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## Theory of Mind and Suicide: A Meta-Analysis

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### Abstract

**Objective:** Disturbances in interpersonal functioning are prevalent in individuals with suicidality. Foundational for interpersonal functioning is theory of mind (ToM), a social-cognitive ability that allows individuals to understand the thoughts and feelings of others. Recent work has begun to investigate ToM performance in individuals with suicidality, though no review has quantitatively aggregated findings from these varied studies. The current study investigated the relations between ToM and suicidality with meta-analysis.

**Method:** We identified and meta-analyzed 15 studies which presented data for 2,895 participants (617 of whom had reported at least one suicide attempt).

**Results:** Results indicated a significant, negative relation between ToM and suicidality with a medium overall effect size ( $g = -.475$ ). Moderator analyses revealed that this effect was consistent across age, sex, ToM content, and suicidal outcome.

**Conclusion:** Deficits in ToM associated with suicidality hold promise for risk-identification, treatment, and prevention work.

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Suicide is one of the leading causes of death worldwide, with estimates indicating that approximately 800,000 people die annually due to suicide (World Health Organization, 2017). Suicidal spectrum behaviors include ideation, plans, and attempts (Auerbach et al., 2017; Septier et al., 2019), and in this review, we refer to these collectively as “suicidality,” unless otherwise specified. Despite some hopeful advancements in prediction and prevention (e.g., Barak-Corren et al., 2017; Mou et al., 2020; Nock et al., 2018), suicidality remains a public health issue of grave importance and an area in need of further study (Allen et al., 2019; Bachmann, 2018; Bredemeier & Miller, 2015).

### Social Cognition and Suicide

We speculate that interpersonal difficulties observed in individuals with suicidality might be associated with social-cognitive deficits. Across clinical disorders, individuals with suicidal ideation and suicide attempts exhibit disturbances in social functioning from adolescence through adulthood. In teenagers, suicidality has been linked with increased social difficulties (King & Merchant, 2008) and greater interpersonal rejection (Prinstein et

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al., 2000). In young adults, suicidal ideation is associated with lack of social support and lack of social connectedness (Hollingsworth et al., 2018), and in adults, those with suicidal behavior report greater difficulty with social problem-solving (Gibbs et al., 2009; Pollock & Williams, 1998). Specific impairments in social cognition may be relevant to these observed interpersonal disturbances in those with suicidality.

Social cognition refers to the broad mental, affective, and social processes critical for effective interpersonal engagement (Mitchell, 2006). Together, these processes promote affiliation, social communication, understanding mental states of self, and understanding mental states of others (Insel et al., 2010). Within these general social-cognitive skills, we focus specifically on the ability to understand the thoughts and feelings of others, or theory of mind (ToM). ToM represents the ability to ‘put oneself in another’s shoes’ (Flavell et al., 1968). This social-cognitive ability often is separated into two constituent parts: *cognitive ToM*, which refers to understanding the thoughts of others, and *affective ToM*, which refers to understanding the feelings of others (Brothers & Ring, 1992; Shamay-Tsoory & Aharon-Peretz, 2007). ToM skills develop throughout infancy (Onishi & Baillargeon, 2005), childhood (Pons et al., 2004; Sullivan & Winner, 1993), adolescence (Sebastian et al., 2012), and young adulthood (Shamay-Tsoory et al., 2010), and these skills are critical for social functioning across the lifespan (e.g., Fonagy, 2006).

ToM is foundational to effective interpersonal interactions (e.g., Barbato et al., 2015; Happe & Conway, 2016) as understanding the thoughts and feelings of others can foster closeness and attunement in social relationships, whereas misunderstanding such thoughts and feelings can instigate confusion and rifts in social relationships (e.g., Lecce et al., 2017). Indeed, effective ToM skills are positively associated with engagement in prosocial behavior in childhood (Imuta et al., 2016), with self-understanding and peer-rated social understanding in adolescence (Bosacki, 2000; Bosacki & Wilde Astington, 1999), and with effective social communication in adulthood (Krych-Appelbaum et al., 2007).

Taken together, we propose that ToM may be associated with suicidality. In particular, given documented interpersonal disturbances in individuals with suicidality, as well as ToM’s role in interpersonal functioning, we suggest that deficits in ToM may represent a social-cognitive vulnerability for, correlate of, or byproduct of suicidality. Below we offer theoretical frameworks with which we conceptualize the potential association between ToM and suicidality.

## ToM and Theories of Suicide

Careful review of prevailing theoretical explanations of suicide reveals the potential role of ToM in suicidality. We specifically focus on three of the most well-documented theories in the suicide literature: the Interpersonal Theory of Suicide (IPT) (Joiner, 2007; Van Orden et al., 2010), the Integrated Motivational-Volitional (IMV) Model (O’Connor, 2011), and the Three-Step Theory (3ST) (Klonsky & May, 2015). Below we explain how ToM might be related to each of these theories of suicide.

First, the IPT posits that the simultaneous occurrence of three constructs, thwarted belonging, perceived burdensomeness, and capability for suicide, may motivate suicide in an individual. Of these three constructs, two are primarily social in nature: thwarted belonging and perceived burdensomeness. According to the IPT, these two social constructs are also most relevant to desire for suicide (Van Orden et al., 2010). Ineffective ToM might relate specifically to these two social constructs of the IPT. First, thwarted belonging, or unwanted feelings of aloneness or isolation, may arise from social difficulties associated with poor ToM abilities. For example, deficits in ToM may lead to unsuccessful interpersonal interactions, which, in turn, may lead to increased feelings of loneliness. Similarly, unsuccessful interpersonal interactions may lead to deficits in ToM, which may contribute to feelings of loneliness. Indeed, in studies of young adolescents, lower ToM ability is inversely related to loneliness and peer rejection (e.g., Devine & Hughes, 2013), and in studies of adults, difficulty understanding the mental states of others is associated with decreased social interactions (Bailey et al., 2008). Therefore, ToM-related social difficulties may be associated with an individual's experience of thwarted belonging, an empirically supported risk factor for suicidal desire. We note also that a third variable may be driving associations between ToM and thwarted belonging.

Additionally, a specific type of ToM error, over-mentalizing, might be highly relevant to the interpersonal construct of perceived burdensomeness. Identifying the self as a burden to others inherently requires the use of ToM skills. For example, Person A must take the perspective of Person B in order to determine that Person B espouses negative thoughts and feelings about Person A. As such, Person A's belief of perceived burdensomeness may be inaccurate and due to an error in understanding Person B's thoughts and feelings. In other words, Person A may have inferred overly intense and negative thoughts and feelings to the mental state of Person B. This type of ToM error is called over-mentalizing, and has been observed in individuals with schizophrenia (Montag et al., 2011), BPD (e.g., Andreou et al., 2015), and social anxiety disorder (e.g., Hezel & McNally, 2014). Perhaps, then, individuals with this specific ToM deficit are more likely to perceive themselves as burdensome. Conversely, those who perceive themselves as burdensome might be more likely to display this ToM deficit. Still, perhaps another variable explains the association between ToM and perceived burdensomeness. Regardless, we suggest that over-mentalizing might be associated with this particular interpersonal risk factor for suicidal desire – the inaccurate perception of burdensomeness.

Second, we suggest ToM is also relevant to aspects of the IMV model, which provides a tripartite theoretical framework for the emergence of suicidal ideation and behavior, as well as the transition from ideation to attempt (O'Connor, 2011; O'Connor & Kirtley, 2018). Pre-motivational (e.g., diathesis-stress of background factors and triggering events), motivational (e.g., in which ideation and intention emerge), and volitional (e.g., in which ideation/intention transition to enactment) phases comprise this framework. Of particular relevance to ToM, we suggest, is a central part of the motivational phase: signals of defeat and humiliation, which alongside feelings of entrapment, lead to the emergence of suicidal ideation (e.g., O'Connor & Kirtley, 2018). Specifically, we suggest that deficits in ToM, particularly excessive and unrealistic beliefs about what others expect of us, may increase an individual's sensitivity to such signals of defeat and humiliation. For

example, research indicates that individuals who *think* that others hold excessively high expectations about their behavior may be at increased risk for self-harm, particularly in the face of acute life stressors (O'Connor et al., 2010). In other words, we suggest that difficulties with appropriately understanding others' beliefs (i.e., deficits in ToM) about their behavior might mechanistically serve as a vulnerability or sensitivity to signals of defeat and humiliation, which is critical to the emergence of suicidality. Additionally, the IVM model suggests that poor social problem-solving, a threat-to-self moderator of the motivational stage, may exacerbate feelings of defeat and entrapment (e.g., O'Connor & Kirtley, 2018). As poor social problem solving and ToM are related (Saint-Jean et al., 2019), it is possible that deficits in ToM might interact with feelings of defeat and entrapment during the motivational phase of the IVM model, indicating again ToM's relevance within this theoretical framework.

Third, we suggest that ToM is integral to aspects of the 3ST. The 3ST emphasizes that, on the background of hopelessness, when pain outweighs an individual's feelings of connectedness, suicidal ideation emerges; it follows that when an individual has capability for suicide, attempts then emerge (Klonsky & May, 2015). Thus, the 3ST highlights how connectedness can be a protective factor against the transition to suicidality. Connectedness, per Klonsky and May (2015), is similar to the IPT social constructs of thwarted belonging and perceived burdensomeness (Joiner, 2007; Van Orden et al., 2010). (Though, Klonsky and May (2015) note that their conceptualization of connectedness is particularly emphasized in the specific context of high risk for strong ideation due to pain and hopelessness.) As such, we suggest ToM is relevant to connectedness in the same ways that we suggest ToM is relevant to thwarted belonging and perceived burdensomeness. That is, misunderstanding the thoughts and feelings of others would negatively affect a person's sense of connectedness to those around them.

## Current Study

The current study aims to examine quantitatively the association between ToM and suicidality using meta-analysis. Several recent studies have investigated the association between ToM and suicidality in specific populations (e.g., Canal-Rivero et al., 2017; Goueli et al., 2019), though, findings suggest varied associations between ToM performance and suicidality. For example, one study indicated no significant association between ToM and suicidality (Ekinci & Ekinci, 2016), whereas another study found a large significant negative association (Szanto et al., 2012), such that ToM impairment was associated with increased suicidality. Still, other studies of social cognition, more broadly (e.g., emotion identification and recognition), have reported positive associations between suicidality and social cognition, such that better social cognition was associated with more suicidality (e.g., Brick et al., 2019). These prior studies, however, may have been underpowered to detect true effects. Meta-analyzing studies can account for diversity of findings that might exist and can synthesize the specific relations between ToM and suicidality. An additional aim of the current meta-analysis is to explore continuous and categorical variables that might moderate the relations between ToM and suicidality. Specifically, we investigated moderators of age, sex, ToM content (i.e., cognitive ToM versus affective ToM), and suicidal outcome (i.e., measures of suicidal ideation versus exclusively suicide attempts).

## Methods

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for this meta-analysis (Moher et al., 2009, see Figure 1), and we conducted a review of the literature using the Google Scholar, PubMed, and PsycINFO databases to identify relevant studies (January 1970 to April 2021) applying the following search parameters: (“theory of mind” OR mentalizing OR “social cognition” OR “perspective taking”) AND (suicid\* OR attempt\*). We limited our search to results published between January 1970 and April 2021 in English. Studies were eligible if they included a measure of ToM, in addition to a measure of some aspect of suicidality, and if they presented adequate data in English to calculate the selected effect size (i.e., Hedges’ *g*). If data provided in published studies were insufficient for effect size calculation, we contacted authors via email.

This search strategy yielded a total of 522 articles, excluding duplicate reports. We identified additional studies (*n*= 77) via various search engines (e.g., Google Scholar) and reference lists of published reports. Two coders (SS, BN) independently reviewed the abstract of each search result to determine eligibility. Coders examined full texts of articles when eligibility could not be deduced by the title and abstract alone. The literature search yielded 15 studies meeting inclusion criteria for meta-analytic review. These 15 studies presented data for 2,895 participants (617 of who had reported at least one suicide attempt). We note that three studies did not report the specific number of participants who had made attempts, so it is possible that more than 617 participants made prior attempts.

### Measures of ToM

Eligible studies used various measures of ToM. We determined measures and items from measures to be eligible if they assessed, through task or self-report, the ability to understand the thoughts or feelings of others. Based on this criteria, the following measures were included: Reading the Mind in the Eyes Task (RMET; Baron-Cohen et al., 2001a), Movie for the Assessment of Social Cognition (MASC; Dziobek et al., 2006), False Belief tests (e.g., see Sullivan & Winner, 1993), relevant items from the Social Cognition and Object Relations Scale (SCORS; Westen, 1991), the Reflective Functioning Questionnaire (RFQ; Fonagy et al., 2016), and relevant items from an empathic accuracy task (Brook & Kosson, 2013; see Harenski et al., 2017), and perspective-taking questionnaires (i.e., Interpersonal Reactivity Index – Perspective Taking; IRI-PT; Davis, 1983). In cases of multiple eligible measures, the more widely-used measure, per our literature review, was selected for analysis (e.g., if a study used the RMET and a lesser known ToM task, we used data from the RMET).

### Measures of Suicidality

Eligible studies utilized different measures of suicidal ideation and suicidal attempts. Six studies utilized measures specifically designed to measure suicidality (Beck’s Suicide Intent Scale, Beck et al., 1974; Beck’s Scale for Suicidal Ideation, Beck et al., 1979; Columbia Suicide Severity Rating Scale, Posner et al., 2011; Suicide Attempt Questionnaire, Tillman et al., 2008). Three studies used structured or semi-structured

diagnostic interviews (Computerized Diagnostic Interview Schedule for Children, Shaffer et al., 2000, Longitudinal Interval Follow up Evaluation, Keller et al., 1987; Schedules for Clinical Assessment in Neuropsychiatry, Wing et al., 1990). Three studies extracted items related to suicidality from broader measures of relevant constructs (Beck Hopelessness Scale, Beck et al., 1974; Borderline Personality Questionnaire, Suicide Subscale, Poreh et al., 2006; Brief Symptom Inventory, Derogis, 1992), and finally, one study (Wang et al., 2020) used a published definition to simple query yes/no responses about suicidality (Kao et al., 2011) and two studies (Duñó et al., 2009; Scocco et al., 2020) identified reports of suicidality from admissions to psychiatric hospitals for suicidality.

## Data Analysis

We extracted relevant data from each study and used Comprehensive Meta-Analysis Version 3 (Borenstein, Hedges, Higgins, & Rothstein, 2015) to conduct all analyses. Hedges'  $g$  was calculated from reported means and standard deviations,  $t$ -statistics,  $p$ -values, or correlations, and confidence intervals and  $z$ -values of effect sizes were used to assess statistical significance. Distributions of effect sizes were heterogenous for the number of variables so we used the random effects model. In other words, due to significant variability among included studies, we used the random effects model, which allows for the true effect size among studies to vary from study to study, in order to assign more balanced weights to each study. For example, studies that were more precise than others were assigned more weight so as to prevent large studies from dominating the analysis and to prevent small studies from being overly minimized in the analysis. This model is distinct from a fixed effects model which assumes that there is one true effect size shared by all studies (Borenstein et al., 2007). Tau-squared, which is an estimate of between study variance, was used as a measure of heterogeneity in the random-effects model. I-squared and Q-tests were used to test the homogeneity of the distribution of weighted effect sizes. In this study, Hedges'  $g$  represents the magnitude of the association between ToM and suicidality.

In addition, we conducted moderator analyses of four variables: age, sex, ToM content (i.e., cognitive ToM versus affective ToM), and suicidal outcome (i.e., measures of ideation vs. exclusively suicide attempts). We used meta-regressions to tests age and sex as continuous variables (i.e., mean age of sample; percent of sample reported as female). We considered ToM content to be a categorical variable. We classified ToM measures that primarily emphasized the understanding of the feelings of others (i.e., RMET, Empathic Accuracy) as assessments of affective ToM. We considered all other measures to be primarily assessments of cognitive ToM. Similarly, we considered suicidal outcome to be a categorical variable, and we distinguished suicidality measures that examined exclusively suicide attempts (e.g., interview data querying "How many attempts have you made in the last year?") from measures that examined ideation. When studies provided effect sizes relevant to more than one moderator group, we separated them for these analyses.

## Results

Our model included the analysis of effect sizes for nine studies that tested differences in ToM in individuals with suicidality versus ToM in healthy controls, as well as six studies

that directly tested the relations between ToM performance and suicidality (i.e., dimensional measures of suicidality). Analysis revealed a medium effect size (Hedges'  $g = -.475$ , 95% CI  $[-.686, -.264]$ ) for the negative relation between ToM and suicidality. In other words, we found sufficient evidence in the extant literature in support of an association between impaired ToM and an increased level of suicidality. Tau-squared = .128 and I-squared = 82.339 suggested heterogeneity for the distribution of effect sizes of all these measures on the random-effects model.

### Moderators

Meta-regressions were performed to analyze potential continuous variables (i.e., age and sex) for an effect of moderation; none were significantly related to the association between ToM and suicidality (mean age:  $Z = .29$ ,  $p = .774$ .; percent female:  $Z = .10$ ,  $p = .316$ ). In addition, we tested two categorical variables (i.e., ToM content and suicidality outcome). The relation between ToM and suicidality was not moderated by ToM content. Specifically, the effect size ( $g = -.398$ ) for the six studies assessing affective ToM did not differ significantly ( $p = .591$ ) from the effect size ( $g = -.506$ ) for the nine studies assessing cognitive ToM. The relation between ToM and suicidality also was not moderated by suicidal outcome examined. The effect size ( $g = -.482$ ) for the four measures examining levels of ideation did not differ significantly ( $p = .985$ ) from the effect size ( $g = -.487$ ) for the 12 measures examining actual suicide attempts.

### Publication bias

In order to assess for publication bias, we visually examined the funnel plot (see Figure 2) and conducted trim and fill analyses (Duval & Tweedie, 2000) and Egger's test of the intercept (Egger's et al., 1997). Trim and fill analyses revealed a symmetrical funnel plot with no values needed to be added to the left or right of the mean. Additionally, non-significant Egger's test ( $p = .22$ ) did not indicate publication bias.

### Discussion

The current meta-analysis investigated the extent of the association between ToM abilities and suicidality. Findings provide general support for a significant association between ToM deficits and suicidality, indicating that individuals with suicidality have moderate impairment in ToM, as indexed by a medium effect size. This effect is consistent across a wide variety of moderators, including age, sex, ToM content, and suicidality outcome. Neither sex, age of sample, nor type of suicidality outcome moderated the association between ToM ability and suicidality.

Our findings may support three potential models for the relation between ToM and suicidality: (a) the *Risk-Factor Model*, suggesting deficits in ToM represent a risk-factor for suicidality, (b) the *Byproduct Model*, suggesting deficits in ToM are a byproduct of suicidality, or (c) the *Correlate Model*, suggesting deficits in ToM co-occur with suicidality (i.e., they are correlates). Below we discuss further these three models, implications specific to each one, and general clinical possibilities relevant to our findings.

First, per the Risk-Factor Model, deficits in ToM might indicate risk for suicidality, or in other words, deficits in ToM might precede and predispose suicidality. Therefore, ToM, in conjunction with other variables in a prediction model, may hold promise for prevention work. In other words, we acknowledge that ToM deficits alone likely would not provide enough predictive information of suicidality. We suggest, however, that ToM deficits may account for some variance in a prediction model, alongside other identified variables of risk (e.g., loneliness, stressful life events, etc.). If deficits in ToM account for some significant, albeit small, variance in the prediction of suicidality, they may have clinical value as a modifiable risk factor, compared to more stable variables of risk (e.g., gender, family history, etc.). That is, ToM may be targeted and modified with intervention to reduce risk in populations vulnerable to suicidality. In the adult literature, interventions for improving ToM in adults with Autism Spectrum Disorder (ASD; for a review, see Fletcher-Watson et al., 2014) and adults with schizophrenia (Bechi et al., 2013; 2015) are quite effective. In many of these interventions for participants across the age range, children engage in different age-appropriate perspective-taking activities and games and adults practice understanding and verbalizing the thoughts and feelings of others by reading comic strips of complex social situations, thus training ToM skills (e.g., Bechi et al., 2013; Hoddenbach et al., 2012). The enduring effects of these interventions on ToM performance, however, remain to be tested. Further, in children, a recent meta-analysis of 32 studies found that ToM training interventions significantly improved ToM as compared to control interventions, with an average effect size of nearly .75 (Hedges'  $g$ ) (Hofmann et al., 2016). These ToM improvements emerged in typically developing children, those with hearing impairments, and those with Autism Spectrum Disorder (ASD). As such, ToM interventions might be suitable for individuals of wide age ranges and with diverse abilities and presentations. Future longitudinal work should explore whether changes in ToM performance lead to changes in suicidality and whether ToM deficits account for significant variance in suicidality prediction models in conjunction with more clinically relevant factors.

The Byproduct Model is the second possible explanation of the association between ToM and suicidality. Per this model, ToM deficits are a byproduct of suicidality, or in other words, suicidality might precede deficits in ToM. Several theories may support this explanation. First, individuals with suicidality might be so consumed with negative thoughts about their lives (e.g., "I am worthless and want to die.") and the world around them (e.g., "Nothing will get better.") that they become less attuned to the thoughts and feelings of those in their environment. This type of negative self-focused attention (for review, see Ingram, 1990; Mor & Winquist, 2002) may detract from effective ToM. Additionally, feelings of loneliness, often associated with suicidality, may lead to deficits in ToM. That is, individuals with suicidality may become socially isolated and thus experience decreased exposure to social interactions. This decreased exposure to social interactions might make individuals with suicidality out of practice at appropriately identifying the thoughts and feelings of others. To better understand the veracity of the Byproduct Model, future work should explore whether changes in suicidality lead to changes in ToM performance. To our knowledge, no studies have examined how suicidality might predict later social-cognitive deficits. We speculate that this may be due to a true absence of effect, publication bias, lack of exploration, or a



focus in the literature on how other variables might predict suicidality versus how suicidality might predict other variables.

The Correlate Model is a third possible explanation of the association between ToM and suicidality: that ToM deficits and suicidality co-occur, without chronological specificity. Regardless of their temporal relations, however, associations between ToM and suicidality may prove clinically important for identification of vulnerable populations. That is, the association between ToM and suicidality may aid in identification of suicidality. Many individuals with suicidal intent are not motivated to disclose such intent to others. In fact, nearly 80% of individuals who die by suicide deny suicidal intent in their final communication prior to death (Busch, Fawcett, & Jacobs, 2003). Performance-based assessment of ToM deficits may provide clinicians more objective, more efficient, and less invasive data to detect risk for suicidality as compared to reliance on an individual's self-report of intent.

To date, no intervention exists that specifically targets ToM in individuals at-risk for or experiencing suicidality. Tailoring such interventions according to type of ToM error prevalent in suicidality might be particularly useful. For individuals with suicidality, interventions that target and improve ToM might focus on appropriately identifying the thoughts and feelings of others to diminish risk for social constructs (i.e., lack of belonging, perceived burdensomeness, social problem-solving, signals of defeat, low connectedness, etc.) relevant to theoretical frameworks of suicide. For example, bolstering ToM skills in those with suicidality may serve to facilitate positive social interactions and quell feelings of loneliness. Additionally, teaching appropriate identification of others' thoughts and feelings might emphasize specific strategies to mitigate over-mentalizing. In doing so, reducing overly negative and intense construal of others' mental states may alleviate perceptions of burdensomeness and signals of defeat, among other negatively skewed ToM errors. Future work should determine the exact nature of ToM errors in suicidality in order to best adapt interventions for individual needs.

Bolstering this understanding of others also could be a particularly important treatment target for individuals with suicidality in the context of depression. Specifically, ToM deficits in depression-remitted adults have been shown to be a vulnerability for recurrence of a subsequent depressive episode (Inoue et al., 2006). If interventions could enhance ToM in individuals with suicidality in depression, recurrence may be less likely. A current randomized controlled trial is examining the efficacy of a ToM-focused CBT intervention, compared to a standard CBT intervention, for adolescents with depression (Garber, 2018). ToM-focused CBT interventions may emphasize cognitive restructuring through testing the veracity of beliefs about others' thoughts and feelings, considering alternative explanation for others' behaviors, and explicitly practice understanding the thoughts and feelings of others in different stories or cartoon scenarios. These treatment emphases are aimed at strengthening and improving ToM skills in the context of CBT. Additionally, a CBT protocol with particular focus on behaviorism may suggest that decreasing social isolation and active engagement with practicing social interactions to be useful therapeutic strategies for ToM improvement. Conversely, ToM-focused interventions may be effective as a transdiagnostic treatment target. That is, a ToM intervention component could augment treatment (e.g.,

Cognitive Behavioral Therapy (CBT), Acceptance and Commitment Therapy, Dialectical Behavior Therapy, etc.) for individuals with suicidality across various diagnostic groups (e.g., schizophrenia, BPD, anxiety, etc.), not just depression. Still, interventions should consider the possibility that that ToM deficits may impede treatment response to certain therapeutic approaches (i.e., a person with ToM deficits may struggle with specific components of CBT such as challenging thoughts about others' thinking).

Moreover, understanding the association between suicidality and ToM might help us understand the cognitive distortions or etiology of these distortions in suicidal populations. Evidence exists for a heritable component of suicidality above and beyond what is conferred through psychopathology (Erlangsen et al., 2018), yet much more research is necessary to identify these factors of risk. Understanding thoughts and feelings of others might be both a heritable and learned skill. As such, further study ToM may help elucidate other mechanistic pathways of risk for suicidality. Future research should explore the heritable basis for this specific social-cognitive skill as it relates to risk for suicidality.

### **Strengths, Limitations, & Future Directions**

The strength of this meta-analysis is its quantitative exploration of ToM as a specific, modifiable, and novel correlate of suicidality. The specificity of ToM as a discrete ability allows more concrete conclusions to be drawn about suicidality from our findings, rather than from more global exploration of broad social-cognitive functions. Additionally, that this meta-analysis examines a particular ability (i.e., ToM) that can be changed and improved through training underscores the value of the implications of our findings in the context of prevention of suicide. The implications of our findings also may hold promising clinical utility for risk-identification work. Finally, the topic of this meta-analysis represents a timely investigation of current studies. Though prior developmental, social, cognitive, and clinical research has investigated ToM for decades (e.g., (Flavell, 2004; Leslie, 1987; Stone et al., 1998), 13 of 15 studies included in the current meta-analysis were published in the last five years, highlighting the increasing relevance of ToM's novel role in suicidality.

Our meta-analysis is, however, not without its limitations. First, due to the recent nature of this area of research, few studies met criteria for inclusion into our analyses and many varied measurement modalities were included in these studies. For example, seven different ToM measures were included in this meta-analysis. Such variability across ToM measures indicates that measurement weakness likely exists for this construct and warrants cautious interpretation of our findings. To minimize such variability among measures as much as possible, in the current study we emphasized adherence to specific criteria (i.e., measures must assess thoughts and/or feelings of others) when determining eligibility of ToM measures. Still, we reiterate that findings must be interpreted with relative caution and that we were not powered adequately to detect effects for our moderator analyses.

Moreover, our meta-analysis was limited in terms of our measurement of suicidality. Multiple, varied measures of suicidality were included in this meta-analysis, thus limiting the precision with which we could assess specific suicidal outcomes. In other words, due to small numbers of eligible studies and variability across measurements, we were unable to test precise differential associations between ToM and pure ideators and between

ToM and attempters. As such, the precision of our suicidal outcomes moderator could only distinguish between measures of ideation and attempts. In other words, individuals considered ideators in some studies may have also attempted, but this data were not captured in our meta-analysis. Therefore, due to potential overlap among measures of suicidality, these moderator analyses must be interpreted with caution, particularly as we note the importance of distinguishing factors relevant to ideation versus those relevant to attempt (e.g., Klonsky & May, 2014). Recent meta-analytic work, though, has found that those who have attempted and those with ideation score comparably across neurocognitive abilities, suggesting that differences in ToM performance might not vary significantly by severity of suicidality (Saffer & Klonsky, 2018). Future work should test these potentially differential associations, though, and also explore other possible moderators of the associations between ToM and suicidality. Nevertheless, our review included 2,895 individuals across a variety of diverse populations, methodologies, and diagnoses, and despite these differences, results were remarkably consistent.

In future exploration of moderators with larger sample sizes, we specifically encourage researchers to consider the intersectionality of demographic moderators (i.e., race, ethnicity, sex) to better conceptualize contextual factors relevant to identified associations between ToM and suicidality. To our knowledge, little previous research exists on the study of demographic identity associations with ToM, aside from secondary analyses of ToM in children that revealed ethnicity did not affect or predict ToM performance (e.g., Devine & Hughes, 2016; O'Brien et al., 2011). Interesting work in sociology, however, suggests a link between social stratification theory and perspective-taking, such that that individuals in lower positions (or in more subordinate roles) within a society may be socialized to take the perspectives of others more readily, may be better at such perspective-taking, and may orient more strongly toward gathering information to understand the intentions of those in higher positions. (e.g., Fiske, 2010; Zink et al., 2008). This honed skill may be borne out of a societal pressure or need to understand how high-power individuals are stereotyping them (Lammers et al., 2008). Therefore, understanding the power structure of a society, particularly through a lens of social stratification, may help clarify associations between ToM ability and identity as so often racial, ethnic, and gender identity status informs an individual's power and status within a society. Without understanding the social structure of countries in which our studies were conducted though, we are unable to draw conclusions about the impact of identity status on ToM in our current review, and so we suggest that future work specifically explore the relations between ToM and race/ethnicity.

Next, we acknowledge that several studies included in our meta-analysis of relatively few total studies maintain very large sample sizes, which may risk allowing such studies to exert undue influence on our meta-analytic findings. However, as we have noted in our methods, we used a random effects model to ensure that all included studies were assigned more balanced weights in order to prevent large studies from dominating our analyses. Finally, we must consider that a third variable may be driving the observed association between ToM and suicidality. For example, it is possible that depression is driving the negative association between ToM and suicidality. Indeed, meta-analytic work has identified a significant negative relation between ToM performance and depression in individuals across the lifespan (e.g., Bora & Berk, 2015; Richman & Unoka, 2015; Nestor et al., 2021).

But, suicidality has been identified outside of depression (e.g., Miret et al., 2013), suggesting that depression may not account for the entirety of this observed association in the current study. Unfortunately, though many did, not all eligible studies in the current meta-analysis included a measure of depression making us unable to control for depression in our analyses. Future work should continue to explore depression and other relevant constructs (e.g., stress, impulsivity, executive function, general cognitive abilities) that may explain these identified associations.

In conclusion, our meta-analysis revealed a significant negative relation between ToM and suicidality such that deficits in ToM were associated with greater suicidality. These findings remained consistent across a variety of moderator analyses, including age, sex, ToM content, and suicidal outcome. In general, our findings suggest that ToM may represent a risk factor for, a byproduct of, or a correlate of suicidality. Regardless of temporal emergence, deficits in ToM might indicate the co-occurrence of suicidality in ways that can meaningfully inform clinical work in terms of suicide prevention, identification, and treatment efforts. Longitudinal research is necessary to better determine the nature of these associations.

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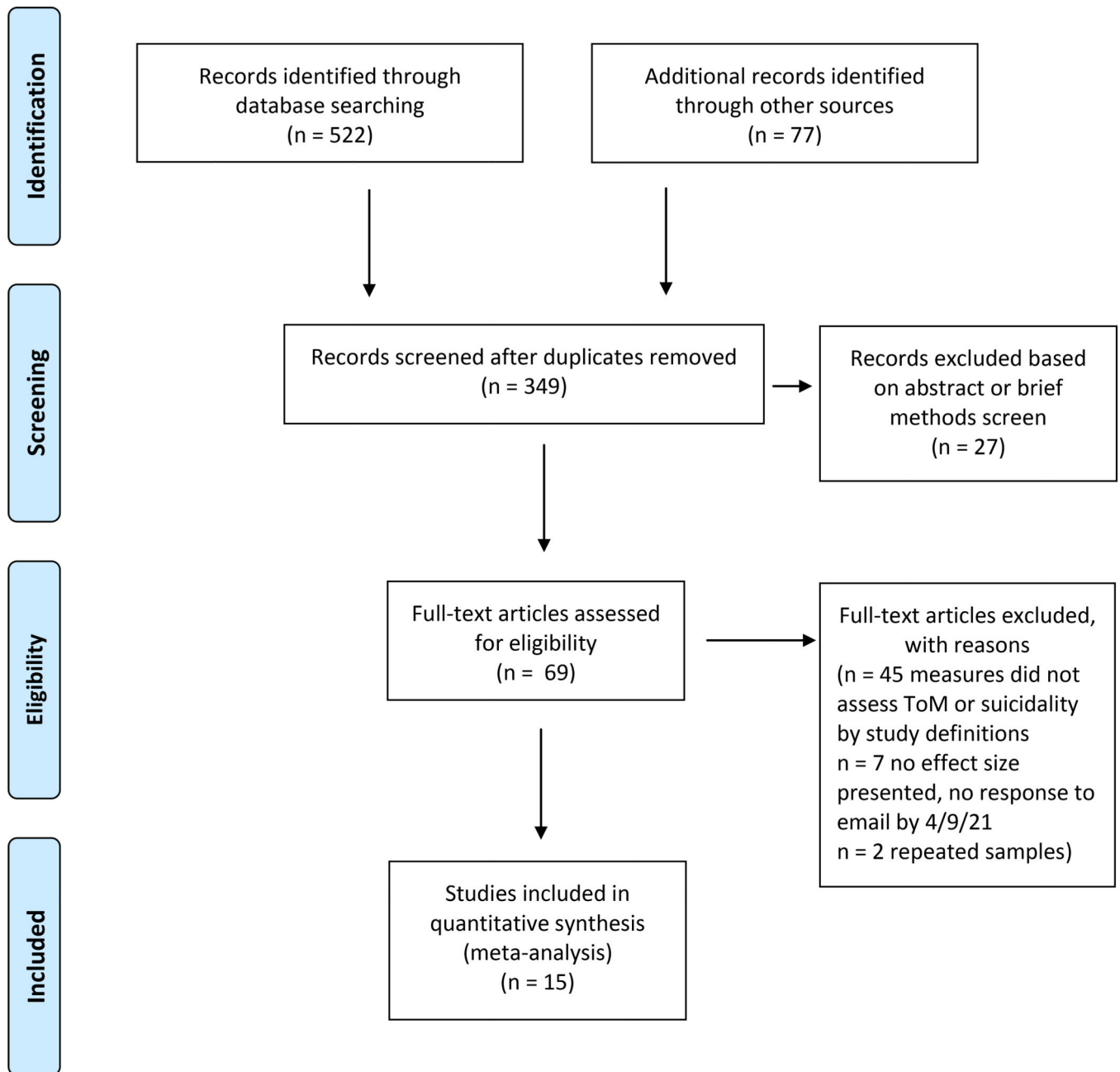
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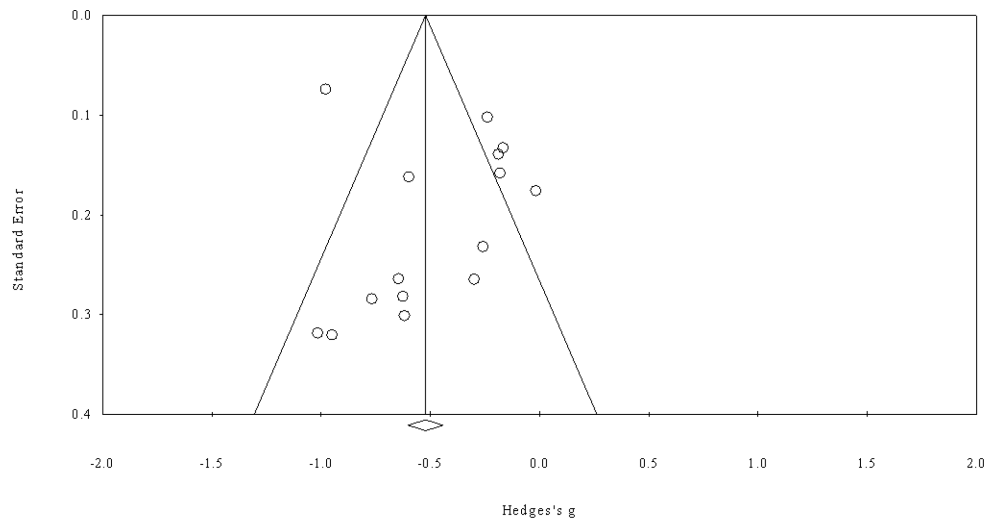
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**Highlights:**

- Theory of mind (ToM) abilities are critical for effective interpersonal functioning.
- Meta-analytics results indicate that ToM deficits are associated with suicidality.
- Identifying such suicidality-related ToM deficits may inform risk-identification, treatment, and prevention work.



**Figure 1.**  
PRISMA diagram.



**Figure 2.**  
Funnel plot of standard error by Hedges' g

**Table 1**

Eligible study demographic descriptions

Study	Sample	Mean Age; Sex	Location	Ethnicity	Sample Recruitment Setting
Canal-Rivero et al., 2017	n = 65 clinical	26.2 years; 32% fem.	Spain	Caucasian	Inpatient
Clemence & Lewis, 2018	n = 50 clinical	36 years; 80% fem.	USA	Majority Caucasian (96%)	Outpatient
Duno et al., 2009	n = 25 clinical	31.5 years, 30% fem.	Spain	N.R.	Inpatient
	n = 32 HC				
Ekinci et al., 2016	n = 83 clinical	34.1 years; 72% fem.	Turkey	N.R.	Outpatient
Ferrer et al., 2020	n = 116 hx of attempt	41.2 years; 69% fem.	France	N.R.	Outpatient
	n = 95 HC				
Green et al., 2021	n = 29 clinical	32.15 years; 69% fem.	England	Majority Caucasian (83%)	Inpatient, Outpatient
Goueli et al., 2019	n = 30 clinical	17.8 years; 100% fem.	Egypt	N.R.	Outpatient
	n = 30 HC				
Harenski et al., 2017	n = 18 clinical n = 26 HC	39 years; 0% fem.	USA	Caucasian, African-American, and "other"	Prison facility
Hatkevich et al., 2019	n = 391 clinical	15.4 years; 63% fem.	USA	Majority Caucasian (88%)	Inpatient
Lewis et al., 2016	n = 131 clinical	n.r.; 63% fem.	USA	Majority Caucasian (89%)	Inpatient
Scocco et al., 2020	n = 56 clinical	48.8 years; 58% fem.	Italy	N.R.	Inpatient
	n = 138 HC				
Stagaki et al., 2021	n = 258 HC	30.7 years; 69% fem.	London	Majority Caucasian (66%)	Inpatient, Outpatient
	n = 649 clinical				
Szanto et al., 2012	n = 24 clinical	69 years; 50% fem.	USA	Majority Caucasian (89%)	Inpatient, Outpatient
	n = 28 HC				
Wang et al., 2020	n = 505 clinical	47.7 years; 37% fem.	China	Chinese	Inpatient
Zhang et al., 2019	n = 81 clinical	63 years; 55% fem.	USA	Majority Caucasian (77%)	Inpatient, Outpatient
	n = 35 HC				

**Table 2**

Eligible study measures and effect sizes

Study	Presence of control group (Y/N)	Theory of Mind Measure	Measure/Designation of Suicidality	Hedges's g
Canal-Rivero et al., 2017	N	False Beliefs	SCAN Attempts	-0.646
Clemence & Lewis, 2018	N	SCORS Complexity	Ideation	-0.619
Duno et al., 2009	N	False Beliefs	Lifetime attempts	-0.626
Ekinci et al., 2016	Y	IRI-PT	Attempts	-0.599
Ferrer et al., 2020	Y	RMET	Attempts (C-SSI)	-0.188
Goueli et al., 2019	Y	RMET	Suicide BPQ subscale	-0.299
		MASC		
Green et al., 2021	Y	RFQ-U	Attempts	-1.016
Harenski et al., 2017	Y	Empathic accuracy	Attempts	-0.95
Hatkevich et al., 2019	N	MASC	Ideation	-0.239
		MASC	Attempts	-0.017
Lewis et al., 2016	N	SCORS COM&SC		
Scocco et al., 2020	Y	IRI-PT	Attempts	-0.182
Stagaki et al., 2021	Y	RFQ-H	Ideation, attempts	-0.979
Szanto et al., 2012	Y	RMET	Beck's Scale for Suicidality	-0.768
Wang et al., 2020	N	IRI-PT	Attempt interview	-0.167
			Ideation	
Zhang et al., 2019	Y	IRI-PT	Attempts	-0.259