits, empathy and mindfulness. The original two factors showed satisfactory reliability and construct validity in French-speaking adults and adolescents (Badoud et al., 2015). In the Polish version 530 adolescents participated in the pilot study for the adaptation of the RFQ and Cronbach's alpha values were .60 for RFQ-U and .62 for RFQ-C (Gambin et al., 2021). The RFQ has neither been translated into Persian nor validated in this language. Therefore, one of this study's objectives was to translate and validate the Persian version of the RFQ in adolescents. First, the purpose was to assess the two-factor structure of the RFQ in Iranian adolescents and its relation to some clinical problems such as internalizing and externalizing problems, and psychological variables and capacities such as identifying feelings, mindfulness skills, cognitive empathy, perspective-taking, and metacognition.

Method

Participants

Participants in this study were 369 non-clinical adolescents who were studying at high schools of Tehran and Shahryar (a countryside city of Tehran). The total sample was comprised of 369 students including 195 females (53%) and 174 males (47%) with a mean age of 16.09 years. In order to explore

test-retest reliability, 63 students (all female, mean age = 16.94 years) participated in a retest and completed the RFQ seven weeks later again. In this study, the term “subsample” was used for the participants who participated in the retest phase.

Procedure

After gaining permission from the developers of the instrument, two native Persian speakers who were fluent in English translated the questionnaire into Persian. Then two Iranian expert psychologists revised the items based on their clarity and equivalency. The Persian version of RFQ was then back translated to English by a bilingual translator. Afterward, a comparison of the back-translated English version and the RFQ was made, and translation discrepancies were corrected. Pilot testing was conducted to evaluate the applicability of the pre-final Persian-version of the RFQ.

In order to have a relatively representative sample of the Iranian adolescents with regard to socioeconomic status, participants were selected among 12–18 years old adolescents studying at schools in different areas of Tehran and Shahryar, through convenience sampling. First, a general description of the research purposes was presented for potential participants, then, the volunteers completed the questionnaires. The students were asked to select and write a personal code on their questionnaire and remember it for a later retest. After seven weeks, 63 female students who had written a code were asked to fill out the RFQ questionnaire again.

Measures

Reflective Functioning Questionnaire (RFQ)

The RFQ is a self-report measure, comprised of 8 items that assess RF in a two-dimension model: certainty (RFQc) and uncertainty (RFQu) about mental states (Fonagy et al., 2016). Participants rate items on a 7-point Likert scale ranging from “completely disagree” to “completely agree.” Scores of both subscales are computed through recoding of six items. Items 1, 2, 3, 4, 5, and 6 are recoded to 3, 2, 1, 0, 0, 0 to yield certainty about mental states. Moderate agreements reflect an adaptive level of RF and low agreements reflect extreme certainty about mental states which is also known as hyper-mentalizing. Hyper mentalizing is when a person is overly certain about other people’s mental states and intentions to a degree beyond observable evidence (Sharp et al. 2013). For example, person A invites person B to a party, but B does not attend. Then A is overly certain that B did not attend her party because B does not like her at all because of another similar incident she recalls from years ago, instead of maybe assuming that B may have been busy that day. To obtain the score of RFQu, items 2, 4, 5, 6, and 8 are recoded to: 0, 0, 0, 0, 1, 2, 3, and item 7, is conversely recoded to: 3, 2, 1, 0, 0, 0, 0. An example of high levels of RFQu would be a mother who is completely clueless about why her child is crying or behaving in a certain way. The RFQ has shown to have acceptable internal consistency for both RFQu and RFQc subscales with Cronbach’s alpha values of 0.77 and 0.65 respectively, and very good test – retest reliability over 3 weeks with $r_s = 0.84$ and 0.75 (Fonagy et al., 2016). Satisfactory reliability and construct validity of the two subscales of RFQ are reported in different studies (Badoud et al., 2015; Morandotti et al., 2018). The Italian version of the RFQ subscales had good internal consistency, with Cronbach’s alpha coefficient of 0.77 for RFQu and 0.75 for RFQc. The test–retest reliability was good, with 0.85 for RFQu 0.81 for RFQc (Morandotti et al., 2018). Construct validity was confirmed.

Relationship structures questionnaire of the Experiences in Close Relationships Revised (ECR-RS)

The ECR-RS, designed by Fraley et al. (2000), is a 36-item self-report instrument that assesses adult attachment dimensions (avoidance and anxiety) in different interpersonal domains. The core assumption of ECR-RS is that people construct mental representations of the self and significant others which are relationship-specific, so this questionnaire assesses attachment dimensions in multiple contexts rather than in general. Anxiety dimension is characterized by fear of rejection

while Avoidance dimension is described by worry about intimacy and closeness. The same 9 items are used for each interpersonal domain including father, mother, romantic partner, and best friend. Participants indicate their agreement or disagreement with each item on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The scores of avoidance and anxiety should be computed separately for each interpersonal domain. To obtain global attachment scores, the mean score of avoidance with mother, father, partner, and friend as well as the mean score of anxiety in all four domains should be computed. Higher scores indicate greater insecurity attachment in each area of the relationship. Fraley et al. (2011), reported good reliability for ECR-RS scores (Cronbach's alpha = 0.83 to 0.92) in their study of over 21,000 participants. They also indicated that ECR-RS attachment anxiety and avoidance are, across most relational domains. The psychometric properties of the Persian translation of the ECR-RS were examined by Pouravary et al. (2014), with a sample of 340 adults. Internal consistency by Cronbach's alpha coefficient was higher than 0.70 and the test-retest coefficient over two weeks was between 0.69 to 0.80. The convergent validity of ECR-RS was supported by its correlation with anxiety, depression, and stress.

The Toronto Alexithymia Scale (TAS)

The Toronto Alexithymia Scale is a self-evaluation measure devised by Bagby et al. (1994). Alexithymia is a multi-dimensional construct including difficulty processing emotional information and tendency to focus on the concrete details of external events (Bagby et al., 1994). Items are rated on a 5-point Likert scale ranging from "completely agree" to "completely disagree." It provides a total score for Alexithymia and three subscale scores for its separate dimensions: Difficulty Identifying Feelings (DIF), Difficulty in Describing Feelings (DDF), and Externally Oriented Thinking (EOT). In this study, we only applied the TAS-DIF subscale, which consists of seven items (items 1, 3, 6, 7, 9, 13, 14) and evaluates individuals' difficulty identifying their emotional states and distinguishing them from bodily senses. Some examples of TAS-DIF are: "When I am upset, I don't know if I am sad, frightened, or angry" and "I am often puzzled by sensations in my body."

TAS-DIF subscale demonstrated good internal consistency with 0.77 to 0.79 Cronbach's alpha, as well as good retest reliability of 0.77 to 0.83 (Bagby et al., 1994; Bressi et al., 1996). Besharat (2007), examined the Persian version of the TAS with a sample of 587 Iranian undergraduate students and provided evidence for the internal consistency of TAS-DIF (alpha value = 0.82) and test-retest reliability (test-retest correlation coefficient = 0.85), and concurrent validity through examining correlations between TAS-DIF and emotional intelligence, and mental health indices.

The Interpersonal Reactivity Index (IRI)

The Interpersonal Reactivity Index, developed by Davis (1983), is a multidimensional approach to assessing empathy. Four subscales are used to assess different aspects of empathy, including Perspective-Taking (PT), Fantasy (FS), Empathic Concern (EC), and Personal Distress (PD). Items are rated on a 5-point Likert scale, ranging from 0 (does not describe me well) to 4 (describes me very well). In this study, we used the Perspective-Taking subscale of Interpersonal Reactivity Index (IRI-PT), which represents the cognitive component of empathy and measures the ability to adopt another's psychological perspective in every-day life (De Corte et al., 2007; Fernández et al., 2011). IRI-PT consists of seven items (3, 8, 11, 15, 21, 25, and 28). Examples of items are: "I sometimes try to understand my friends better by imagining how things look from their perspective." De Corte et al. (2007) reported satisfactory internal consistency for IRI-PT with a Cronbach's alpha coefficient of 0.73. Feizabadi et al. (2008) validated the IRI questionnaire in a non-clinical sample of 726 Iranian students. Cronbach's alpha for the Persian version of the IRI-PT was 0.76.

Basic Empathy Scale (BES)

The Empathy Scale was developed and validated by Jolliffe and Farrington (2006). It comprises 20 items, estimating two different components of empathy: cognitive and affective. Participants are asked

to indicate their degree of agreement for each statement on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree.” In this study, we used the cognitive empathy subscale (BES-CE) which encompasses 9 items including items 3, 6, 9, 10, 12, 14, 16, 19, and 20. Cognitive empathy is the intellectual apprehension of another’s mental state, currently associated with the theory of mind (D’Ambrosio et al., 2009). The BES-CE mostly measures the ability to recognize and understand other people’s emotions, a construct that cannot be directly assessed by other instruments including the IRI (Albiero et al., 2009). Examples of the items are “I can understand my friend’s happiness when she/he does well at something,” and “I can often understand how people are feeling even before they tell me.” (Refer to appendix?). The BES was found to have satisfactory internal, and test-retest reliability and discriminant validity using a sample of 446 French adolescents (D’Ambrosio et al., 2009). The coefficient of correlation between the BES scores at two times was 0.66 for the affective empathy and 0.54 for the cognitive empathy. It also exhibited convergent and divergent validity (Jolliffe & Farrington, 2006). Exploratory factor analysis by Jafari et al. (2017) in a sample of Iranian students, found similar factors to Jolliffe & Farrington, which confirmed the construct validity of the Iranian version of the BES. In their study, Cronbach’s alpha and retest coefficient for BES-CE were 0.74 and 0.76, respectively.

Mindful Attention Awareness Scale (MAAS)

The MAAS is a single structure factor that assesses mindfulness which is the state of being attentive to and aware of what is taking place in the present (Brown & Ryan, 2003). The MAAS consists of 15 items. Each item is rated on a 6-point Likert scale, ranging from 1 (almost always) to 6 (almost never). An example of an item on the MAAS is “It seems I am ‘running on automatic’ without much awareness of what I’m doing.” Cronbach’s alpha was reported above 0.80 (Brown & Ryan, 2003). Abdi et al. (2015) validated the Persian version of this scale and confirmed its divergent and convergent validity. The Cronbach’s alpha and test-retest reliability of MAAS were reported to be 0.76 and 0.69 respectively.

Meta-Cognitions Questionnaire (MCQ)

A short-form version of the MCQ (MCQ-30) developed by Wells and Cartwright-Hatton (2004) evaluates five factors of metacognition: (1) cognitive confidence (2) positive beliefs about worry (3) cognitive self-consciousness (4) negative beliefs about the uncontrollability and danger of worry (NB) and (5) beliefs about the need to control thoughts. A four-point Likert scale ranging from 1 (do not agree) to 4 (agree very much) are used for each item. In this study, participants filled out the “Negative Beliefs about the Uncontrollability and Danger” subscale which measures negative beliefs about worrying. The sample items are “When I start worrying, I cannot stop” and “My worrying is dangerous for me.” Wells and Cartwright-Hatton (2004) found good internal consistency and convergent validity, and acceptable to good test-retest reliability. In their study, a strong relationship between MCQ-NB and both pathological worry and trait-anxiety was reported. Cronbach’s alpha coefficient for this subscale was 0.91 and Pearson re-test correlation was 0.59.

Shirinzadeh DastgiriIn et al. (2009) examined the structure factor of the MCQ-30 in a sample of 258 Iranian participants and extracted five factors as same as those found by Wells and Cartwright-Hatton (2004). They found evidence for concurrent and divergent validity and reliability of the Persian version of the MCQ-30. In their study, the MCQ-NB subscale explained 29.39% of the total variance of the test and had the highest correlation (0.87) with the total score of the MCQ-30. Cronbach’s alpha coefficient, the test-retest coefficient and the half-splitting coefficient for this subscale were 0.87, 0.59, and 0.89, respectively.

The Youth Self Report (YSR)

YSR (Achenbach, 1991), is a well-known self-report questionnaire designed to study the behavioral and emotional problems in adolescents and is divided into two parts: 1) competencies and 2) problems. Competencies are measured by responding to the questions referring to social events and participation in activities like sports and hobbies. The YSR problem subscale consists of 112 items, assessing different emotional/behavioral problems. The items are rated from 0 (not true), reflecting the

absence of the problem, to 2 (very true or often true), reflecting the presence of symptoms. All ratings refer to existence or lack of symptoms during the past 6 months. Achenbach (1991) divided the YSR total problem scale into “internalizing” and “externalizing” problems, each consisting of a number of subscales. The internalizing dimension consists of “withdrawn,” “somatic complaints,” and “anxious/depressed” syndromes and externalizing dimension consists of “delinquent behavior” and “aggressive behavior” syndromes. Other syndromes were not compatible with either internalizing or externalizing dimensions, the “social problems,” “thought problems,” and “attention problems,” formed the “mixed scales” group. The internal consistency for all syndromes were higher than 0.70, except for the withdrawn syndrome. The test-retest reliabilities for the dimensions and total problem score were about 0.80 in American adolescents (Achenbach, 1991). The standardization of this test for Iranian adolescents has been done by Minai (2005). The Cronbach’s alpha and test-retest reliability of YSR scales were reported to be in the range of 0.63– 0.95 and 0.32– 0.67, respectively.

Statistical methods and analysis

Psychometric properties of the RFQ were assessed as follows: First, we conducted a Confirmatory Factor Analysis (CFA) for the proposed two-factor model. The fit indices used were χ^2 , normed χ^2 , Comparative Fit Index (CFI), the Goodness of Fit (GFI), and Root Mean Square Error of Approximation (RMSEA). For the model to fit, fit indices should be CFI and GFI > 0.9, RMSEA < 0.08, and the χ^2 value should be non-significant. χ^2/df values < 2 indicate excellent fit, and values < 5 indicate acceptable fit (Kline, 2015). The reliability of the two subscales were estimated by calculating Cronbach’s alpha coefficients (low effect size ≤ 0.3 , medium = 0.31– 0.5, large ≥ 0.51 ; Cohen, 1992) and test-retest correlation coefficient. Construct validity was established by examining the correlations between the RFQ subscales and related constructs. Construct validity was further examined by correlational analysis on the RFQ subscales correlated with indices of maladaptive psychological functioning as measured by YSR. Statistical analyses were conducted using SPSS (IBM SPSS statistics 23) and AMOS software.

To examine the mediating role of RFQc and RFQu between attachment anxiety/avoidance and indices of maladaptive psychological functioning (internalizing and externalizing problems), first, correlations were calculated to explore the relationships among the variables. Next, three separate structural equation models (SEM) were used to investigate the theoretical models. The significance of indirect effects were tested using bootstrapping procedures. Unstandardized indirect effects were computed for each of 10,000 bootstrapped samples. To investigate the fitness of model, the following fit indices were used: χ^2/df , CFI, and RMSEA. The following cut off values were used: $\chi^2/\text{df} \leq 2$ for an excellent fit; CFI > .90, and RMSEA < 0.08 (acceptable fit) and < 0.06 (good fit) (Hu & Bentler, 1999).

Results

Demographics

Demographic characteristics of the participants are given in Table 1. The mean age of participants was 16.09 (SD = 1.43) ranging from 12 to 18 years old.

Confirmatory factor analysis

The RFQc and RFQu items were subjected to a CFA. The model did not provide a good fit to the data, $\chi^2/\text{df} = 2.75$; RMSEA = 0.12; CFI = 0.73, NNFI = 0.67. Modification indices suggested adding error covariances between several items with similar item content and/or wording, which resulted in a model with a good fit: $\chi^2/\text{df} = 1.64$; RMSEA = 0.05 (CI = 0.01–0.08); CFI = 0.93, NNFI = 0.91. All items, except one, had substantial and significant loadings in the expected direction on their respective factors (see Table 2).

Table 1. Demographic characteristics of participants.

		Total sample Mean (SD)	Subsample Mean (SD)
Age		16.09 (1.43)	16.94 (1.04)
Gender	Female	n (%) 195 (53)	n (%) 63 (100)
	Male	174 (47)	0 (0)
n ^a		369	63
Have sibling	Yes	299 (84)	56 (91.8)
	no	56 (16)	5 (8.2)
n ^a		355	61
Father educational level	Low	90 (28.5)	10 (18.5)
	Medium	163 (51.5)	17 (31.5)
	High	64 (20)	27 (50)
n ^a		317	54
Mother educational level	Low	114 (35)	17 (32.1)
	Medium	184 (56)	19 (35.8)
	High	29 (9)	17 (32.1)
n ^a		327	53

n^a = No. of study participants for whom responses were available for each item

Table 2. Standardized factor loadings and factor covariance.

	PPRFQ item	Standardized loadings
RFQ-Certainty	C1	0.24
	C2	0.57
	C3	0.51
	C4	0.54
	C5	0.52
	C6	0.64
RFQ-Uncertainty	U2	0.47
	U4	0.58
	U5	0.61
	U6	0.56
	U7	0.07*
	U8	0.41
		Standardized covariance
Factor1- Facror2		−0.64

*not significant

Reliability

Internal consistency was satisfactory for both RFQc (Cronbach's alpha = 0.707), and RFQu (Cronbach's alpha = 0.624). Furthermore, to examine temporal reliability, the RFQ was answered a second time, seven weeks after initial administration by 63 participants (subsample in Table 1). Significant positive correlations between the first and second administration of the RFQ were obtained. The test-retest correlation coefficient was 0.780 for RFQu and 0.813 for RFQc.

Correlations with demographic features

RFQu was significantly different between groups in relation to both mother's and father's level of education ($F = 5.65$, $p = .004$ for father's level of education, and $F = 3.87$, $p = .022$ for mother's level of education). Post hoc analysis showed that the mean score of RFQu for adolescents whom their mother had a low level of education was significantly higher than both adolescents whose mother had a medium or high level of education, but RFQu mean was not significantly different between medium and high-level groups. RFQu for adolescents whom their father had a low level of education was significantly lower than adolescents whom their father had a medium or high level of education, but

RFQu mean was not significantly different between groups with medium or high-level of father's education. RFQc and RFQu did not differ significantly in relation to any of the other demographic features.

Correlations with related measures

Validity was further supported by relations with related measures. Correlations are shown in Table 3. The RFQc was positively correlated with perspective-taking (IRI-PT $r = 0.247$, $p = .001$), and negatively correlated with difficulty identifying feelings subscale of alexithymia (TAS-DIF $r = -0.559$, $p = .000$), and negative beliefs about uncontrollability and the danger of worry subscale of metacognition (MCQ-NB $r = -0.212$, $p = .003$). Contrary to expectations, RFQc was not related to cognitive empathy or mindfulness skills.

The RFQu was negatively related to perspective-taking (IRI-PT $r = -0.256$, $p = .001$), cognitive empathy (BES-CE $r = -0.145$, $p = .044$), and mindfulness awareness (MAAS $r = -0.242$, $p = .001$), and as expected, positively correlated with negative beliefs about uncontrollability and danger of worry subscale of metacognition (MCQ-NB $r = 0.329$, $p = .000$) and difficulty identifying feelings subscale of alexithymia (TAS-DIF $r = 0.502$, $p = .000$).

Correlations with indices of maladaptive psychological functioning

Correlations of RFQc and RFQu with indices of maladaptive psychological functioning, as measured by YSR are shown in Table 4. RFQc was negatively correlated with both internalizing ($r = -0.286$, $p = .004$), and externalizing ($r = -0.315$, $p = .000$) problems. RFQu was positively correlated with both internalizing ($r = 0.295$, $p = .002$) and externalizing ($r = 0.358$, $p = .000$) problems.

Structural equation modeling

As Table 5 indicates, ERC-anxiety was significantly correlated with all the variables, consisting of ERC-avoidance ($r = .224$, $p = .002$), RFQc ($r = -0.301$, $p < .001$), RFQu ($r = 0.251$, $p < .001$), internalizing problems ($r = 0.331$, $p < .001$), and externalizing problems ($r = 0.304$, $p < .001$). ERC-avoidance was

Table 3. Correlations with related constructs.

	TAS-DIF	IRI-PT	BES-CE	MAAS	MCQ-NB
RFQc	−0.559**	0.247**	0.106	0.080	−0.212**
RFQu	0.502**	−0.256**	−0.145*	−0.242**	0.329**

RFQc and RFQu stand for Reflective Functioning Questionnaire certainty and uncertainty; * $p < .05$,

** $p < 0.01$

Table 4. Correlations with indices of maladaptive psychological functioning.

	RFQc	RFQu
Internalizing	−0.286**	0.295**
Externalizing	−0.315**	0.358**

RFQc and RFQu stand for Reflective Functioning Questionnaire certainty and uncertainty; ** $p < 0.01$

Table 5. Correlations among attachment styles, RFQ, and internalizing/externalizing.

	1	2	3	4	5	Mean (SD)
1. ECR-anxiety	1					8.187 (4.596)
2. ECR-avoidance	.224**	1				23.179 (6.217)
3. RFQc	−.301**	.047	1			.861 (.656)
4. RFQu	.251*	.178*	−.458**	1		.508 (.418)
5. Externalizing	.304**	.174*	−.259**	.377**	1	12.912 (8.741)
6. Internalizing	.331**	.237**	−.359**	.443**	.648**	18.454 (9.621)

significantly correlated with RFQu ($r = 0.178, p = .013$), internalizing problems ($r = 0.237, p = .001$), and externalizing problems ($r = 0.174, p = .016$). However, it was not significantly correlated with RFQc. Based on the correlation values, we did not examine the mediating role of RFQc between ERC-avoidance and internalizing or externalizing problems.

At first, the theoretical model 1, in which ERC-anxiety was the predictor and RFQc was the mediator, did not provide a good fit to data ($\chi^2 = 108.090, p < .000; df = 40; \chi^2/df = 2.702, CFI = .888, RMSEA = .094$). In this model all paths were significant. The statistical software, AMOS, suggested adding error covariances between the errors of some RFQc items, most probably because of the similar formulation of the items. This led to the final model 1 (Figure 1), which provided a good fit to data ($\chi^2 = 47.742, p = .134; df = 38; \chi^2/df = 1.256, CFI = .984; RMSEA = .037$). When RFQc was entered as the mediating variable, total, direct and indirect effects of attachment anxiety on internalizing and externalizing problems were statistically significant. The indirect effect was .365 for internalizing problems which was statistically significant ($p = .002$), accounting for 48% of the total effect. Also, the indirect effect was .223 for externalizing problems which was statistically significant ($p = .011$), accounting for 33% of the total effect. The standardized regression coefficients are presented in Figure 1.

Model 2 (in which ECR-anxiety was the predictor and RFQu was the mediator) provided a good fit to data ($\chi^2 = 50.073, p = .007; df = 33; \chi^2/df = 1.699, CFI = .955, RMSEA = .060$). In this model (Figure 2), RFQu7 did not have significant loading on RFQu. This path was removed. Also, we added error covariance between items 2 and 6 of RFQu because of the similar wording and content of the items. When RFQu was entered as the mediating variable, total, direct and indirect effects of attachment anxiety on internalizing and externalizing problems were statistically significant. The indirect effect was .220 for internalizing problems which was statistically significant ($p = .010$), accounting for 29% of the total effect. Also, the indirect effect was .200 for externalizing problems which was statistically significant ($p = .010$), accounting for 30% of the total effect. The standardized regression coefficients are presented in Figure 2.

Model 3 (in which ERC-avoidance was the predictor and RFQu was the mediator) provided a good fit to data ($\chi^2 = 32.529, p = .334; df = 30; \chi^2/df = 1.084, CFI = .992, RMSEA = .021$). In this model, the total and direct effect of attachment avoidance on both internalizing and externalizing were significant, but the indirect effect was not significant, indicating that RFQu did not mediate the relationship between attachment avoidance and internalizing or externalizing symptoms reported by youths.

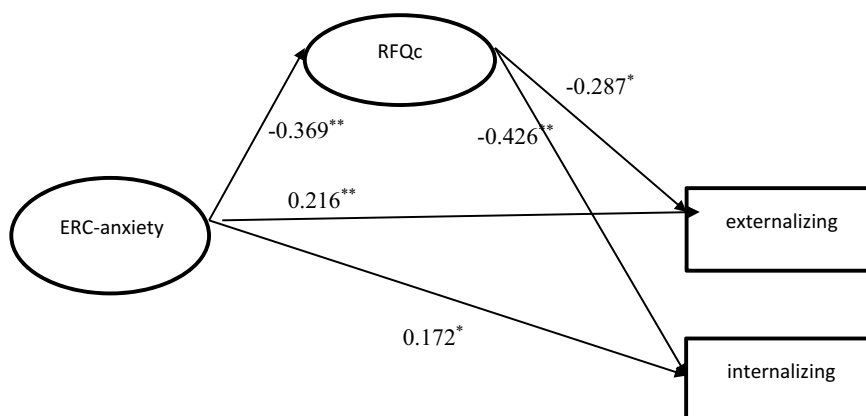


Figure 1. Final model 1. Standardized values are given for the path coefficients. $*p < .05$, $**p < .01$.

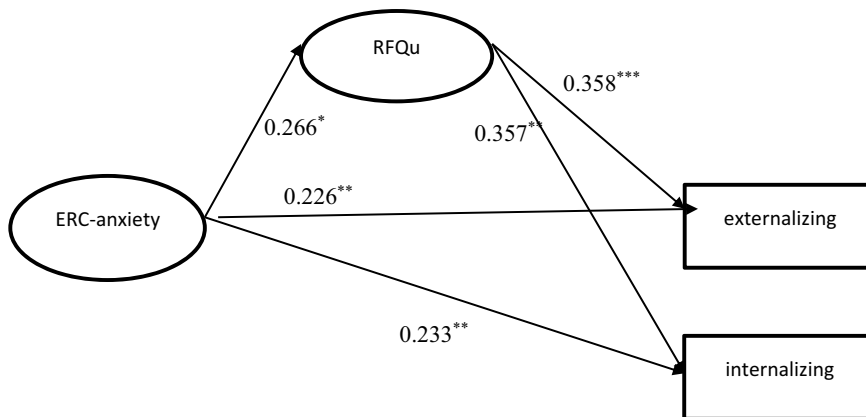


Figure 2. Final model 2. Standardized values are given for the path coefficients. * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

This study first examined the psychometric properties of the Persian translation of the RFQ by factor analysis and by examining its correlations with related constructs and indices of maladaptive functioning in a sample of non-clinical Iranian adolescents. Associations between the RFQ scores and selected socio-demographic factors and internal consistency were also explored. Confirmatory factor analysis confirmed that certainty about mental states and uncertainty about mental states underlie the RFQ items. Both subscales had satisfactory internal consistency and good temporal reliability by seven weeks interval test-retest examining.

Both RFQc and RFQu were unrelated to socio-demographic features except that RFQu was significantly higher in adolescents whose parents had a low level of education compared with others. This finding is congruent with the literature which suggest that the caregiver's capacity to enter the mental world of the child, might play an important role in the development of RF in children over time (Hoffman et al., 2012; Luyten et al., 2017; Slade, 2005), and studies have shown positive correlations between parents' level of education and parental RF (Luyten et al., 2017). Studies have shown that RF is correlated with IQ (Thomas & Maio, 2008) and intelligence (Ibanez et al., 2013), as attaining high levels of mentalizing can be a complex cognitive task. Therefore, it is expected that RF would be correlated with education levels (Luyten et al., 2017). However, no studies have specifically assessed education levels with RFQu and RFQc, but it can be assumed that people with higher cognitive abilities are better able to mentalize effectively. To conclude, parents with medium to high level of education, are more likely to have higher parental RF than those with a lower level of education, which in turn can result in higher RF in their children.

Similar to other studies (Badoud et al., 2015; Morandotti et al., 2018), RFQu was significantly positively, and RFQc was significantly negatively correlated with alexithymia. As alexithymia, the inability to experience, identify and express emotions, reveals uncertainty about mental states in self and others, these findings were theoretically expected. Although modest to small in size, RFQu was significantly negatively correlated with certain dimensions of mentalizing, including perspective-taking, empathy, and mindfulness. Findings that are congruent with other studies (Badoud et al., 2015; Fonagy et al., 2016) establish the construct validity of the Persian version of the RFQ, and also, suggest that RF overlaps but is different with constructs such as empathy and mindfulness.

RFQc was significantly positively correlated with perspective-taking. However, contrary to expectations, RFQc was not significantly correlated with cognitive empathy or mindfulness. Some studies have reached similar findings. In a study done by Badoud and colleagues (2015), RFQc was not correlated with a subscale of alexithymia. This finding might be due to differences between RF capacity

and other related features including empathy and mindfulness. Authors also suggest that these findings may reveal that although uncertainty about mental states suggests poor RF, but too much certainty about mental states (hyper-mentalizing) may also indicate poor RF, as theoretical literature emphasizes that genuine mentalizing is characterized by the recognition of the opaqueness of mental states. High certainty levels can prevent effective RF by making people too certain about their own view of the world, hindering their ability to recognize other people's state of minds. Therefore, extreme scores on RFQc reflect hyper-mentalizing which is an impairment in RF, common in many mental disorders such as borderline personality disorder. According to the theory of mentalization we would expect a non-linear relationship between certainty about mental states and other constructs related to mentalizing, since both extremely high and extremely low levels of certainty reveal impaired RF (Luyten et al., 2017). More studies are needed to investigate the relationship between RFQc scores and adaptive and maladaptive psychological functioning.

As expected, both RFQc and RFQu were correlated with MCQ-NB. This metacognitive belief consists of items such as "I cannot stop worrying," which has been demonstrated to be highly correlated with indices of anxiety (Spada et al., 2008), negatively valenced thinking and emotion dysregulation (Fergus & Bardeen, 2017). Therefore, it can be argued that MCQ-NB is theoretically expected to reveal poor RF. Altogether, these findings regarding the relationship between subscales of the RFQ and related constructs support the construct validity of the Persian translation of the RFQ.

Finally, RFQc and RFQu were correlated with indices of maladaptive psychological functioning (internalizing and externalizing problems), as measured by the YSR, which establish the predictive validity of the Persian version of the RFQ in a sample of youth. This result connects us to the other purpose of this research which was assessing the mediating role of RF in the relationship between attachment orientation in regard to parents and externalizing and internalizing problems. As expected, there was a significant association between attachment anxiety and both internalizing and externalizing problems, and also, a weaker but still significant association between attachment avoidance and both internalizing and externalizing problems. Insecurely attached children perceive themselves as unloving and undeserving and have a view of the world as anxiety-provoking and untrustworthy. Therefore, they are hypervigilant to threat and anxiety-provoking situations, thus increasing their risk of experiencing more anxiety related symptoms (internalizing) or acting in a hostile or aggressive manner (externalizing) (Goldstein, 2012).

The weaker correlation could be explained by the tendency of individuals with an avoidant attachment style to underreport their level of psychological distress (Mikulincer & Shaver, 2007). When RFQu was included as the sole mediating variable in the SEM, there was a significant total effect of attachment anxiety on the severity of both internalizing and externalizing problems which were significantly mediated by RFQu. RFQc was also a significant mediator in the relationship between attachment anxiety and maladaptive psychological functioning. However, when attachment avoidance was entered as the predictive variable, the resulting model showed a non-significant indirect effect of attachment avoidance on maladaptive psychological functioning mediated by RFQu, revealing that RFQu does not mediate the relationship between attachment avoidance and internalizing or externalizing problems.

Previous studies have shown that the inability to recognize and interpret mental states can influence emotion regulation capacity and may result in problems in functioning (Allen, 2008). Although adolescents have shown to have a great need of mentalization (Borelli et al., 2015), their brain's cortical regions responsible for mentalization have not yet been fully developed. At this stage of cognitive development, adolescents are integrating mental state knowledge and are beginning to express them. It is possible, however, that mentalizing can be impaired when this integration becomes too challenging (Rutherford et al., 2012). Based on the theory of mentalization, Fonagy and Bateman (2016) concluded that misperception of other people's actions can lead to a decrease in one's inhibition of violence against others. Furthermore, Fonagy and Luyten (2018) suggested that a low level of RF can impede an adequate regulation of interpersonal situations, which is based on empathy and perspective-taking. Consequently, adolescents with low RF may exhibit more externalizing

problems, such as violence and aggression. On the other hand, there doesn't seem to be consistent evidence regarding the relationship between mentalizing deficits and internalizing problems (Sharp & Venta, 2012). In this research, however, RF had a stronger relationship with internalizing problems. This finding can be explained by Fonagy et al. (2002), on the growing ability of abstract thinking during adolescence and complexity in relational experiences. They suggested that this growing capacity can result in adolescents' ongoing sensitivity to their own and other's mental states, which may become overwhelming for them and lead to increased anxiety. Accordingly, it can be argued that adolescents' preoccupation with new mental capacities may result in symptoms of internalizing, or more extremely, cause temporary withdrawal from their mental activities in the service of relief from overstimulation by one's own or others' affective states and so reducing the RF level (Target et al., 2001).

In the assessment of correlations between RF and attachment anxiety/avoidance, RFQu was shown to be positively correlated with both attachment anxiety and attachment avoidance, while RFQc was shown to be only negatively correlated with attachment anxiety. In other words, it seems that individuals with insecure attachments are more uncertain about the mental states of self and others, while people with lower attachment anxiety display more certainty. This finding is in line with studies suggesting that attachment anxiety and attachment avoidance are both maladaptive strategies to regulate affect in response to emotionally and physically unavailable caregivers, and thus are related to impairments in RF (Fonagy & Luyten, 2009; Luyten et al., 2017).

The mediating role of RF was confirmed only for attachment anxiety. Anxious attachment can be a predictor of high levels of emotion dysregulation. Marszal and Janczak (2018) concluded that people with attachment anxiety show more emotion dysregulation than people with attachment avoidance. Moreover, people with anxious attachment have shown to have higher levels of emotion dysregulation, than people with secure or avoidant attachment (Fraleigh, 2011). Nolte et al. (2011) concluded that hyperactivity strategies of attachment anxiety may lead to higher vigilance for threat and result in the deactivation of brain areas involved in reflective social cognition. On the other hand, based on Vrticka and Vuilleumier (2012) study, reactivating strategies of avoidant people seems to lead to lower brain responsiveness to social-emotional information and can result in an average mentalization ability. So, the nature of anxiety, unlike avoidance, can explain the mediating role of RF between attachment anxiety and externalizing/internalizing problems.

To our knowledge, this was the first study to validate a measure to assess RF in adolescents in Iran. Theoretical and empirical literature emphasize the role of typical and atypical development of RF in adolescents' psychological adjustment, resilience, and mental health. Due to this great concern, a valid and reliable tool to assess RF seems critically needed for both researchers and clinicians. However, when interpreting the present study's findings, some limitations should be considered. First, this study examined the psychometric properties of the Persian version of the RFQ in a sample of non-clinical adolescents. Further studies are needed to investigate these results in clinical samples. Second, all of the analyses and conclusions were based on self-report measures. Therefore, a comparison of RF scores assessed by the RFQ with RF scores obtained through interview-based measures and also through experimental assessments is needed to be examined in future studies. Lastly, this study used convenience sampling, therefore generalization must be done with caution.

In conclusion, this study provides preliminary evidence for the validity and reliability of the Persian version of RFQ as a self-report tool to assess RF in adolescents. The results of this study showed that RF, measured by RFQ can play a mediating role in the relationship between attachment anxiety and internalizing and externalizing problems in adolescents. Further studies are needed to investigate the relationship between RF and attachment avoidance in the non-clinical samples.

Key Practitioner Message

What is known?

- RF is the capacity to reflect on one's own and others' thoughts, feelings, and desires and interpret behaviors based on their underlying mental states. RF contributes to the mental health and development of adolescents, but the link between RF and psychological symptoms in adolescents has received less attention in literature, somewhat because of measurement concerns.

What is new?

- The RFQ has been studied in some cultures but not in the Iranian population, therefore this study focused on the short form of the RFQ in Persian. Correlations of the RFQ with other variables (empathy, perspective taking, mindfulness, etc.) were also considered.
- The mediating role of RF in the relationship between attachment to parents and psychological functioning in adolescents is not well known.

What is significant for clinical practice?

- This instrument can be applied in clinical settings for assessment and diagnosis cross-culturally.
- The findings can be used for better understanding of RF mechanisms in adolescents and for planning more targeted interventions to increase RF capacity in this population.

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