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Beyond diagnosis: Mentalization and mental health from a transdiagnostic point of view in adolescents from non-clinical population

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ABSTRACT

An increasing volume of evidence suggests that mentalization (MZ) can be an important factor in the transition from mental health to mental illness and vice versa. However, most studies are focused on the role of MZ in specific disorders. This study aims to evaluate the relationship between MZ and mental health as a trans-diagnostic process. A sample of 172 adolescents aged 12 to 18 years old (M = 14.6, SD = 1.7; 56.4% of girls) was assessed on measures of MZ, psychopathology and psychological functioning from a multimethod and multi-informant perspective. Contrary to predictions, MZ was not associated with general psychopathology and co-morbidity, even when explored from a broad, trans-diagnostic perspective. However, we observed a robust association linking MZ to functioning and well-being across many dimensions, involving social, role and several psychological indicators of adjustment and mental health. These results suggest that MZ may contribute to mental health beyond symptoms, not so much associated with psychopathology, but rather resilience and well-being.

1. Introduction

Mentalization (MZ) is a higher order cognitive capacity that allows individuals to make sense of what unfolds in one's own mind and the mind of others (Fonagy and Bateman, 2016). Thus, MZ is the capacity to recognize the mental states (feelings, wishes, thoughts) that underpin human behavior. MZ is a multidimensional capacity conceptually close to concepts such as social cognition, theory of mind, insight, or meta-cognition (Choi-Kain and Gunderson, 2008; Freeman, 2016; Kim, 2015). These concepts are often used interchangeably with MZ in the literature.

There are clinical and empirical reasons for hypothesizing that MZ plays a significant role in the transition from mental health to mental illness and vice versa. First, MZ impairment seems to be associated with poorer mental health as a large body of research reports problems of MZ in several psychopathological conditions (Katznelson, 2014). For example, problems of MZ have been associated with psychosis (Chung et al., 2013; Das et al., 2012; Debbané et al., 2016; Matt et al., 2012; Sugranyes et al., 2011), autism spectrum disorders (Baron-Cohen et al., 1985; Chung et al., 2013; Sugranyes et al., 2011), personality disorders (Bateman and Fonagy, 2016), especially borderline personality disorder (BPD) (Badoud et al., 2017; Bateman and Fonagy, 2004, 2008, 2010,

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2015; Fonagy and Luyten, 2009; Luyten, 2017; Sharp and Kalpakci, 2015; Sharp et al., 2011), aggressive, violent, and psychopathic behavior patterns (Bateman and Fonagy, 2008; Dolan and Fullam, 2004; McGauley et al., 2011; Morosan et al., 2017; Tauber et al., 2013), depression (Bora and Berk, 2016), anxiety (Nolte et al., 2011; Plana et al., 2014), the social anxiety spectrum (Hezel and McNally, 2014; O' Toole et al., 2013; Washburn et al., 2016), trauma-related disorders (Allen et al., 2008), addictions (Bateman and Fonagy, 2012; Suchman et al., 2017), eating disorders (Bora and Kose, 2016; Caglar-Nazali et al., 2014), attention problems (Perroud et al., 2017), and attachment-related-problems (Fonagy and Target, 1997; Morken et al., 2013). Indeed, the evidence frames MZ as a trans-diagnostic process of relevance for various manifestations of psychopathology.

Second, it is traditionally accepted in clinical settings that the awareness of illness and the understanding of the problem (i.e., MZ about one's own condition) are active ingredients contributing to attitude, adherence and success (e.g., Cuffel et al., 1996; Grant, 2001; Hann et al., 2017). In fact, MZ is probably the most important common active ingredient of most empirically-validated treatments (Allen et al., 2008; Bateman and Fonagy, 2004, 2015). Once psychological programs are analyzed, it may be suggested that most evidence-based psychological treatments have as a primary or secondary objective to promote insight. This promotion usually aims: 1) to increase acceptance, therapeutic adherence, and motivation for change, or 2) to foster a more accurate explanation of one's own or others' behavior in order to modify schemas, to reduce conflicts, or to improve self-definition and social relationships. The fact that MZ processes are promoted in medical (e.g., Denniston et al., 2012; Holmes et al., 2018; Zarotti et al., 2018) and psychological treatments (Grant, 2001) suggests that this higher order function might be important for healthy mental functioning.

Moreover, Mentalization Based Treatment (MBT) was initially developed for Borderline Personality Disorder (BPD) (Bateman and Fonagy, 2010). However, in light of its potential efficiency (e.g., Bateman and Fonagy, 2008; 2009), it has also been recently adapted for treatment of several mental disorders (Bateman and Fonagy, 2012), and a wider array of clinical settings (Allen and Fonagy, 2007). Overall, this might be indicative of the importance of working in mentalizing abilities to achieve improvement in several disorders.

While studies of MZ and psychopathology have been highly informative, they have typically approached disorders as discrete entities, leaving out high comorbidity between disorders. When disorders systematically covary, it is reasonable to argue that one or more latent dimensions account for this co-occurrence pattern. Coincidently, there has been a recent wave of studies that have sought to uncover the latent structure of psychopathology (e.g. Caspi et al., 2014; Del Guidice, 2015; Patalay et al., 2015; Sharp and Kalpakci, 2015). Specifically, there has been growing interest in the evaluation of general factors that account for common variance shared across diagnoses and unique sources of variance that may represent more specific forms of psychopathology. While MZ has been suggested as a transdiagnostic (Ballespí et al., 2017; Fonagy et al., 2011) and/or an important resilience factor (Ballespí et al., 2014; Fonagy et al., 1994), this question is yet to be empirically evaluated.

Therefore, the global aim of this study is to analyze the relationship between MZ and mental health from a broader perspective. To do this, two lines of analysis will be carried out: one going beyond specific disorders and one going beyond symptoms. First, we aim to analyze if there is a relationship between the level of MZ and the degree of psychopathology from a trans-diagnostic perspective.

In this sense, our first hypothesis predicts that a global measure of MZ will be associated with an index of general psychopathology, and we expect that the higher the MZ, the lower general psychopathology will be. The empirical base of the Achenbach's System of Assessment (Achenbach and Rescorla, 2001a), based on factor analysis, justifies using the scale of Total Problems as an index of general psychopathology. In addition, comorbidity is present in the majority of cases and constitutes an indicator of severity and prognosis (Kessler et al., 2005; Krueger and Markon, 2006). Thus, we will also analyze the relationship between MZ and comorbidity, expecting that the higher the level of MZ, the lower the number of psychopathological conditions that will coexist in a clinical level.

Second, there is a *zeitgeist* in the recent years pointing the importance of psychological functioning beyond the psychopathological domain. The inclusion of functioning (i.e., social, role, or general functioning) in the studies about impairment, prognostic and recovery suggests that functioning emerges as an important additional indicator of mental health, beyond symptoms (e.g., Cardozo et al., 2000; Dickerson, 1997; Laird et al., 2017; Ros and Graziano, 2018; Schorre and Vandvik, 2004). This is consistent to the World Health Organization's vision of Health and Mental Health (WHO, 2016, 2018). In fact, in the specific field of psychiatry, impairment, adjustment and functioning have been transversal diagnostic criteria for all syndromes in APA's Diagnostic Classification of Psychopathology (see, for example, DSM-IV-TR; APA, 2000). So, this apparently emerging idea of psychopathology and functioning as two faces of the same coin is, in fact, already implicit in the definition of mental health and in the diagnosis of mental illness. Moreover, it has already gathered some empirical attention in fields like psychosis (see, for example: Collip et al., 2013 or Oorschot et al., 2012). In light of this, it is innovative to go beyond symptoms. So, we additionally aim to analyze if MZ is associated to the level of social and role functioning, as well as to other indicators associated to mental health such as self-esteem (Mann et al., 2004; Pysczynsci et al., 2004), resilience (Patel and Goodman, 2007), transcendence (e.g., Nygren et al., 2005), or happiness (e.g., Ho et al., 2018).

Thus, our second hypothesis predicts that MZ will be associated to better functioning independently of the level of psychopathology. Therefore, we expect that the higher the global level of MZ capacity, the social and role functioning as well as well-being measures will be higher.

2. Methods

2.1. Participants

The sample consisted of 172 adolescents (56.4% of girls) aged 12 to 18 years old (M = 14.6, SD = 1.7). This sample was recruited through schools in the context of a broader project about psychopathology, personality and coping strategies in the adolescence. The basic inclusion criterion in the current study was to be in eligible age range of the study (12–18). The exclusion criteria were: 1) presence of severe mental illness such as psychosis, autism spectrum disorder, or intellectual disability; 2) parents, teachers or adolescents failing to fill in one or more scales involving study variables. Recruitment was carried out through the schools to simplify logistics. Ten schools of similar characteristics (not rural, similar size, similar families' SES, similar educational orientation and methodologies, geographically close to each other) were invited to participate in the project according to their proximity to the research center, and the possibility to count on a wide eligible sample considering the risk of low rates of participation, since in Catalonia the participation of families in school matters is low (10% to 20%). Five of these schools agreed to collaborate, thus providing an eligible sample of 1735 families, considered enough for keeping at least 161 participants (see power analysis in Statistical analysis section). Approximately 15% of these families signed the informed consent and agreed to participate. The principal reasons from families to refuse to participate were low interest in the project, being too busy, the refusal giving data about family's mental health or, in the case of some immigrant families, the impossibility to understand at least one of the two possible languages of the questionnaires (i.e., Spanish or Catalan). Finally, full data from adolescents, parents and teachers were obtained from 172 of the initial participants (see Fig. 1). Approximately 87% of the participants were Caucasian (White-European), 9% Arabic, 2%

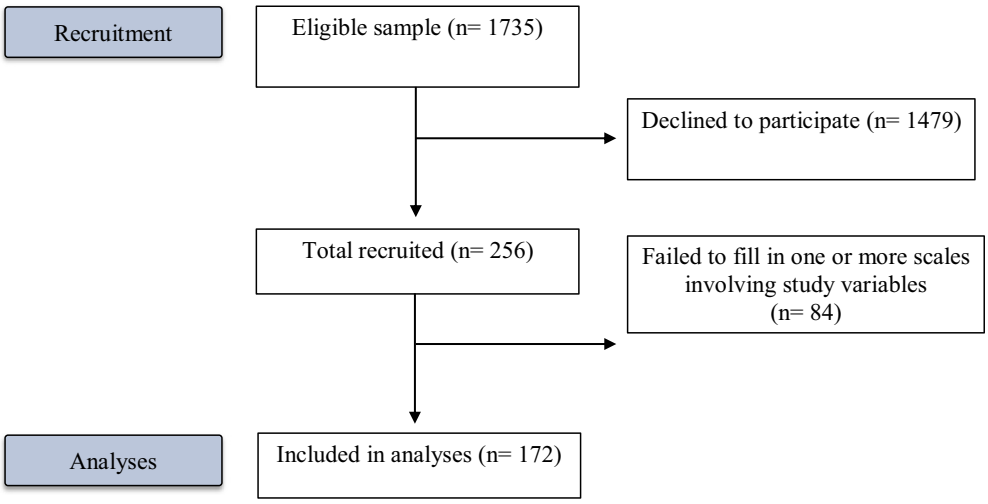

Fig. 1. Sample recruitment flow chart.

Asian and 2% Latino. According to the Hollingshead's index (Hollingshead, 1957), 71% of the adolescents came from families with middle socio-economic level, although there was a bias to medium-high and high socio-economic level (11.9% Low, 13% Medium-Low, 22.3% Medium, 35.8% Medium-High, 17.1% High).

2.2. Measures

2.2.1. Mentalization

In light of the current difficulty to assess MZ with a single valid and reliable measure, a multi-method assessment approach was adopted. Thus, a global measure of MZ was developed combining the information of the 4 instruments described below, through factor analysis. All the scales from these instruments (8 scales in total; see below) were introduced in a principal components analysis. All the factor loadings (i.e., the correlations between the original variables and the principal component aimed to resume them) were ranged from 0.5 to 0.7 with the exception of the MZQ. This scale has been specifically designed to assess problems of awareness and comprehension of one's own mental states in clinical populations. Although the factor loading of MZQ was the lowest (i.e., 0.134) and that its exclusion might lead to higher internal consistency of the General Index of MZ, we considered the information from MZQ very important as it provides the perspective of deficit. Thus, in order to obtain a Global Measure enriched with as much information as possible, MZQ was also included in the analysis. The 30% of the total variability was explained by this single factor, which indicates that it can be scientifically useful as a summary of the information that it contains. Additionally, an internal consistency of 0.51, according to the Cronbach's Alpha index, suggests acceptable reliability for this combination of 8 items (i.e., the 8 subscales combined in this Global Measure: MZQ, the 2 subscales of AMI assessing MZ referred to one's own (self) and to other's mental states (others); the 3 subscales of TMMS referred to dimensions of meta-cognition: attention, comprehension, repair; and the 2 subscales of BRF —self and others). The standardized factor scores in the global dimension obtained were used as a general indicator of MZ capacity.

Mentalization Questionnaire (MZQ). This instrument was designed to assess MZ deficit in clinical population (Hausberg et al., 2012). We used it in a non-clinical population because it was the only instrument with evidence for psychometric properties at the moment we carried out the study (2013). It consists of 15 items scored from 1 (I disagree) to 5 (I agree). We used the total score of MZQ to design the global index of MZ. The Spanish version of this instrument (Ballespí et al., 2015) shows adequate internal consistency (Cronbach's Alpha = 0.79) and adequate test-retest reliability (ICC = 0.65), as well as evidence for good convergent validity. The reliability in the current sample is acceptable (α = 0.77).

Adolescent Mentalizing Interview (AMI). This brief, two-part, semi-structured interview (Ballespí and Pérez-Domingo, 2015a) specifically designed for adolescents consists of 7 items scored from 0 (No MZ) to 4 (Sophisticated MZ). In the first part (3 items), the participant is asked about the mental states of the three characters of a story. In the second part, the adolescent is encouraged to choose 2 Very Close Others (i.e., two people important for them at this moment of his/her life) and different *demand* questions (Fonagy et al., 1998) are made in order to elicit MZ ability. So it provided a measure of MZ referred to others' MS and a measure of MZ referred to one's own MS. Both measures were used here to contribute to the global index of MZ. Evidence supports good to excellent reliability (i.e., internal consistency of α = 0.90, according to Cronbach's index;, good inter-rater reliability, according to Intra-Class Correlation index ranging from 0.79 to 0.88). Evidence for convergent validity support the psychometric properties of this scale as well.

Trait Meta-Mood Scale (TMMS). This is a widely used scale focused on perception, understanding and regulation of one's own mental states (Fernández-Berrocal et al., 2004; Salovey et al., 1995). It consists of 24 items scored from 1 to 5 according to the degree of agreement. In addition to a total score, the TMMS provides 3 dimensions of meta-cognition (attention, comprehension and repair), which were used here to contribute to the global index of MZ. The Spanish version shows good internal consistency (Cronbach's α from 0.86 to 0.90) and adequate test-retest reliability (ICC from 0.60 to 0.83). Excellent internal consistency in the current study (α = 0.90) supports the reliability of this measure.

Brief Reflective Function scale (BRF). It is a very brief self-report (Ballespí and Pérez-Domingo, 2015b) inspired in other brief instruments such as the Relationship Questionnaire of Bartholomew and Horowitz (1991), and consists in 4 items scored from 1 (I totally disagree) to 7 (I totally agree) focused on the assessment of MZ referred to others' mental states. So it offers a complementary self-report measure of the TMMS. Both scores of MZ (referred to self and others) were used here in the global index of MZ. It shows adequate internal consistency (α = 0.71) and test-retest reliability (ICC from 0.47 to 0.62), as well as good convergent validity (Ballespí and Pérez-Domingo, 2015b). The internal consistency in the current study (from α = 0.73 to α = 0.80) also supports the reliability of this measure.

2.2.2. General psychopathology

In order to base our analysis in more solid measures, a multi-informant perspective was adopted for the construction of principal

dependent variables. As a measure of general psychopathology we combined the information that parents and teachers provide through the second-order scales (i.e., *Internalizing, Externalizing, and Total problems scales*) of CBCL and TRF respectively, two instruments of the Achenbach's System of Empirically Based Assessment (ASEBA) (2016) described below. The second-order problems scales (i.e., Internalizing, Externalizing and Global Problems) are those scales empirically derived when correlations among clinical first-order dimensions of CBCL and TRF are factorially analyzed. Thus, a multi-informed measure of *General psycopathology* will be used here as a global index of problems. Additionally, multi-informed measures of *Internalizing and Externalizing problems* will be used as well.

Child Behavior Check-List (CBCL/6–18) (Achenbach and Rescorla, 2001a). This is a well-known dimensional and empirically derived system to classify psychopathology. In this case, CBCL corresponds to the parents' form. Along with the other forms of Achenbach's system (ASEBA, 2016) (e.g., TRF or YSRF for teachers and youngers, respectively), parents' CBCL is integrated into the Assessment Data Manager /ADM), a computerized scoring system. The CBCL has been adapted to 100 languages with good psychometric properties. It consists of 113 items with 3 response options and offers scores on 8 clinical scales, 3 second-order dimensions, 6 DSM-based scales and several indicators of role, social and general functioning. The Spanish adaptation (Achenbach and Rescorla, 2001b) shows excellent internal consistency (Cronbach's Alpha from 0.78 to 0.97) and adequate test-retest reliability (ICC between 0.85 and 0.90), thus suggesting good reliability.

Teacher's Report Form (TRF/6–18). The teachers' version of CBCL provides the same clinical scales, second order dimensions, and DSM-based indexes as parents' form but different functioning indicators, in this case related to academic performance. Internal consistency (Cronbach's Alpha from 0.72 to 0.97) and test-retest correlations (ICC from 0.60 to 0.90) range from moderate to excellent for the different scales and suggest good reliability (Achenbach and Rescorla, 2001a, 2001b; ASEBA, 2016).

Given that parents and teachers usually do not coincide (Achenbach et al., 1987; De Los Reyes and Kazdin, 2005), but they both provide important information from different settings (De Los Reyes et al., 2015), we combined their information through factor analysis. Thus, we introduced the scores in the second order scales of CBCL (parents) and TRF (teachers) in a principal components analysis and we used the standardized factor scores of the one-factor solution as a single but multi-informed index of total (70% of explained variance; weights = 0.84; $\alpha = 0.58$), internalizing (67% of explained variance; weights = 0.80; $\alpha = 0.44$), and externalizing problems (64% of explained variance; weights = 0.82; $\alpha = 0.50$). The psychometric properties of these indexes are considered good enough because they combine information from complementary (i.e., usually discrepant; Ballespí et al., 2012) informants.

2.2.3. Comorbidity

Comorbidity is referred to the number of co-existing clinical conditions and complements the idea of severity provided by the index of general psychopathology. The higher the comorbidity, the higher the complexity of the psychopathological situation is. In the current study, the comorbidity index is also designed from a multi-informant assessment approach. In this case, we used the 8 clinical scales of CBCL/6–18 and TRF/6–18, described above. These scales can be consulted at the ASEBA's website (ASEBA, 2016). For every one of the 8 clinical scales, we considered that an adolescent presented a clinical level of a psychopathological condition when parent's or teacher's scores in that scale exceeded the cut-off of normality according to the Manual of the CBCL, situated in a T-score of 70 or, which is the same, in percentile 97. (T-scores are standard scores that compare the child's standing on a scale with the distribution of scores obtained from a normative sample of children; Achenbach and Rescorla, 2001a; page 78). Thus, the sum of psychopathological domains in a clinical level (i.e., those with scores from parents, teachers or both above the cut-off of normality) constitutes the *Comorbidity index* that was used in the analyses, which ranges from 0 to 8 (i.e., 8 in the case that a person presented all the domains in a clinical level).

2.2.4. Psychological functioning

General multi-informed indexes of psychological functioning were generated with the information from parents and teachers through CBCL and TRF, respectively, according to two domains: social functioning and role functioning. The parents' form of CBCL provides 3 specific indexes of functioning (Activities, Social, school) and an index of total competence that summarizes all of them. The Teachers' Report Form (TRF) provides a scale of academic performance, 4 specific dimensions of adaptive functioning (Working Hard, Behaving, Learning, Happy) and a final index of adaptive functioning based on a sum of the 4 specific ones (see the CBCL and TRF's Manual for more detailed information about these scales; Achenbach and Rescorla, 2001a). We designed 3 general indexes of functioning combining parents' and teachers' information: *General Functioning, Social Functioning and Role Functioning*. In the 3 cases, the information from single scales was integrated in a global index through factor analysis.

The *Role Functioning* index includes parents' reports of level of activity and school performance, as well as teachers' reports of Behavior at the school, Learning, and Working Hard. The *Social Functioning* index includes parents' CBCL scale of Social Competence, as well as measures of Sociometric Status and Secure Attachment Style, both related to social functioning (Ros and Graziano, 2018; Sheinbaum et al., 2015). Finally, the most *General Functioning* index was generated including all functioning information from parents and teachers. This index combined parents' CBCL rates on the CBCL scale of General Competence, and teachers' general scales of Adaptive Functioning and Academic Performance.

Sociometric Index (SI). This is a brief instrument specifically created to assess sociometric status in adolescents (Ballespí, 2013). In the current study, both parents' and teachers' reports on SI are used. It consists on 4 items (Amount of friends, Peer's acceptance, Leadership, and Popularity) scored with Likert-type scales of 9 points, the sum of which provides a scale of sociometric status ranged from 4 to 36. There is evidence for convergent validity according to moderate correlations (ranged from 0.2 to 0.5) with related constructs. The internal consistency is good to excellent for parents' ($\alpha = 0.87$) and teachers' ($\alpha = 0.90$) forms. To create our multi-informant measurement, we combined the information of parents and teachers through principal component analysis, using the standardized factor scores of the first component as a multi-informant sociometric measure. This factor explained 55% of total variability and all factor loadings ranged from 0.6 to 0.9. Internal consistency was ($\alpha = 0.87$).

Relationship Questionnaire (RQ). This is one of the most extensively used self-reports to assess the attachment framework of Bartholomew and colleagues (Bartholomew and Horowitz, 1991; Griffin and Bartholomew, 1994), and it consists of four items, each one with a short description referred to a prototypical attachment pattern (secure, dismissing, preoccupied, fearful) as it applies in close relationships. Participants score each description on a 7-point Likert-type scale according to the degree of agreement with every statement. Given that each item assesses a different attachment style, they are not expected to be intercorrelated, so Cronbach's Alpha index is not calculated here. Additionally, only one item will be use here: that providing a scale of secure attachment style. Considering that secure attachment style contributes to healthy social relationships (because of the higher quality of maintained relationships, Pietromonaco and Collins, 2017) and indirectly it also contributes to better social support (Finkel et al., 2017), it is considered valuable information for the index of social functioning. That's why the subscale of the RQ referred to "secure attachment style" was used here, in combination to the remaining information, to design the global indicator of social functioning.

2.2.5. Other indicators of mental health

The broad conceptualization of mental health used in this paper is consistent to the definitions of 'health' and 'mental health' of the World Health Organization (WHO, 2016, 2018, respectively), both including to well-being as an aspect of mental health (see also Ho et al., 2018). As a final step beyond symptoms, we also included measures of concepts that are usually low in absence of mental health, such as self-esteem (Keane and Loades, 2017; Pysczynsci et al., 2004), resilience (e.g., Davydov et al., 2010; Rutten et al., 2013) or transcendence (Nygren et al., 2005)

Happiness. TRF's (Achenbach and Rescorla, 2001a, 2001b; ASEBA, 2016, described above) scales of functioning include a scale of happiness. Although it consists only of one item ('*How happy is he/she*?') rated in a 7-points scale (from *1-Much less* to *7-Much more*), it was considered interesting to be included here as indicator of well-being.

Self-Esteem. It was assessed with the widely used *Rosenberg's Self-Esteem Scale* (RSES) (Rosenberg, 1965), consisting of 10 items rated with 5-point scales according to the degree of agreement with each statement. All adaptations show good to excellent internal consistency (Cronbach's Alpha from 0.84 to 0.95), and the Spanish adaptation additionally shows adequate test-retest reliability (ICC = 0.72). The internal consistency in the current sample is excellent (α = 0.90).

Resilience. A measure of trait-resiliency was developed combining the information from the 10-items version of *Connor-Davidson Resilience Scale* (CD-RISC10) (Connor and Davidson, 2003), focused on the ability to cope life events and overcome adversity, and the Ego-Resiliency Scale Revised (ER89-R) (Block and Kremen, 1996), and referred to a personality tendency to good adjustment, appropriate self-regulation, and high attainments at different stages of life. The CD-RISC10 is rated from 0 to 4 according to the frequency of each behavior with excellent psychometric properties in all adaptations and shows good internal consistency in the present sample (α = 0.89). The ER89-R consists on 10 items scored from 1 to 7 according to the degree of agreement; it shows excellent psychometric properties in several cultures. The internal consistency in the present sample is considered adequate (α = 0.70).

Transcendence Index. This is an indicator based on the dimensions of Spirituality, Community and Conformity of the Aspiration Index of Kasser and Ryan (1993, 2001; Grozet et al., 2005) consisting of 12 items rated from 1 to 9 based on their importance and likelihood in the life of the participant. The internal consistency ranges from α = 0.72 to α = 0.89 in the original version, and it is considered good in the present sample (α = 0.79 for the importance ratings and α = 0.80 for the likelihood ratings). The score here used considers both the importance and likelihood of every statement.

2.3. Procedure

The study meets ethical standards according to Declaration of Helsinki and the revision of the Ethics Committee of the Universitat Autònoma de Barcelona (CEEAH) (Spain). (Núm. CEEAH: 2603). All families provided written informed consent for the different parts of the broad project called "Personality, psychopathology and coping strategies in adolescence". In the case of the current study, families were informed about objectives, relevance, and implications through a letter widespread by the school and were also invited to a meeting to solve any doubts regarding the study. After obtaining the informed consent, data were recruited in the schools to simplify logistics. The participants (adolescents, parents, and teachers) received the questionnaires in closed envelops with their identity encrypted with alphanumeric codes and were given a deadline to return them. Missing values and out-of-range values were detected in order to contact the families to rectify them. Simultaneously, an appointment with every adolescent was made at the school in order to complete the Adolescent Mentalizing Interview and other experimental procedures not related with this particular project. These meetings took part in private rooms at each school. Teachers were asked to rate different questionnaires for every one of their students that agreed to participate. The data recruitment took approximately five weeks in every school and lasted from January to June of 2013.

2.4. Statistical analysis

Lineal regressions were performed to test the relationship between MZ and different measures of psychopathology, psychological functioning, and well-being. All regression models included sex, age, and SES as potential confounding variables given that: (1) Sex is a variable closely related both to psychopathology (Zahn-Waxler et al., 2008) and mentalization (Cheng et al., 2009; Schulle-Ruther et al., 2008); i.e., girls are expected to show better MZ capacities, especially in adolescence because they mature before than boys); (2) mentalization is a Higher Order Cognition that becomes more complex with age (Frith and Frith, 2003; Klindt et al., 2017); i.e., older adolescents (participants are aged 12 to 18 years old) are expected to show better MZ capacities than younger ones. (3) SES is a well-known contributor to (i.e., a general risk factor for) psychopathology (Boe et al., 2014; Costello et al., 2003; Lund et al., 2011; Wadsworth and Achenbach, 2005), and it is also related with MZ (Schibli et al., 2017; Vera-Estay et al., 2016), so it must also be controlled here.

We conducted power analyses using Stata V. 15.1 (Statacorp, 2017). With α = 0.05, power (1-β) = 0.8, two explanatory variables, three control variables, the sample needed to detect a minimum change of 0.05 in R2 was 161. All of the analyses were performed sample size of 172.

Regression backward model selection was conducted, using IBM SPSS Statistics v20.0 package (IBM Corp, 2011) to fit each model. The results of the association between MZ and each psychopathology, psychological functioning and well-being measure are presented as linear regression coefficients (B) for quantitative responses, reporting 95% confidence intervals (95% CI), and P-values (P).

3. Results

Regression analyses were performed to predict psychopathology from MZ. As Table 1 shows, MZ is not associated to general psychopathology neither to comorbidity in the complete adjusted model (i.e., controlling for sex, age and SES).

By contrast, when we move into the functioning measures (Table 2), results from linear regression adjusted for age, sex and SES showed a significant relationship between MZ and all indexes of psychological functioning. Thus, although the adjusted effect of MZ does not predict general psychopathology nor comorbidity, in the case of the functioning, the adjusted effect of MZ does predict general, social, and role functioning according to the global indexes presented in Table 2.

In a more detailed analysis of the relationship between MZ and every measure that integrate the general indexes presented in Table 2, linear regression reveal that the higher the MZ capacity, the higher the general competence (B = 0.79, 95% CI: 0.18 to 1.40, p = 0.01), the better the adaptive functioning (B = 1.08, 95% CI: 0.41 to 1.74, p = 0.001) and sociometric status (B = 2.40, 95% CI: 0.91 to 3.89, p = 0.002), and the higher is tendency to secure attachment style

Table 1
MZ and psychopathology.

Dependent variable	*B* (95% CI)	*P*
General Psychopathology	−1.12 (−2.49–0.24)	0.11
Internalizing problems	−0.87 (−2.13–0.40)	0.18
Externalizing problems	−0.67 (−2.09–0.75)	0.35
Comorbidity Index	−0.12 (−0.27–0.03)	0.11

N = 172. Linear regression coefficients (*B*) adjusted for sex, age and SES (Hollingshead), 95% mean confidence intervals (95% CI), and *p* values (*P*).

Table 2
MZ and psychological functioning.

Dependent variable	*B* (95% CI)	*P*
General Functioning	0.29 (0.15–0.42)	< 0.0005
Social Functioning	0.24 (0.10–0.38)	0.001
Role Functioning	0.28 (0.15–0.41)	< 0.0005

N = 172. Linear regression coefficients (*B*) adjusted for sex, age and SES (Hollingshead), 95% mean confidence intervals (95% CI), and *p* values (*P*).

Table 3
MZ and well-being.

Dependent variable	*B* (95% CI)	*P*
Happiness	0.22 (0.05–0.40)	0.013
Self-esteem	1.86 (1.24–2.47)	< 0.0005
Resiliency	4.82 (3.67–5.98)	< 0.0005
Transcendence	3.03 (1.17–4.89)	0.001

N = 172. Linear regression coefficients (*B*) adjusted for sex, age and SES (Hollingshead), 95% mean confidence intervals (95% CI), and *p* values (*P*)

($B = 0.45$, 95% CI: 0.23 to 0.66, $p < 0.0005$). Findings suggest also a nearly significant higher level of activity ($B = 0.37$, 95% CI: 0.08 to 0.74, $p = 0.05$) and higher social competence ($B = 0.27$, 95% CI: −0.04 to 0.58, $p = 0.09$). Moreover, the higher the MZ, the better the school performance, predicted by increase in hard work ($B = 0.28$ 95% CI: 0.06 to 0.50, $p = 0.012$), progress in behaving ($B = 0.21$, 95% CI: 0.02 to 0.40, $p = 0.03$) and in learning ($B = 0.36$, 95% CI: 0.16 to 0.56, $p < 0.0005$), according to teacher's reports.

Finally, also the indicators of well-being, selected as additional measures of mental health, show a significant and positive relationship with MZ, as it is shown in Table 3.

4. Discussion

The aim of this study was to extend the existing evidence about the importance of MZ for mental health by analyzing this relationship from a broader trans-diagnostic perspective. Two analyses were carried out in order to go beyond specific diagnoses, thus studying the association between MZ and level of general psychopathology and comorbidity, and in order to go beyond symptoms, analyzing the relationship between MZ and psychological functioning.

Interestingly, the results did not support the expected association between MZ and general psychopathology. A higher level of MZ does not predict a lower level of psychopathology or comorbidity. Thus, against predictions, regarding general psychopathology measures, MZ does not seem to explain the level of mental health. Although further studies are needed to confirm this result, which has been obtained without adolescents' self-reports of psychopathology (i.e., this information is rated here by parents and teachers), the absence of a relationship between MZ capacity and level of general psychopathology is surprising because preceding results support the association between MZ and several specific disorders (Baron-Cohen et al., 1985; Bateman and Fonagy, 2008, 2016; Bora and Berk, 2016; Bora and Kose, 2016; Caglar-Nazali et al., 2014; Chung et al., 2013; Das et al., 2012; Debbané et al., 2016; Dolan and Fullam, 2004; Fonagy and Bateman, 2008; Fonagy and Luyten, 2009; Fonagy and Target, 1997; Hezel and McNally, 2014; Maat et al., 2012; McGaulet et al., 2011; Morken et al., 2013; Nolte et al., 2011; O' Toole et al., 2013; Plana et al., 2014; Sharp and Kalpakci, 2015; Sharp et al., 2011; Suchman et al., 2017; Sugranyes et al., 2011; Taubner et al., 2013; Washburn et al., 2016). So it was reasonable to expect that MZ might "contribute" to mental health reducing unspecific/general symptoms, even in a non-clinical sample.

However, when we go beyond symptoms and we analyze functioning measures, in contrast to psychopathological measures, results support that MZ explains psychological functioning, and this association between MZ and psychological functioning remains highly consistent along all general and specific measures of global, social, and role functioning. This unexpected contrast between psychopathological and functioning measures is probably more interesting than the expected results, because it suggests that MZ does not prevent from suffering and presenting psychopathology, but it may be a key factor for the adjustment, psychological functioning, and even well-being, at least in non-clinical population.

Thus, maybe the response to our original question of whether MZ contributes to mental health is not the global, clear and uniform answer we expected in our hypotheses (i.e.: the higher the MZ capacity, the lower the level of general psychopathology and the better the global psychological functioning). The findings of this pilot study suggest that having a good MZ capacity does not prevent from presenting symptoms. This can be understandable in light that, also in case of great MZ capacities, other important factors such as genetics and life events play an uncontrollable role on risk for psychopathology given that all of us are unavoidably exposed to their effect. However, results also suggest that, although MZ does not prevent from suffering, maybe its contribution to mental health consists on providing of tools to better deal with suffering — to better metabolize or manage emotional suffering— thus optimizing psychological functioning independently of psychopathology.

An additional question emerges in light of this possibility: whether MZ moderates the impact of psychopathology on psychological functioning. If MZ does not prevent from suffering but it helps to better deal with it, it could be expected that the higher the MZ capacity, the lower the functioning impairment should be in presence of psychopathology. Additional analyses (not presented here) with the most general measures of this study were carried out in light of this emerging possibility. These preliminary results did not support this hypothesis. Thus, both MZ and general psychopathology contribute to general functioning, but the interaction between MZ and psychopathology was not significant, thus indicating that MZ does not modify the effect of psychopathology on functioning.

It is possible that the cross-sectional design of this study impedes the deep analysis of this moderation, because we only know the state of MZ once symptoms are already present. Psychopathology is usually associated to the impairment of psychological functions such as attention, motivation, or thought. Thus, it can also be expected that MZ becomes impaired as a consequence of psychopathology, although we still do not know if MZ impairment is a cause or a consequence (or both) of psychopathology. If MZ becomes impaired as a consequence of psychopathology, then it could not be moderating but mediating the relationship between psychopathology and functioning. So, to investigate if MZ mediates or moderates the relationship between psychopathology and functioning, it is necessary to know the level of MZ before suffering symptoms.

Future studies should improve the design in order to analyze whether the level of MZ, before presenting symptoms, moderates the relationship between psychopathology and functioning, and whether the MZ impairment associated to psychopathology (Baron-Cohen et al., 1985; Bateman and Fonagy, 2008, 2016; Bora and Berk, 2016; Bora and Kose, 2016; Caglar-Nazali et al., 2014; Chung et al., 2013; Das et al., 2012; Debbané et al., 2016; Dolan and Fullam, 2004; Fonagy and Bateman, 2008; Fonagy and Luyten, 2009; Fonagy and Target, 1997; Hezel and McNally, 2014; Maat et al., 2012; McGaulet et al., 2011; Morken et al., 2013; Nolte et al., 2011; O' Toole et al., 2013; Plana et al., 2014; Sharp and Kalpakci, 2015; Sharp et al., 2011; Suchman et al., 2017; Sugranyes et al., 2011; Taubner et al., 2013; Washburn et al., 2016) mediates the relationship between psychopathology and impairment.

In light of the current results, this study stresses the importance of dissociating the impact of MZ on psychopathology versus functioning and mental health. We did not observe an association between MZ and psychopathology, even when explored from a broad, trans-diagnostic perspective. However, we did observe a robust association between MZ, functioning and well-being across many dimensions, involving social,

role, and several psychological indicators of adjustment and mental health.

Thus, these findings seem to reinforce the current *zeitgeist* in terms of the importance of examining what factors are relevant to the development and maintenance of clinical disorders and what factors are important for an adaptive functioning and promote mental wellbeing. Simply put, the absence of psychopathology is not equal to mental wellbeing, and the presence of psychopathology does not lead to proportional maladjustment and impairment, and probably the factors involved differ to a certain extent.

What the results of this study suggest —that MZ does not prevent from suffering but it may be a key factor to deal with (i.e., to hold, to understand and to metabolize) this suffering, thus leading to better adjustment and psychological functioning—has two important implications. First, it implies that when MBT or whatever other treatment that includes MZ as an active ingredient does not allow helping patients with their symptoms, this does not mean that this treatment is not efficient. Maybe it is not from symptoms point of view, but it can be critical to improve the adjustment and functioning of the affected person in the key areas of life, independently of the impact of the treatment on psychopathology. Second, if the improvement of MZ capacity can be important beyond symptoms, then MZ is not important only for clinically affected people, but it can be important for everybody's mental health, as the current results obtained with a non-clinical sample suggest. This would imply that MZ might confer resiliency, that is, it might confer protection or resistance in the presence of risk for losing mental health, as well as mental skills to deal with suffering and fostering recovering. This is a hypothesis should be tested in future studies.

This study has three important limitations. Firstly, the cross-sectional design impedes to establish cause-effect relationships further than simple hypotheses. As an example, the relationship between MZ and impairment can be interpreted in both directions, because as well as MZ can contribute to prevent psychopathology (our first hypothesis), psychopathology seems to impact on MZ. We have the conviction that both relationships are possible, but it is necessary a longitudinal study and a developmental perspective to check this interesting relationship. Secondly, the global measures used need to be improved in future. Knowing the well-established discrepancy among informants of developmental psychopathology (De Los Reyes and Kazdin, 2005) and the importance of multi-informant measurements (De Los Reyes et al., 2015), the lack of the information from the adolescents is an important shortcoming. Therefore, we do not know if we would still find a lack of association between MZ and general psychopathology if we included adolescent self-reports. Additionally, the global measure of MZ is probably a good attempt to apprehend this capacity, but it reflected moderate-low reliability, possibly due to a combination of complementary capacities. Finally, although potential confusion variables such as sex, age, and socio-economical level were controlled in all the analysis, the characteristics of the sample (i.e., it is relatively small, self-selected, and non-representative of general population) calls for caution in considering current findings and makes necessary, as always, replication of these preliminary results. Since this study is the first to check this hypothesis (i.e., the value of insight for mental health using a transdiagnostic point of view), it should be considered a pilot providing a new question more than providing a definitive answer.

Future studies might benefit of improvement in the generation of latent variables. For instance, a global measure of MZ including additional measures such as Reading the Mind tests (e.g., Baron-Cohen et al., 2001; see other tests in the Autism Research Center, 2018), deeper MZ interviews (like the Reflective Functioning Interview; Fonagy et al., 1998), or experimental procedures such as the MASC (i.e., the Movie for the Assessment of Social Cognition, Dziobek et al., 2006) might enrich this variable. Additionally, the multidimensional structure of MZ should be empirically tested. Regarding psychopathology measurements, it is important that any future replication of this study does not lack of self-reports with this information. This might help to see if consistent results are obtained (i.e., if a lack of association between MZ and general psychopathology is maintained). Additionally, it might be interesting to analyze whether different dimensions of MZ (for instance, MZ referred to ones' own mental states (insight) versus MZ referred to others or social cognition) contribute to various aspects of functioning and well-being. Finally, the idea of MZ as a moderator of the relationship between psychopathology (or suffering) and functioning is also worthy of further research as it might contribute to evidence whether MZ is a factor of emotional metabolism.

This study also has two important strengths. First, the independent variable (MZ) has been designed from a multi-method assessment perspective, and the most important dependent variables have been derived from multi-informant assessment, so the analysis are based on measures that combine multiple sources of information. Second, to our knowledge, this is the first study analyzing the relationship between MZ and psychopathology from a trans-diagnostic point of view and going beyond symptoms in support of a broader conceptualization of mental health.

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