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DSM-5 Personality Dysfunction in a mentalization perspective: the interplay among personality dysfunction, emotion dysregulation and mentalization ability in a sample of Italian community dwelling-adults

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Abstract

Background: Mentalization represents the ability to interpret one's own and others' behaviours in terms of intentional mental states. Previous studies have suggested that impairments in mentalization are associated with personality pathology. The aim of our study was to examine the relationships between mentalization and DSM-5 Alternative Model of Personality Disorder Criterion A in a sample of community dwelling adults. Furthermore, since mentalization and personality dysfunction are associated with emotion dysregulation, we aimed to explore the interconnections among these three constructs.

Methodology: In a sample of 1225 Italian community dwelling adults and in a sub-sample of 97 participants we evaluated mentalizing ability and personality dysfunction. We relied on two methods that map different mentalization aspects: (a) in the whole sample, we used a self-report questionnaire (Reflective Functioning Questionnaire), and (b) in a sub-sample, we administered a performance test (Movie for the Assessment of Social Cognition). Moreover, in the whole sample, we explored the mediating role of emotion dysregulation on the association between mentalization and personality dysfunction.

Results: The results suggested that uncertainty about mental states was a significant predictor of self and interpersonal personality impairment. Considering the sub-sample, interpersonal dysfunction was associated with a mentalization deficit characterized by hypermentalization, hypomentalization and lack of mentalistic abilities. In the whole sample we found that mentalization deficits might affect personality dysfunction via their effect on emotion regulation.

Conclusion: Our findings showed that failures in mentalizing can leave an individual vulnerable to personality impairment and support Zettl et al. (2020) work showing that all the dimensions of personality impairment are associated with mentalistic abilities. Moreover, in line with both theoretical and empirical literature, the mediation analyses results could promote the comprehension of the interplay among mentalization, emotion dysregulation and interpersonal dysfunction supporting the psychotherapeutic model that considered these constructs as targets of psychotherapy.

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Abbreviations

AMPD: Alternative Model of Personality Disorder

RFQ: Reflective Functioning Questionnaire

MASC: Movie for the Assessment of Social Cognition

ToM: Theory of mind

RF: Reflective Function

RFQ_C: Certainty about mental states

RFQ_U: Uncertainty about mental states

DSM-5: Diagnostic and Statistical Manual of Mental Disorders, fifth edition

LPFS: Level of Personality Functioning Scale

PD: Personality Disorders

PID-5: Personality Inventory for DSM-5

LPFS-SR: Level of Personality Functioning Scale – Self Report

LPFS-BF: Level of Personality Functioning Scale – Brief Form 2.0

DERS: Difficulties in Emotion Regulation Scale

CAMSQ: Certainty About Mental States Questionnaire

1. Introduction

Mentalizing is an imaginative mental activity referring to the human capacity to perceive, comprehend and interpret, explicitly or implicitly, one's own and others' behavior in terms of intentional mental states (e.g., needs, desires, feelings, beliefs, and goals; Allen et al., 2008; Bateman & Fonagy, 2006). The ability to mentalize effectively is a relevant psychological process that develops in early childhood within the context of secure attachment, allowing individuals to build a stable sense of self as well as constructive and mutual interpersonal interactions (Fonagy et al., 2002; Bateman & Fonagy, 2006).

Based on evidence coming from functional magnetic resonance studies, Luyten and colleagues (2012) proposed that mentalization may be underpinned by four functional polarities supported by specific neural systems (Lieberman, 2007): (a) automatic-controlled, (b) internally focused-externally focused, (c) self-oriented/other-oriented, and (d) cognitive process-affective process (Lieberman, 2007; Luyten et al., 2012). Moreover, Fonagy & Bateman (2016), suggested that mentalization represents one of the core distinguishing features of the higher-order cognitive processes, namely information-processing mechanisms that do not rely on a static, fixed set of

specialized brain regions and fixed neuroanatomical connections but seem to operate by optimizing neural resources and creating routes between processing systems (Rudrauf, 2014).

Different non-mentalizing modes can arise from a failure in mentalization. Hypermentalization (or pseudo-mentalization) represents an attempt to understand others' behavior in terms of mental states without having any evidence to support this hypothesis. Hypomentalization (or psychic equivalence) implies a concrete thinking that denotes difficulty in understanding oneself and others in terms of mental states, that is the tendency to experience thoughts as real. Lastly, the teleological modality consists in recognizing mental states and thoughts only when their results are observable on a physical level (Luyten & Fonagy, 2015).

The ability to mentalize is often used interchangeably with the cognitive concept of theory of mind (e.g., Baron-Cohen et al., 2000; Dennett, 1987). Indeed, the cognitive term coined by Premack and Woodruff (1978) of theory of mind (e.g., ToM; Baron-Cohen et al., 2000; Dennett, 1987) is well associated to the mental process of mentalizing (Fonagy & Luyten, 2009). Although ToM and mentalization are two related constructs, they are not equal because mentalization involves the ability to reflect on both others' and one's own mind whereas ToM implies solely the reflection on the others' mind. However, ToM and mentalization are thought to belong to the broader construct of social cognition (Fossati et al., 2017; Fonagy & Luyten, 2009).

Moreover, mentalization construct shows some degree of associations with other constructs (Choi-Kain & Gunderson, 2008). For example, alexithymia (which implies a deficit in identifying and verbalizing emotions, difficulty distinguishing between feelings and bodily sensations of arousal and lack of imagination (Karukivi & Saarijärvi, 2014) and mentalization might be considered as related constructs (Calaresi & Barberis, 2019; Barberis et al., 2023). From this perspective, Wallin (2007) found a negative association between the ability of mentalizing and alexithymia. Other studies have also confirmed that alexithymia is associated to a higher level of impairment in mentalization, which in turn is connected with the incapacity to assume the point of view of the others (Swart et al., 2009; Moriguchi et al., 2006). Furthermore, both constructs are highly associated with several psychopathologies, chronic and somatic diseases (see for example Ricciardi et al., 2023; Di Giuseppe & Conversano, 2022; Cosenza et al., 2022).

A construct that has represented an empirically grounded framework for the assessment of mentalization (Katznelson, 2014; Anis et al., 2020) and has often been used as a synonymous with the term "mentalizing" (Fonagy et al., 2016) is reflective functioning (RF). In particular, RF has been broadly defined as (a) awareness of the nature of mental states in the self and others remaining aware of their opaque nature, and (b) the mutual influences at work between mental states and behavior (Steele & Steele, 2008). The majority of empirical studies of RF were based on the RF scale that was designed to be used in conjunction with the Adult Attachment

Interview (Fonagy et al., 1998). To develop a practical and easier-to-use measure to assess this construct, Fonagy et al. (2016) proposed the self-report Reflective Functioning Questionnaire (RFQ). Fonagy et al., (2016) developed a 46-item and 54-item version before settling on a final 8-item version (RFQ-8). RFQ consisted of two scales: certainty about mental states (RFQ_C) and uncertainty about mental states (RFQ_U); high scores on RFQ_U describe hypomentalization while lower scores indicate the knowledge of the opaque nature of mental states (Fonagy et al., 2016). RFQ_C should reflect a good understanding of mental states, however excessive certainty may reflect hypermentalization (Fonagy et al., 2016). RFQ has been broadly used in a growing body of mentalization research, although recent studies have showed some concerns (Muller, et al., 2022; De Meulemeester et al., 2018; Euler et al., 2021). In particular, it seems that the RFQ assesses a unidimensional construct (Spitzer et al., 2020, Muller, et al., 2022). Moreover, empirical evidence (e.g. Muller et al., 2022; Euler et al., 2021; Spitzer et al., 2020; De Meulemeester et al., 2018) have suggested that RFQ is able to measure hypomentalizing (having too little certainty about mental states), but it does not capture hypermentalizing (having too much certainty about mental states) adequately. In addition, Muller et al. (2022), highlighted that RFQ items showed relevant overlap with other constructs such as emotional lability and impulsivity. Although these critical considerations regarding the validity of RFQ have been discussed, currently it is widely used to assess mentalization ability (Euler et al., 2021).

Among the wide range of instruments currently available, the experimental/observational tasks represent promising measures in the field of mentalization research; an example is the Movie for the Assessment of Social Cognition (MASC; Dziobek et al., 2006). The MASC is a tool that permits to evaluate the ability to infer mental states of others through a video presenting everyday life social interactions among four characters. It considers different mental states modalities such as emotions, intentions and thoughts and it was developed starting from social cognition concepts (Dziobek et al., 2006).

1.1 Mentalization and personality pathology

A compromised capacity to understand oneself and others in terms of mental states (i.e. mentalizing) seems to play an important role in personality pathology (Bateman & Fonagy, 2016). The link between mentalistic abilities and personality pathology has been repeatedly demonstrated (Diamond et al., 2014; Fonagy & Bateman, 2008; Goodman & Siever, 2011; Newbury-Helps et al., 2017). For example, hypermentalizing has been associated with borderline personality disorder (Dziobek et al., 2011; Euler et al., 2021; Fossati et al., 2017; Sharp et al., 2013) while hypomentalizing was found in narcissistic personality disorder (Ritter et al., 2011). Moreover, Fossati et al. (2017) investigated the association between mentalization

deficits and personality pathology, confirming an association between the reduced ability to attribute mental states and the presence of at least one diagnosis of personality disorder. Furthermore, a review published by Luyten et al. (2020) showed that the current mentalizing approach to psychopathology considers impairments in specific dimensions of mentalizing and that specific personality disorders are characterized by different imbalances in these dimensions. Also, meta-analytic studies supported the associations between mentalization deficit and personality pathology (McLaren et al., 2022; Johnson et al., 2022; Bora, 2021).

The Criterion A of the Alternative Model of Personality Disorders (AMPD) listed in Section III of the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5; APA, 2013), was designed highlighting the relevance of mentalization in personality functioning (Bender et al., 2011). In particular, in the Criterion A, personality functioning was operationalized through the Level of Personality Functioning Scale (LPFS) that was developed through a review of different measures of personality pathology and personality functioning (Bender et al., 2011). One of the instruments considered was the RF scale, a measure of mentalization (Fonagy et al., 1998). Identity and empathy domains of LPFS were thought to be associated with mentalization ability showing conceptual overlap with the RF Scale (Bender et al., 2011). Specifically, the identity domain involves experience of oneself as unique, stability of self-esteem and accuracy of self-appraisal and ability to regulate emotional experiences. This domain shows overlap with mentalization since mentalizing plays a relevant role in creating and maintaining a stable internal representation of self and others and in modulating affective states, and it is linked to regulation of the self, including the inhibition of impulsive responses to distress (Fonagy & Target, 2006). Considering the empathy domain, it includes the ability to create an accurate model of another's thoughts and emotions and the capacity to consider or integrate multiple perspectives (i.e. mentalization ability). Up to now, few empirical studies have investigated the associations and conceptual overlap between mentalization and AMPD Criterion A. Zettl et al. (2020) found that impairments in identity, self-direction, empathy, and intimacy were associated with poor mentalization skills, while little or no personality dysfunction was associated with higher-level mentalistic skills. Moreover, they found that mentalization and Criterion A domains showed overlapping features (Zettl et al., 2020). Specifically, they showed that mentalization was associated to all domains of Criterion A. Indeed, the facet "the ability to self-reflect productively" which was in line with the definition of mentalizing was included in the self-direction domain. Similarly, the intimacy domain involved the "mutuality of regard reflected in interpersonal behaviour" which overlapped with the ability to regulate oneself in interpersonal relationships that, in turn was a mentalizing component (Taubner, 2015).

More recently, Rishede et al. (2021) carried out a study with the aim of examining the relationship between the severity of borderline personality disorder, mentalization and personality dysfunction. The authors confirmed the presence of an association between personality dysfunction and mentalization. In addition, Maerz et al. (2022) supported the associations between mentalization and personality functioning domains and found that they are significant predictors of mental health outcomes.

As a whole, these data were in line with the mentalization theory (Bateman & Fonagy, 2019) according to which mentalizing is about understanding and interpreting interpersonal interactions and, therefore, plays a key role in constructive and meaningful interpersonal functioning. Indeed, when the ability to reflect on the inner states of others and how others experience their actions is impaired, interpersonal relationships are negatively affected (Bateman & Fonagy, 2019).

1.2 Emotion dysregulation, personality and mentalization

The regulation of emotional experience represents another core element of an adaptive psychological functioning that enables individuals to act effectively in everyday life areas (Teixeira et al., 2015). The lack of the ability to understand and regulate our emotional reactions is well-known as emotion dysregulation: a common element in mental disorders. Indeed, difficulties with emotion regulation have been consistently described in relation to many diagnosed conditions: substance abuse (Fox et al., 2007; Fox et al., 2008), anxiety disorders (Mennin et al., 2009; Roemer et al., 2009), eating disorders (Racine & Wildes, 2013) and personality disorders (Bornovalova et al., 2008; Gratz et al., 2006). Up to now, the definition of emotion regulation is still controversial and different models have been developed (e.g. Berking & Wupperman, 2012; Bloch et al., 2010). In particular, they have included temporal process models (Gross et al., 2015), strategy-based models (Aldao et al., 2012) and ability-based models (Gratz & Roemer, 2004). A meta-analytic study (Naragon-Gainey et al., 2017) examining the structure of self-reports habitually used to assess emotion regulation strategies showed that three underlying factors (namely disengagement, aversive cognitive perseveration, and adaptive engagement) best characterized the available data.

In the present study we relied on Gratz and Roemer's (2004) model of emotion dysregulation. This model, considered a dispositional ability-based model, conceptualized emotion dysregulation as a multidimensional construct characterized by different dimensions: a) lack of awareness and clarity of emotions, b) non acceptance of emotions, c) lack of the ability to engage in goal-directed behavior, and refrain from impulsive behavior when experiencing negative emotions, and d) difficulty in accessing emotion regulation strategies perceived as effective (Gratz et al., 2006).

Considering the relationship between emotion dysregulation and personality pathology, scientific evidence has supported the relation between the various domains of emotion dysregulation and DSM-5 Section II personality disorders (PD) traits (Loas et al., 2011; Salvatore et al., 2012; Abdi & Pak, 2019; Pollock et al., 2016). For example, nonacceptance of emotional responses seemed to be a significant predictor of personality traits across all clusters, being positively related to paranoid, schizotypal, borderline, avoidant, and dependent PD traits (Garofalo et al., 2018). Furthermore, data showed that dependent PD was associated with difficulties engaging in goal-directed behavior when distressed (suggesting that people with high dependent traits might exhibit low distress tolerance) while obsessive-compulsive traits were negatively related to negative urgency (Garofalo et al., 2018). Moreover, Pollock et al. (2016) examined the unique associations between Personality Inventory for DSM-5 (PID-5) pathological traits and emotion regulation difficulties. Consistent with previous studies concerning neuroticism (e.g. Bolger & Schilling, 1991), PID-5 negative affectivity, detachment and antagonism showed strong associations with various aspects of difficulties in emotional experiences due to limitations in the use of emotion regulation strategies. In addition, the authors evaluated how these pathological traits moderated the link between negative emotional experiences and negative daily interpersonal events providing evidence of the impact of emotion dysregulation on interpersonal functioning. The relationship between personality psychopathology and emotion dysregulation was confirmed also by systematic reviews (Daros et al., 2019; Bud et al., 2023).

Considering the relationship between personality functioning and emotion dysregulation, the DSM-5 Criterion A includes the ability to regulate a range of emotional experience as a dimension of the identity domain (APA, 2013). To our knowledge, research on the associations between Criterion A operationalization and emotion regulation strategies are still lacking at the moment. A recent study (Katar et al., 2023) showed that difficulties in emotion regulation and maladaptive personality traits represented potential predictors of poor personality functioning in a clinical sample. Moreover, emotion dysregulation partially mediated the relationship between DSM-5 antagonism domain and personality functioning.

In order to gain a clearer understanding of the link between emotion dysregulation and personality pathology, literature has shown that the capacity to perceive and reflect upon one's own mental states represents a relevant prerequisite for emotion regulation (e.g. Fonagy et al., 2002; Allen et al., 2008). According to the mentalizing perspective (Bateman & Fonagy, 2016), overwhelming emotions can lead to significant mentalizing impairments. The psychic equivalence represents the non-mentalizing mode most often linked to emotions dysregulation. This mode is characterized by emotions perceived as too real and by experience of thoughts and feelings as concrete. If the thoughts and feelings are perceived as too real, a state of mind

that does not allow alternative perspectives occurs. As a result, emotions are perceived as intense and overwhelming. Thus, psychic equivalence mode makes hard for the individual to consider alternative perspectives that could help regulate the intensity of the experience. In line with this perspective, Jurist (2018) suggested that emotion regulation is based on mentalization ability: without the capacity to understand and interpret mental states, emotional regulation might be impaired, leading to inappropriate or dysfunctional behaviours.

Also, empirical data have supported those associations (e.g., Sharp et al., 2011; Euler et al., 2021; Schwarzer et al., 2021). In particular, several authors have found an association between high levels of emotional dysregulation, particularly regarding aspects of non-acceptance of emotional responses and lack of emotional clarity, and poor mentalization skills (Marszał & Jańczak, 2018; Parada-Fernández et al., 2021; Sharp & Vanwoerden, 2015; Vahidi et al., 2021). In addition, Euler et al. (2021) found that both mentalization and emotional dysregulation seemed to be significant predictors of interpersonal problems in a sample of patients with borderline personality disorder. Specifically, mentalization deficits predicted interpersonal problems indirectly through emotional dysregulation, indicating a direct effect of mentalization on emotion regulation. Finally, Sharp et al. (2011) showed the mediating effects of mentalization deficits on borderline personality disorder traits through the influence of emotional dysregulation in a sample of clinical adolescents. In summary, there seems to be an important association between mentalizing abilities and the ability to regulate emotions, where high levels of emotional dysregulation correspond to a greater degree of mentalizing abilities' impairment. Moreover, a recent meta-analytic review supported these associations (Kivity et al., 2024).

Up to now, the empirical evidence on the interconnections between these constructs seems still poor and the available data have investigated the relationship between emotion dysregulation and mentalization in borderline personality disorder (Sharp et al., 2011; Vahidi et al., 2021; Kahya et al., 2023; Euler et al., 2021). To our knowledge no studies were carried out considering the complex association between mentalization, emotion dysregulation and DSM-5 personality impairments. Deepening the complex relationships among mentalization, emotion dysregulation and personality dysfunction in the context of a dimensional model of personality (namely DSM-5 AMPD Criterion A) could represent a relevant topic since a dimensional approach to personality pathology could be more adequate and clinically useful (Krueger et al., 2011).

1.3 Aims of the study

Starting from these considerations, the aim of our study was to examine the relationships

between mentalization and DSM-5 AMPD Criterion A in a sample of community – dwelling adults. Since mentalization is a multidimensional construct, we relied on two methods that map different mentalization aspects: (a) in the whole sample, we relied on a self-report questionnaire (RFQ), and (b) in a sub-sample, we administered a performance test (MASC task). Participants included in the sub-sample were members of the full sample who were willing to fill both the self-reports and the MASC task. In line with Bateman and Fonagy's model (2016), we hypothesized a significant association between personality dysfunction and mentalization deficits both in the whole and in the sub-sample. Specifically, we assumed that the uncertainty about mental states (i.e. hypomentalization) assessed with RFQ may show significant associations with self and interpersonal personality dysfunction. We chose to use the 46-item RFQ version, since the RFQ-8 seems to focus mostly on the self and one's own feelings and thoughts (Müller et al., 2022). RFQ-46 also includes item evaluating the ability to understand feelings and thoughts of others which represents a relevant aspect for our study. Moreover, we assumed that the Criterion A self and interpersonal impairment are related to mentalistic deficits measured through the MASC task.

Furthermore, in light of the mentalization model that suggested that both emotion regulation and personality dysfunction are rooted in mentalization deficit (Bateman & Fonagy, 2016), we aimed to extend the understanding of the role of mentalization and emotion regulation on personality impairments. In particular, in the whole sample, we explored the mediating role of emotion dysregulation on the association between mentalization and personality dysfunction. We hypothesized that hypomentalization may increase difficulties in emotion regulation, which in turn may be associated with self and interpersonal personality dysfunction. As such, emotion dysregulation would partially mediate the relationship between mentalizing and personality impairment. We entered emotion dysregulation as mediator since in their model Bateman & Fonagy (2016) have suggested that emotional regulation relies on the ability of mentalization. Without this ability to understand and interpret mental states, emotional regulation might be inappropriate or inadequate, which may contribute to personality psychopathology (Fonagy & Target, 2006). So, mentalization and emotional regulation seem to be involved in personality dysfunction. Moreover, empirical evidence has suggested that this construct represents a transdiagnostic factor that could mediate the relationship between pathological personality and emotional disorders (Abdi & Pack, 2019) as well as between mentalization and personality pathology (for example Euler et al., 2021).

2. Methods

All participants volunteered to take part in the study after responding to online advertisements from January 2020 to May 2021. In the first phase, participants were given all the information

about the study. They were told that the study aimed to collect data on the relationship between the ability to understand one's and others' mental states, personality, and emotion regulation ability. Then, participants were asked to provide their written informed consent, ensuring that they fully comprehend the nature of their participation. If the informed consent was not obtained, they couldn't proceed. On the other hand, if they provided their consent, they could have access to the self-report questionnaires.

None of the participants received an incentive for participating. The study was conducted in line with the Ethical Principles of Psychologists and Code of Conduct and was approved by San Raffaele Hospital ethical committee. All participants completed the self-report questionnaires whereas the MASC task was administered in a sub-sample. Data collection took approximately 90 minutes and was conducted on-line through google forms. In order to avoid missing data, we used a forced-choice format; thus, only the participants who answered to all questionnaire's items could send their data and were registered in the study data base.

2.1 Participants

The whole sample was composed of 1225 Italian community-dwelling adults. The sample included 1059 (86.4%) women and 161 (13.1%) men; participants' mean age was 27.38 years, $SD = 9.41$. The sample largely consisted of female participants; this data was in line with previous research suggesting that women tend to be more prone than men to respond to online surveys (see for example, Becker, 2022; Becker et al., 2019; Slauson-Blevins & Johnson, 2016). With regard to the level of education, 9 (0.7%) participants reported junior high school degree, 7 (0.6%) participants reported technical or training certificate, 513 (41.9%) participants reported high school degree, 624 (51%) participants reported university degree and 72 (5.9%) participants reported post graduate education.

The sub-sample was composed by 97 participants; 79 (81.4%) participants were female, 18 (18.5%) were male; the mean age was 32.14 years, $SD=13$. The level of education profile of the sub-sample was as follows: 3 (3.1%) participants reported junior high school degree, 1 (1%) participant attended technical school, 32 (33%) participants achieved high school degree, 54 (55.7%) participants reported university degree and 7 (7.2%) post graduate education. The whole sample participants did not differ from sub-sample participants on DERS total score ($t(1223) = 1.860, p > 0.05$), RFQ-U scale ($t(1223) = .688, p > 0.05$) and LPFS-SR-self, ($t(1223) = .97, p > 0.05$), LPFS-SR-interpersonal ($t(1223) = 1.67, p > 0.05$) and LPFS-SR total score, ($t(1223) = 1.338, p > 0.05$). We found significant differences between the whole sample and the subsample on LPFS- BF self ($t(1223) = 4.28, p < 0.001$), LPFS- BF interpersonal ($t(1223) = 2.30, p < 0.05$) and LPFS- BF total score ($t(1223) = 3.86, p < 0.001$). These differences should not be over-interpreted. In fact, according to Cohen (1988) guidelines, the effect size of these

differences was low ($d = .46$ for LPFS-BF self, $d = .24$ for LPFS-BF interpersonal and $d = .42$ LPFS-BF total score). Furthermore, the differences between LPFS-BF and LPFS-SR could be linked to the different areas of application of these instruments: the LPFS-BF allowing a quick screening assessment of general impairment in personality functioning, while the LPFS-SR might enable a more specific and detailed assessment of personality functioning (Weekers et al., 2019).

2.2 Measures

The Reflective Functioning Questionnaire (RFQ; Fonagy et al., 2016)

The RFQ is a 46-item self-report measure designed to assess reflective functioning, the operationalized form of mentalization. It evaluates mentalizing abilities based on response patterns to statements concerning mental processes with respect to oneself and others, such as “Sometimes I do things without really knowing why”. The items are scored on a 7-point Likert scale, ranging from 1 (“Completely disagree”) to 7 (“Completely agree”). The RFQ contains two subscales labelled as certainty (RFQ_C) and uncertainty (RFQ_U) about mental states. Very low agreements on RFQ_C scale reflect hypermentalizing, while some agreement reflects adaptive level of certainty about mental states. Conversely, high scores on RFQ_U scale reflect a stance characterized by an almost complete lack of knowledge about mental states, while lower scores reflect acknowledgment of the opaqueness of one’s own mental states and those of others, typical of genuine mentalizing. Reliability and validity data have been showed both in the English (Fonagy et al., 2016) and Italian version (Morandotti et al., 2018). In the present study, we relied on RFQ_U scale as operationalization of lack of mentalistic ability (hypomentalization) since previous studies have questioned the validity of the RFQ_C subscale because it seemed insufficiently clear whether it measures adaptive or maladaptive aspects of mentalizing (De Meulemeester et al., 2018; Euler et al., 2019). An exemplificative item is “*People’s thoughts are a mystery to me*”. The RFQ_U subscale showed adequate internal consistency both in the original ($\alpha = .63$; Fonagy et al., 2016) and in the Italian validation version ($\alpha = .75$; Morandotti et al., 2018).

Level of Personality Functioning Scale – Self Report (LPFS-SR; Morey, 2017)

The LPFS-SR is a self-report questionnaire comprised of 80 items that evaluates Criterion A of the Alternative Model for Personality Disorders (AMPD). It provides descriptions of five different levels of impairments in all personality functioning domains (Identity, Self-Direction, Empathy, and Intimacy). The items are rated on a 4-point Likert scale, ranging from 1 (“Totally false, not at all true”) to 4 (“Very true”). An exemplificative item for each domain is: “The way others perceive me is totally different from the way that I really am” (Identity); “I’m not sure exactly what standards I’ve set for myself” (Self-Direction); “I can’t stand it when there are

sharp differences of opinion” (Empathy); and “I have relationships, but not many that I consider to be very close” (Intimacy). The LPFS-SR yields both a total score and separate subscale’s scores. In the present study we used Self and Interpersonal scales scores. Adequate psychometric properties have been provided for the original version (Morey, 2017; Hopwood et al., 2018). In particular, the LPFS-SR original version (Morey, 2017) showed adequate internal consistency for the total score ($\alpha = .96$) and component scores (Identity: $\alpha = .89$, Self-Direction: $\alpha = .88$, Empathy: $\alpha = .82$, Intimacy: $\alpha = .88$).

Level of Personality Functioning Scale Brief Form 2.0 (LPFS-BF 2.0 Weekers et al., 2019)

The *Level of Personality Functioning Scale Brief Form 2.0* (LPFS-BF 2.0) was administered in its Italian version. It is a 12 items questionnaire aiming to operationalize Criterion A of the DSM-5 Alternative Model of Personality Disorders. LPFS-BF 2.0 attempts to assess the levels of impairment of personality functioning as delineated by the APA (2013); indeed, it presents the self and interpersonal functioning subscales. Each item is an operationalization of the respective facets of the DSM-5 Criterion A domain. An exemplificative item for each domain is: “I often do not know who I really am” (Self) and “My relationships and friendships never last long” (Interpersonal). The answers are evaluated using a 4-point Likert scale, ranging from 1 = “completely untrue” to 4 = “completely true”. In the original version (Weekers et al., 2019), the LPFS-BF showed adequate internal consistency for the total score ($\alpha = .69$) and scales scores (Self: $\alpha = .57$, Interpersonal: $\alpha = .65$).

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004)

The DERS is a 36 item self-report measure used to assess difficulties in multiple domains of emotion regulation. It is composed of six subscales: (1) lack of acceptance of the emotional responses (“non-acceptance”), (2) difficulty in distracting from emotions and engaging in goal-oriented behaviors (“goals”), (3) limited access to emotion regulation strategies (“strategies”), (4) lack of control when experiencing intense emotions (“impulse”), (5) difficulties in identifying emotions (“clarity”), and (6) limited awareness of emotion (“awareness”). The DERS yields a total score and six separate scores for each subscale. Items are scored on a 5-point Likert scale ranging from 1 (“Almost never”) to 5 (“Almost always”), with higher scores reflecting greater emotion regulation difficulties. An exemplificative item for each subscale is: “When I’m upset, I feel guilty for feeling that way” (Non-acceptance); “When I’m upset, I have difficulty getting work done” (Goals); “When I’m upset, I become out of control” (Impulse); “I care about what I’m feeling” (Awareness); “When I’m upset, I believe I’ll end up feeling very depressed” (Strategies); and “I have no idea how I am feeling” (Clarity). In the present study, we relied on DERS total score. DERS total score showed adequate internal consistency both in the original

($\alpha = .93$; Gratz & Roemer, 2004) and in the Italian validation version ($\alpha = .90$; Sighinolfi et al., 2010).

Movie for the Assessment of Social Cognition (MASC; Dziobek et al., 2006)

In the current study, we employed the Italian translation (Fossati et al., 2017) of the Movie for The Assessment of Social Cognition (MASC). MASC is a computerized task that evaluates the ability to infer mental states. It consists in a 15-minutes video presenting everyday life social interactions among four characters spending a dinner together. MASC administration implies to stop the movie while providing participants a multiple-choice question concerning character's mental states. It is composed by questions regarding actors' feelings (e.g., "*What is Betty feeling?*") and thoughts (e.g., "*What is Cliff thinking?*"). There are four possible answers representing a different mentalization option: a) hypermentalizing response, b) hypomentalizing response, c) no mentalizing response, d) accurate mentalizing answer. The responses permit to outline three categories of mentalization failures: less ToM, corresponding to the tendency to hypomentalization; no ToM, that refers to the lack of mentalization and excessive ToM, that suggests the disposition to hypermentalization (Montag et al., 2011; Dziobek et al., 2006). An exemplification of the questions is: "*What is Sandra feeling?*", and the correct answer is "*She is flattered but somewhat taken by surprise*". The three other options are: hypomentalizing ("*She is pleased about his compliment*"); hypermentalizing ("*She is exasperated about Michael coming on too strong*"); and no-mentalizing ("*Her hair does not look that nice*"). Moreover, the task foresees six control answers to examine subjects' attention and comprehension of the overall plot. MASC displayed adequate test-retest reliability (Dziobek et al., 2006). In the original version (Dziobek et al., 2006), MASC total score showed adequate internal consistency ($\alpha = .84$). Finally, in an Italian sample, the MASC total score showed adequate internal consistency reliability in a non-clinical adolescent sample ($\alpha = .80$) and in a non-clinical adult sample ($\alpha = .76$) (Fossati et al., 2017).

2.3 Data analyses

In the present study we relied on frequentist approach since it is less computationally intensive than a Bayesian approach and it allows for an easy comparison of the results of the current study to the available literature on the topic.

Prior to any analysis, the data were examined for normality of distribution by skewness and kurtosis (Kline, 2016). No variables showed levels of skewness and kurtosis exceeding the acceptable range (skewness < 3 and kurtosis < 10), thus we relied on parametric analyses.

In the light of the imbalance between male and female sub-samples, Hayes and Matthes' (2009) procedure was used to test interactions between gender and independent variables scores in predicting personality dysfunction in the whole sample.

In the whole sample, we performed four regression models that considered LPFS-BF-self, LPFS-BF-interpersonal, LPFS-SR-self and LPFS-SR-interpersonal respectively as dependent variable and RFQ_U as predictor.

The size of whole sample was adequate for the planned analyses (VanVoorhis & Morgan, 2007; Rijnhart et al., 2021). In the sub-sample that completed the MASC task, since the sample size was relatively small, we examined the bivariate associations between MASC scales (correct answers, error answers, exceeding ToM, less ToM and no ToM answers) and overall personality dysfunction, impairment in self and impairment in interpersonal functioning. Moreover, we evaluated the associations between RFQ_U and MASC scales.

We performed other regression models to examine the associations between RFQ_U, DERS total score and LPFS-BF and LPFS-SR scales. In all regression models the participant's age was entered in the first step of the model.

Finally, we carried out mediation analyses using Shrout and Bolger's (2002) and Preacher and Kelley's (2011) procedures. In order to evaluate the strength of mediation, we computed PM (Shrout & Bolger, 2002). We used normal-theory significance tests to evaluate the statistical significance of all path coefficients except indirect effect path coefficients for which we computed 95% bias corrected confidence intervals (CIs) based on 10,000 bootstrap replications (Preacher & Kelley, 2011). Mediation and bootstrap analyses were carried out using Hayes (2013) PROCESS macro for SPSS.

3. Results

Descriptive statistics, Cronbach's α values and correlations with participants' age and the bivariate associations between RFQ_U, DERS and Criterion A measures are showed in table 1 for the whole sample. In table 2 descriptive statistics, Cronbach's α values and correlations with participants' age and the bivariate associations between the MASC task and both LPFS-BF and LPFS-SR are showed for the sub-sample.

Moreover, in our sample RFQ_U scale did not show significant correlations with MASC scales.

Table 1. Descriptive statistics, Cronbach α Values, Correlation with Age and Pearson Correlation Coefficient Values for Level of Personality Functioning Scale Brief Form 2.0, Level of Personality Functioning Scale Self Report, Difficulties in Emotion Regulation Scale, Reflective Functioning Questionnaire in the whole sample (N=1225)

Variable	Whole sample (N=1225)		Age		<i>r</i> Coefficients							
	<i>M</i>	<i>SD</i>	<i>r</i>	α	1	2	3	4	5	6	7	8
LPFS-BF Scales												
1. Self	2.54	.78	-.34***	.77								
2. Interpersonal	2.22	.67	-.14***	.66	.52***							
3. Total score	2.38	.63	-.28***	.80	.89***	.85***						
LPFS-SR Scales												
4. Self	151.46	41.41	-.19***	.92	.59***	.51***	.64***					
5. Interpersonal	111.99	30.17	-.13***	.86	.39***	.57***	.54**	.77**				
6. Total score	263.44	67.42	-.18***	.94	.54***	.57***	.63***	.96***	.82**			
DERS												
7. Total score	2.80	0.62	-.22***	.92	.54***	.41***	.55***	.66***	.48**	.62***		
RFQ												
8. RFQ_U	5.05	4.77	-.09**	.78	.29***	.32***	.35***	.43***	.34***	.42***	.38***	

Note. LPFS-BF: Level of Personality Functioning Scale Brief Form 2.0; LPFS-SR: Level of Personality Functioning Scale Self Report; DERS: Difficulties in Emotion Regulation Scale; RFQ: Reflective Functioning Questionnaire; α : Cronbach's alpha; *r*: Pearson Correlation coefficient. *** $p < .001$, ** $p < .005$.

Table 2. Descriptive statistics, Cronbach α Values, Correlation with Age and Pearson Correlation Coefficient Values for Level of Personality Functioning Scale Brief Form 2.0, *Level of Personality Functioning Scale Self Report, Movie for the Assessment of Social Cognition in the Sub-Sample (N=97)*

Variable	Subsample (N=97)		Age		<i>r</i> Coefficients										
	<i>M</i>	<i>SD</i>	<i>r</i>	α	1	2	3	4	5	6	7	8	9	10	11
LPFS-BF Scales															
1. Self	2.21	.72	-.36***	.83											
2. Interpersonal	2.07	.58	.01	.71											
3. Total score	2.14	.55	-.24*	.82											
LPFS-SR Scales															
4. Self	147.75	39.12	-.10	.91											
5. Interpersonal	107.40	27.95	-.05	.87											
6. Total score	255.15	63.18	-.09	.94											
MASC Scales															
7. Correct answers	30.83	5.79	-.07	.81	-.11	-.18	-.02	-.11	-.33***	-.21*					
8. Error answers	14.10	5.87	.20*	.71	-.09	.18	.03	.11	.32***	.21*	-.99***				
9. Exceeding ToM answers	5.78	2.91	-.07	.62	.03	.19	.13	.21*	.33***	.27**	-.61***	.61***			
10. Less ToM answers	5.52	3.06	.33***	.56	-.14	.05	-.07	.02	.19	.01	-.77***	.79***	.11		
11. No ToM answers	2.77	2.30	.17	.56	-.11	.15	.01	-.01	.16	.06	-.73***	.73***	.15	.51***	

Note. LPFS-BF: Level of Personality Functioning Scale Brief Form 2.0; LPFS-SR: Level of Personality Functioning Scale Self Report; MASC: Movie for the Assessment of Social Cognition; ToM: Theory of Mind; α : Cronbach's alpha; *r*: Pearson Correlation Coefficient *** $p < .001$, ** $p < .01$, * $p < .05$

3.1 Moderation analyses results

In all moderation regression analyses, participant's age was entered as a covariate. Considering the moderating role of gender in the relations between the RFQ_U and LPFS-BF-self, RFQ_U significantly predicted the LPFS-BF-self score, $B = .04, p < .001$ whereas the participant's gender was not associated with LPFS-BF-self score, $B = .03, p > .05$; no significant gender-by-LPFS scale interaction was observed: $B = -.01, p > .05$ (overall model adjusted R^2 value = .10). When we considered LPFS-BF-interpersonal as dependent variable, we found a significant association between RFQ_U score and LPFS-BF-interpersonal, $B = .04, p < .005$; participant's gender was not related to LPFS-BF-interpersonal, $B = .02, p > .05$; we did not observe a gender-by-LPFS-BF-interpersonal interaction $B = .11, p > .05$ (model adjusted R^2 value = .11). Considering the moderating role of gender in the relations between the RFQ_U and LPFS-SR-self, RFQ_U significantly predicted the LPFS-SR-self score, $B = 3.08, p < .001$ whereas the participant's gender was not associated with LPFS-SR-self score, $B = -7.07, p > .05$; no significant gender-by-LPFS scale interaction was observed: $B = .65, p > .05$ (overall model adjusted R^2 value = .22). When we considered LPFS-SR-interpersonal as dependent variable, we found a significant association between RFQ_U score and LPFS-SR-interpersonal, $B = 2.20, p < .001$; participant's gender was not related to LPFS-SR-interpersonal, $B = -6.37, p > .05$; we did not observe a gender-by-LPFS-SR-interpersonal interaction $B = -.15, p > .05$ (model adjusted R^2 value = .13). Moreover, when we examined the association between RFQ_U and DERS total score, the results revealed a no significant gender-by-RFQ_U interaction: $B = .02, p > .05$ (adjusted R^2 value = .18). RFQ_U scale significantly predicted DERS total score, $B = .03, p < .005$ whereas the participant's gender was not associated with RFQ_U scale, $B = -.09, p > .05$.

3.2 Associations between mentalization deficit and personality dysfunction

In the whole sample, the regression model that considered LPFS-BF-self as dependent variable, RFQ_U as predictor and the participant's age as covariate explained the 18.5% of the variance (adjusted $R^2 = .185, p < .001$). RFQ_U was a significant predictor of impairment in self-functioning ($\beta = .27, p < .001$). Similarly, LPFS-BF-interpersonal showed a significant association with RFQ_U scale: $\beta = .31, p < .001$ (adjusted $R^2 = .11, p < .001$). Considering LPFS-SR scales, RFQ_U resulted a significant predictor of both LPFS-SR-self ($\beta = .42, p < .001$, adjusted $R^2 = .21, p < .001$) and LPFS-SR-interpersonal ($\beta = .33, p < .001$, adjusted $R^2 = .12, p < .001$) scales.

Table 3 showed the results of Pearson's r correlations between MASC subscales and LPFS-BF and LPFS-SR scales in the subsample. Controlling for the effect of LPFS-BF-self, exceeding

ToM scale was associated with LPFS-BF-interpersonal ($r = .20, p < .05$). After controlling for the effect of LPFS-SR-self, LPFS-SR-interpersonal functioning impairment showed negative and significant associations with the MASC correct answers ($r = -.38, p < .001$) and it was positively associated to exceeding ToM ($r = .27, p < .01$), no ToM ($r = .24, p < .05$), less ToM ($r = .27, p < .05$), and error scales ($r = .30, p < .001$). Moreover, LPFS-SR-self, controlling for the effect of LPFS-SR-interpersonal scale, was significantly associated with MASC correct answers ($r = -.23, p < .05$) and error scales ($r = .23, p < .05$).

Table 3. Bivariate Partial Pearson Correlation Analyses between the Movie for the Assessment of Social Cognition Scales and Level of Personality Functioning Scale Brief Form 2.0 and Level of Personality Functioning Scale Self Report (N= 97)

	MASC Scales				
	Correct answers pr^1	Error answers pr^2	“Exceeding ToM” answers pr^3	“Less ToM” answers pr^4	“No ToM” answers pr^5
LPFS-BF Scales					
Self	-.20	.19	-.06	-.18	-.16
Interpersonal	-.24*	.24*	.20	.12	.19
LPFS-SR Scales					
Self	-.23	.23*	-.08	-.20	-.19
Interpersonal	-.36***	.37***	-.27**	.27**	.24*

Note. LPFS-BF: Level of Personality Functioning Scale Brief Form 2.0, LPFS-SR: Level of Personality Functioning Scale Self Report MASC: Movie for the Assessment of Social Cognition; ToM: Theory of Mind; pr: Partial Pearson Correlation Coefficient; 1: Controlling for LPFS-BF Interpersonal; 2: Controlling for LPFS-BF Self; 3: Controlling for LPFS-SR Interpersonal; 4: Controlling for LPFS-SR Self. * $p < .05$ ** $p < .01$ *** $p < .001$

3.3 Association between mentalization, Criterion A and emotion dysregulation

When we examined a regression model considering DERS total score as dependent variable and RFQ_U as predictor, uncertainty about mental states significantly predicted DERS total score ($\beta = .36, p < .001, R^2 \text{ adjusted} = .17, p < .001$). Moreover, DERS total score was a significant predictor of both LPFS-BF-self ($\beta = .49, p < .001, R^2 \text{ adjusted} = .35, p < .001$) and interpersonal ($\beta = .40, p < .001, R^2 \text{ adjusted} = .17, p < .001$). Similarly, DERS total score was significantly associated with LPFS-SR-self ($\beta = .42, p < .001, R^2 \text{ adjusted} = .21, p < .001$) and interpersonal ($\beta = .33, p < .001, R^2 \text{ adjusted} = .12, p < .001$). All regression analyses included participants' age as covariate in Step 1.

3.4 Mediation analyses results

The mediating role of the DERS total score in the relations between RFQ_U scale and LPFS-BF-self score was considered (controlling for participants' age). The total effect of the RFQ_U

scale on the LPFS-BF-self scale was significant ($\beta = .27, p < .001$). Similarly, the RFQ_U scale significantly predicted the DERS total score ($\beta = .36, p < .001$), which, in turn, had a significant direct effect on the LPFS-BF-self score ($\beta = .45, p < .001$). The indirect effect of the RFQ_U scale on the LPFS-BF-self score through the DERS total score was significant (ab path coefficient value = .03, 95% CI [.02, .04]; the completely standardized ab coefficient value = .16, 95% CI [.13, .19]). The P_M value for the indirect effect was .61, 95% CI [.49, .76]. The direct effect of the RFQ_U scale on the LPFS-BF-self score remained significant in the final model ($\beta = .10, p < .001$) providing support for partial mediation. The results of this mediation analysis are showed in figure 1.

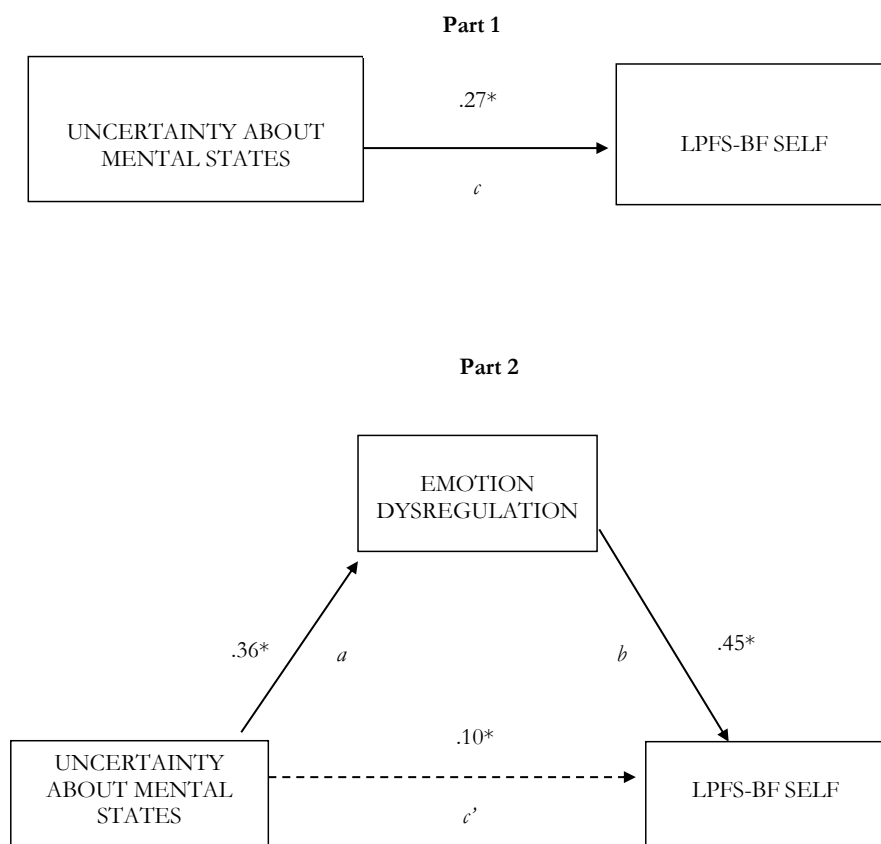


Figure 1. Path diagram showing the total effect (Part 1) of RFQ Uncertainty scale on Self functioning impairment evaluated with the Level of Personality Functioning Scale Brief Form 2.0 (LPFS-BF 2.0) and the mediating effect (Part 2) of emotional dysregulation evaluated with the Difficulties in Emotion Regulation Scale (DERS) controlling for the effect of the age of the participants. For ease of presentation, residues were omitted.

Note. * $p < .001$ LPFS-BF: *Level of Personality Functioning Scale Brief Form 2.0*.

We carried out a mediation model considering the role of DERS total score in the relations between RFQ_U scale and LPFS-BF-interpersonal score (controlling for participant age, figure 2). The total effect of the RFQ_U scale on the LPFS-BF-interpersonal score was significant ($\beta = .31, p < .001$); the RFQ_U scale significantly predicted the DERS total score ($\beta = .36, p < .001$);

.001); and the DERS total score had a significant direct effect on the LPFS-BF-interpersonal score ($\beta = .33, p < .001$). Finally, the indirect effect of the RFQ_U scale on LPFS-BF-interpersonal score through the DERS total score was significant (i.e., completely standardized ab coefficient value = .11, 95% CI [.09, .15]), P_M value was .38, 95% CI [.28, .49]. Once again, the direct effect of the RFQ_U scale on LPFS-BF-interpersonal score remained significant ($\beta = .29, p < .001$) indicating partial mediation.

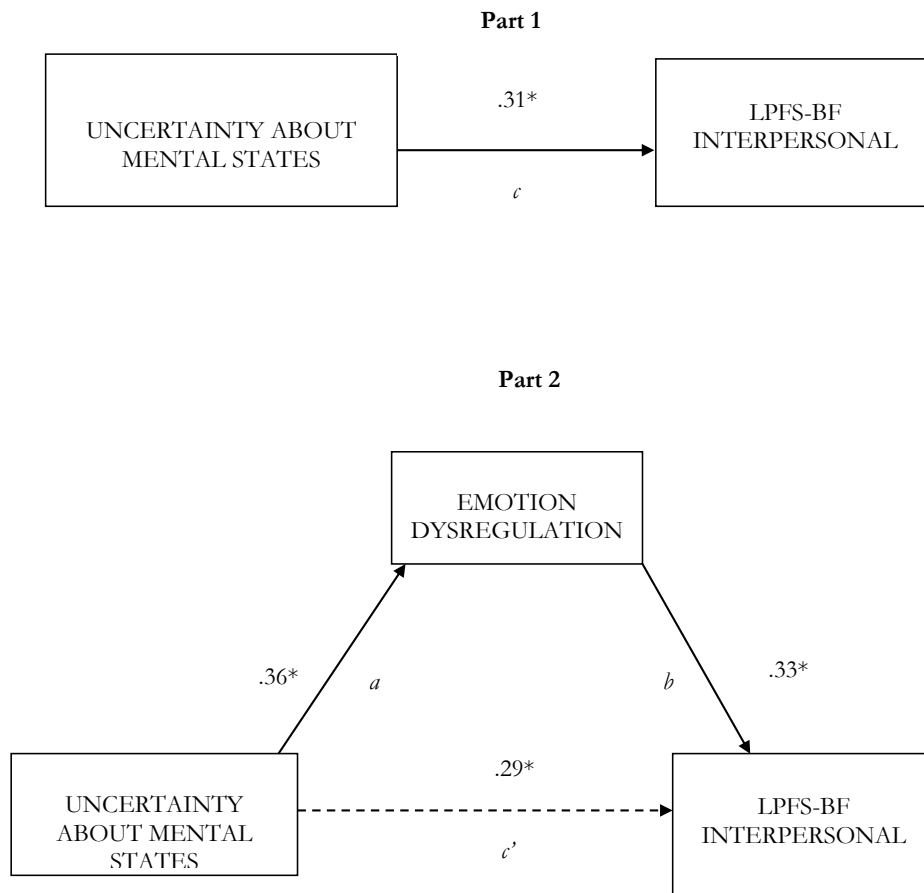


Figure 2. Path diagram showing the total effect (Part 1) of RFQ Uncertainty scale on Interpersonal functioning impairment evaluated with the Level of Personality Functioning Scale Brief Form 2.0 (LPFS-BF 2.0) and the mediating effect (Part 2) of emotional dysregulation evaluated with the Difficulties in Emotion Regulation Scale (DERS) controlling for the effect of the age of the participants. For ease of presentation, residues were omitted.

Note. * $p < .001$. LPFS-BF: *Level of Personality Functioning Scale Brief Form 2.0*.

We found similar results with LPFS-SR scales. The total effect of the RFQ_U scale on the LPFS-SR-self scale was significant ($\beta = .42, p < .001$). RFQ_U scale significantly predicted the DERS total score ($\beta = .36, p < .001$), which, in turn, significantly predicted the LPFS-SR-self score ($\beta = .57, p < .001$). The indirect effect of the RFQ_U scale on the LPFS-SR-self score through the DERS total score was significant (ab path coefficient value = 1.77, 95% CI [1.44, 2.12]; the completely standardized ab coefficient value = .20, 95% CI [.17, .24]). The P_M value

for the indirect effect was .49, 95% CI [.43, .57]. The direct effect of the RFQ_U scale on the LPFS-SR- self score remained significant in the final model ($\beta = .22, p < .001$) providing support for partial mediation (figure 3). In figure 4 are showed the mediation analyses results that considered the role of the DERS total score in the relations between RFQ_U scale and LPFS-SR-interpersonal score. The total effect of the RFQ_U scale on the LPFS-SR-interpersonal score was significant ($\beta = .33, p < .001$); the RFQ_U scale significantly predicted the DERS total score ($\beta = .36, p < .001$); and the DERS total score had a significant direct effect on the LPFS-SR-interpersonal score ($\beta = .40, p < .001$). Finally, the indirect effect of the RFQ_U scale on LPFS-SR-interpersonal score through the DERS total score was significant (i.e., completely standardized ab coefficient value = .14, 95% CI [.11, .18]), P_M value was .44, 95% CI [.33, .57]. Once again, the direct effect of the RFQ_U scale on LPFS-SR-interpersonal score remained significant ($\beta = .19, p < .001$) indicating partial mediation.

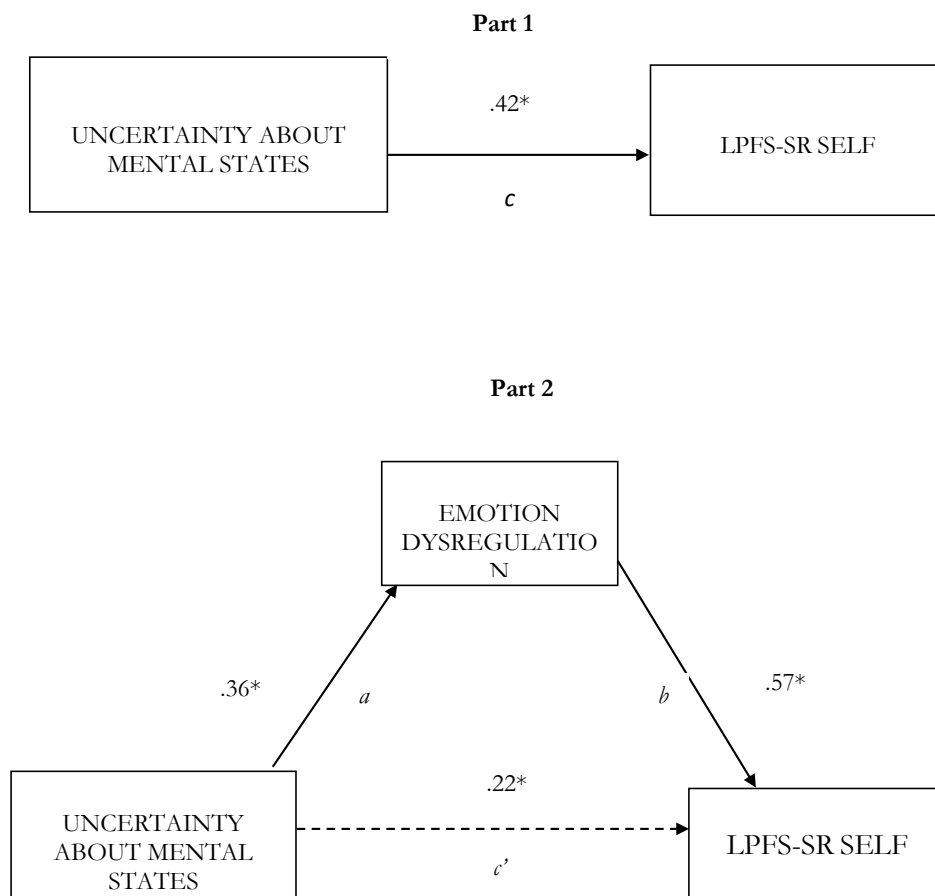


Figure 3. Path diagram showing the total effect (Part 1) of RFQ Uncertainty scale on Self functioning impairment evaluated with the Level of Personality Functioning Scale – Self Report (LPFS–SR) and the mediating effect (Part 2) of emotional dysregulation evaluated with the Difficulties in Emotion Regulation Scale (DERS) controlling for the effect of the age of the participants. For ease of presentation, residues were omitted.

Note. * $p < .001$. LPFS-SR: *Level of Personality Functioning Scale – Self Report*.

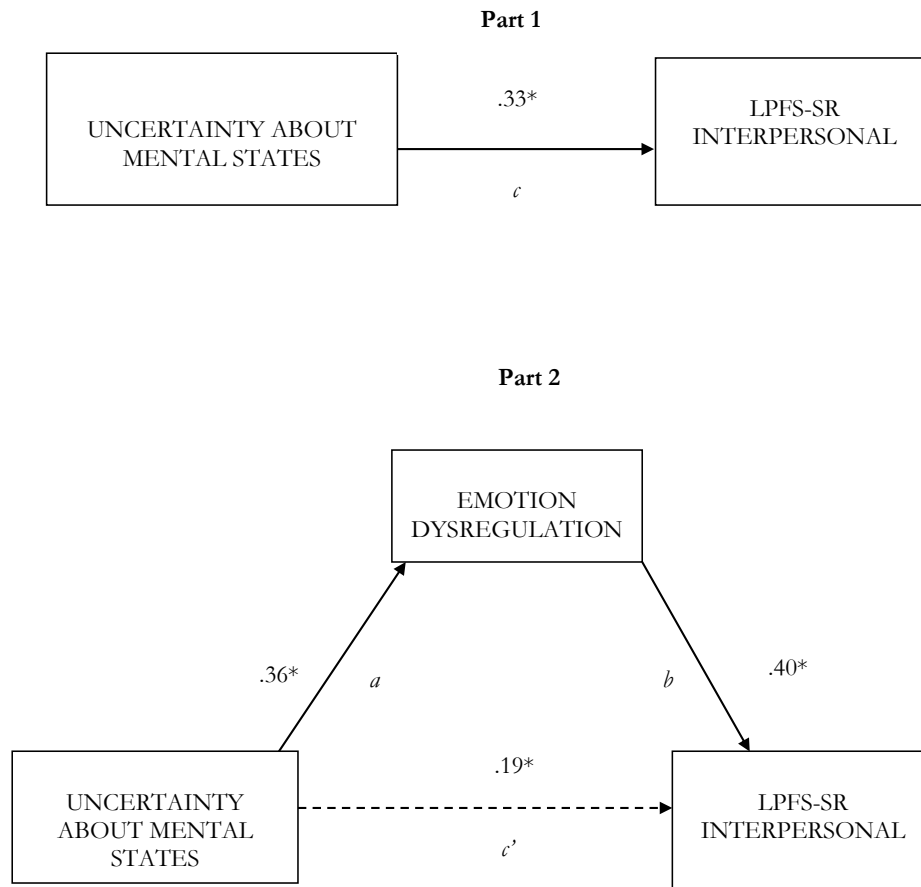


Figure 4. Path diagram showing the total effect (Part 1) of RFQ Uncertainty scale on Interpersonal functioning impairment evaluated with the Level of Personality Functioning Scale – Self Report (LPFS–SR) and the mediating effect (Part 2) of emotional dysregulation evaluated with the Difficulties in Emotion Regulation Scale (DERS) controlling for the effect of the age of the participants. For ease of presentation, residues were omitted.

Note. * $p < .001$. LPFS-SR: *Level of Personality Functioning Scale – Self Report*

4. Discussion

The aim of the present study was to examine the relationships between mentalization, emotion dysregulation and personality dysfunction in a sample of community-dwelling adults. In the whole sample we found that both Self and Interpersonal personality dysfunction are associated with hypomentalizing. Moreover, Self and Interpersonal impairment are linked to emotional dysregulation which in turn partially mediates the relationship between uncertainty about mental states and personality dysfunction. Considering the sub sample, our results suggest that the personality dimension associated with mentalization deficit is the Interpersonal domain. In particular, mentalization impairment is characterized by hypermentalization, hypomentalization and lack of mentalistic abilities.

In our sample, we found that participant's level of personality dysfunction is in line with previous studies carried out in community samples using LPFS-BF (Natoli et al., 2022) and LPFS-SR (Morey, 2017). Moreover, the LPFS-BF and LPFS-SR mean scores found in our sample are lower than the values showed in clinical samples (Weekers et al., 2019; Hemmati et al., 2020).

In the present study, we employed two different measures to assess the ability to mentalize since mentalization is a multidimensional construct with multifaceted nature. In this regard, RFQ is a self-report measure that evaluates mentalizing abilities based on awareness of the nature of mental states in the self and others remaining aware of their opaque nature (i.e., reflective function) whereas MASC is a performance task that addresses the other-focused mentalization dimension. In the present study, in line with Duval et al., (2018) results, we did not find significant associations between the social cognition dimensions assessed with the MASC scales and the uncertainty about mental states assessed with RFQ, suggesting that the two measures capture different dimensions of mentalization. Moreover, recent evidence suggested that mindreading performance tasks showed a negligible latent correlation with mindreading self-reports suggesting that the two methods may capture different constructs (Wendt et al., 2023). Further studies are needed to clarify this issue.

In our sample, we found significant associations between mentalization and personality dysfunction using both a self-report measure and a laboratory task, showing a relevant relationship between personality impairment and different dimensions of mentalization. In addition, we used two self-report questionnaires to evaluate personality dysfunction, namely LPFS-BF and LPF-SR: since they operationalize Criterion A differently and include a more detailed assessment (LPFS-SR), using two different measures may add to the validity of the present findings.

The regression model considering self and interpersonal dysfunction assessed with both LPFS-BF and LPFS-SR as dependent variables and RFQ_U as predictor showed that uncertainty about mental states represents a significant predictor of both self and interpersonal functioning impairment, suggesting that, in our sample, lower mentalistic abilities are associated with impairments in self and interpersonal functioning. In our study the effect size is moderate (from $= .27$ for the associations between RFQ_U and LPFS-BF Self scale to $.45$ for the associations between RFQ_U and LPFS-SR Self scale) and in line with the previous works (see for example Zettl et al., 2020). These data are consistent with previous studies that have suggested a significant relationship between deficits in reflective functioning and personality pathology (see for example Nazzaro et al., 2017; Antonsen et al., 2016). Our findings seem to indicate that failures in mentalizing can leave an individual vulnerable to personality impairment and support

Zettl et al. (2020) work showing that all the dimensions of personality impairment are associated with mentalistic abilities. As a whole, these results highlight the relationship and conceptual overlap between mentalization and DSM-5 Criterion A measures and the relevance of this topic for further research.

When we considered the sub-sample that completed the self-report questionnaires and the MASC task, we found small to moderate associations between MASC and self-reported personality dysfunction. This result is not unexpected since we correlated a self-report questionnaire with a performance task and it is in line with previous data that evaluated the associations between the MASC task and self-report questionnaires (for example, Penner et al., 2020; Fossati et al., 2017). In our study, we found that LPFS-SR self and interpersonal scales are negatively associated with the MASC correct answers, suggesting that personality impairment is linked to mentalization difficulties. Specifically, a higher degree of interpersonal dysfunction (assessed with both LPFS-BF and LPFS-SR) is associated with higher scores on exceeding ToM answers on the MASC task. In line with previous studies (for example Fossati et al., 2017; Sharp et al., 2011) our results suggested that the tendency to over-interpretate mental states far beyond what there is evidence for, (i.e. hypermentalization) is associated with personality pathology. This finding was also consistent with a recent meta-analytic study (McLaren et. al., 2022) which showed that hypermentalization is not a specific mentalistic deficit of borderline personality disorder; in this sense our data suggested that hypermentalization is associated with interpersonal problems that characterize personality disfunction. In our sub-sample, the over-attribution of mental states is not the only type of social-cognitive dysfunction that characterizes interpersonal personality impairments: our results suggested that interpersonal impairment is characterized by all the problematic mentalization modalities assessed through the MASC. Specifically, we found significant associations between LPFS-SR interpersonal scale and lack of mentalization (i.e., MASC no Tom answers) and hypomentalization (i.e., MASC less Tom answers) suggesting that participants who show impairments in interpersonal functioning are prone to explain the behaviour of others making attributions of physical causality instead of considering mental states and are inclined to use insufficient mental state reasoning, thus referring to mental states in an impoverished way. As a whole, our results suggested that mentalizing represents a core component of interpersonal dysfunction since mentalistic deficit make navigating in the social environment hard for individuals. We would like to remark that the partial different results found with LPFS-BF and LPFS-SR may be linked to the differences between the two instruments: the LPFS-BF seems to represent a quick screening tool of general impairment in personality functioning, while the LPFS-SR seems to allow a more specific and detailed evaluation of personality dysfunction (Weekers et al., 2019). Moreover, the sub-sample's

participants showed lower mean scores on LPFS-BF scales than the whole sample; this could lead to attenuate the correlations between LPFS-BF scales and MASC task. In the associations between MASC task and Criterion A measures, we have not corrected the nominal significance level for multiple comparisons, thus increasing the risk of capitalizing on chance. We would like to point out that, in order to achieve a power of .80 (which is usually considered barely acceptable), the sample size with a p value $< .005$ (i.e., Bonferroni-corrected nominal $p < .05$) would have been roughly 1325 participants, a number of participants that can be hardly reached administering a task lasting 45 minutes.

Considering the role of emotion dysregulation, our findings were in line with both theoretical and empirical literature on the complex relations among mentalization ability, emotion dysregulation and personality pathology (Schwarzer et al., 2021; Bateman & Fonagy, 2016). From this point of view, in our sample uncertainty about mental state represents a predictor of emotion dysregulation. Our data seem to suggest that if the capacity to understand and interpret mental states is impaired, emotional regulation might be damaged, leading to inappropriate or dysfunctional behaviours. These data were consistent with Bateman and Fonagy (2016) model of mentalization according to which the capacity to perceive and reflect upon one's own and others mental states constitutes a prerequisite for emotion regulation. Emotion dysregulation seems to be associated to prementalizing modes, especially to psychic equivalence: when thoughts and feelings become too real the individual experiences states of mind that prevent alternative perspectives. In this state of mind emotions are intense and overwhelming (Bateman & Fonagy, 2016). In addition, in the present study DERS total score is associated with both self and interpersonal personality dysfunction assessed with LPFS-BF and LPFS-SR. Our results are in line with previous works that highlighted the role of emotion dysregulation in personality pathology. In particular, we supported and extended in a community sample the data on the relationship between the difficulty to regulate emotions and DSM-5 Criterion A.

Interestingly, our mediation analyses results showed that uncertainty about mental states increases difficulties in emotion regulation, which in turn are associated with self and interpersonal personality dysfunction. In other words, the results suggested that emotion dysregulation accounts for a significant amount of the observed associations between personality impairments and mentalization at least in our sample of community - dwelling adults. Findings of a significant indirect effect of mentalization deficit on personality dysfunction through emotion dysregulation are consistent with and extended in an adult nonclinical sample previous researches (i.e., Vahidi et al., 2021; Euler et al., 2021) suggesting that mentalization deficit might affect personality pathology via its effect on emotion regulation. Moreover, all mediation models showed partial mediation suggesting that the relationship between

mentalization deficit and personality dysfunction is not due entirely to their shared associations with emotion dysregulation. Although the cross-sectional nature of this study prevented conclusions regarding the causal role of mentalization in personality impairment, our findings were consistent with prominent clinical models that emphasize the centrality of mentalization in personality dysfunction (Bateman & Fonagy, 2004, 2016). Specifically, the indirect relationship between hypomentalizing and personality dysfunction seemed to indicate that the role of hypomentalizing on personality impairments might manifest through emotion dysregulation. Furthermore, they were in line with the mentalization model that suggested that both emotion regulation and personality dysfunction are rooted in mentalization deficit (Bateman & Fonagy, 2016). Considering the clinical implications, these data highlighted that increasing mentalizing ability may improve emotion regulation and in turn induce beneficial effects on personality impairment. As a whole, our findings supported the hypothesis that the impairments in personality functioning described in the DSM-5 Alternative Model of Personality Disorders are consistent with a mentalizing perspective.

Our results should be considered in light of several limitations. First, the study has not been pre-registered for organizational factors related to the beginning of the research project. We recruited a convenience sample of community-dwelling adults who volunteered to participate in the study and it cannot be considered a representative sample of the Italian population. Moreover, our findings may not be generalizable to clinical samples. The majority of the sample was composed by females, however moderation analyses, moderation analyses showed that participants' gender did not significantly impact the associations between our research variables. Further studies are needed to clarify the role of gender in more balanced samples. We carried out a cross-sectional study that did not allow us to test any causal models. In the whole sample, we used RFQ to assess mentalization impairment although its construct validity is questioned; thus, our results should be considered with caution. Further investigations are necessary to replicate our finding assessing mentalization with other instruments such as Certainty About Mental States Questionnaire (CAMSQ, Müller et al., 2023), a promising self-report questionnaire that evaluates the ability to infer mental states of the self and others. Also, LPFS-SR scale showed several limitations concerning its factor structure and its ability to distinguish between personality and non-personality-based forms of psychopathology (Sleep et al., 2019). Although the self-report questionnaires used in the study did not show relevant content overlap, the potential influence of shared method variance on our findings needs to be considered. Specifically, it is possible that the use of self-report measures may have spuriously increased inter-correlations between measures. The limited number of participants who completed MASC and the small correlations found between self-reported personality dysfunction and MASC

scales prevented us to carry out mediation analyses considering the MASC task. Moreover, as the MASC was conducted online, in a non-controlled environment, we had no possibility to check whether the participants completed it using audio. Furthermore, when we used MASC, we considered the term social cognition as a synonym of mentalizing although MASC did not cover the self-polarity of mentalization. On the other hand, among available experimental tasks, the MASC task is similar to the demands of everyday-life social cognition (Dziobek et al., 2006) and is considered one of the most accurate procedures to assess mentalizing abilities (Luyten et al., 2012). Indeed, with the exception of the self–other dimension, the MASC is highly sensitive to all functional mentalizing polarities (Luyten et al., 2012). Finally, it should be noted that our findings were observed according to the Bateman & Fonagy (2016) model; our predictions could be explained by alternative theories (Popper, 2014).

Even keeping these limitations in mind, we feel that our findings may prove useful in understanding the relationships between DSM-5 personality impairments and mentalization deficit and in helping clinicians in the assessment and treatment of personality pathology. Moreover, the mediation analyses results may promote the comprehension of the interplay among mentalization, emotion dysregulation and interpersonal dysfunction; indeed, these constructs represent targets of current effective psychotherapies for personality pathology (see Mentalization Based Treatment, Bateman & Fonagy, 2016). Further studies are needed to replicate our finding considering other variables as possible mediator of the relationship between personality dysfunction and mentalization ability. For example, depression could represent a relevant variable that plays a role in personality impairment and mentalization capacity (see for example Murri et al., 2017).

Ethical approval

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 and were approved by San Raffaele Hospital ethical committee (TREATEFFPD, 22/05/2019).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of Interest

The authors declare that the research was conducted in the absence of any potential conflict of interest.

Authors' Contribution

S B: Conceptualization, data collection, analysis and interpretation of data, writing original draft.

G R: Conceptualization and design, analysis and interpretation of data, writing original draft. C

G: acquisition of data, analysis and interpretation of data, writing -original draft. E M: writing -original draft, interpretation of data. A F: revising article critically and supervision.

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