

Perspective taking as a transdiagnostic risk factor for interpersonal dysfunction

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Abstract

Objective: Numerous psychiatric populations have demonstrated reduced tendency to adopt others' perspectives relative to those without psychiatric illness; yet, the clinical implications of these deficits remain unclear. We examined whether impairments in perspective-taking are prospectively associated with symptom severity and functional outcomes in an acute psychiatric sample. We hypothesized that poorer perspective-taking would prospectively predict more severe depressive symptoms, functional impairment, and relationship problems.

Method: Participants were 421 adults seeking psychiatric treatment at a partial hospital program. Participants completed the following self-report questionnaires at admission and discharge: Interpersonal Reactivity Index, Patient Health Questionnaire, Work and Social Adjustment Scale, and Behavior and Symptom Identification Scale. We conducted cross-lagged panel models to estimate directional effects.

Results: Consistent with hypotheses, more frequent perspective-taking was significantly and prospectively associated with less overall functional impairment ($\beta = -.08$, $p = .04$) and fewer relationship problems ($\beta = -.11$, $p = .02$). When modelled together, perspective-taking remained a significant and bidirectional predictor of relationship problems, but not overall functional impairment. Inconsistent with hypotheses, perspective-taking did not prospectively predict depressive symptoms.

Conclusions: Results suggest that perspective-taking deficits are uniquely associated with relationship problems among adults with severe mental illness and highlight a potential target for future intervention.

Keywords: Perspective-taking, social cognition, transdiagnostic, interpersonal functioning,

functional outcomes.

General scientific study: This study suggests that perspective-taking is closely linked with relationship functioning among people with mental illness. Less frequent perspective-taking leads to more relationship problems, but relationship problems also lead to less frequent perspective-taking. This research suggests that perspective-taking impairments may be involved in the development and course of ongoing functional impairment in mental illness.

Perspective taking as a transdiagnostic risk factor for interpersonal dysfunction

Human beings are a social species that has relied on interpersonal connections to survive and thrive (Aktipis et al., 2018). The suite of psychological processes humans possess that are thought to facilitate these interpersonal interactions are referred to as “social cognition.” In the current manuscript, we examined a fundamental aspect of many social cognitive processes: the tendency to adopt the psychological viewpoint of another person (i.e., “perspective-taking”; Davis, 1983; Happé et al., 2017).

Although virtually all adults *can* take others’ perspective, there are well-established individual differences in the tendency to do so (Devine & Apperly, 2022; Carpenter et al., 2016). Numerous psychiatric populations have demonstrated reduced tendency to adopt others’ perspectives relative to a comparison population without psychiatric illness. For example, individuals with schizophrenia (Bonfils et al., 2017), major depressive disorder (Schreiter et al., 2013), bipolar disorder (e.g., Cusi et al., 2010), anorexia nervosa (Bora & Köse, 2016), and autism spectrum disorder (e.g., Rogers et al., 2007; Rueda et al., 2015) all exhibit less frequent spontaneous perspective-taking relative to those without psychiatric diagnoses. Given that social cognitive impairments are nearly ubiquitous across many different psychiatric conditions, social cognitive deficits are thought to be a core cognitive phenotype of mental illness (Cotter et al., 2018).

Many experts believe that deficits in social cognition broadly, and perspective-taking in particular, contribute to functional impairments (e.g., Fletcher-Watson et al., 2014; Todd & Galinsky, 2014). Among samples unselected for psychiatric diagnoses, less frequent perspective taking is cross-sectionally associated with lower levels of relationship satisfaction (Péloquin & Lafontaine, 2010), less engagement in social activity (Bailey et al., 2008), and smaller social

networks (Lewis et al., 2011; Stiller & Dunbar, 2007). Although fewer studies have investigated the relation between perspective-taking and functioning among those with psychiatric diagnoses, a small number of cross-sectional studies suggest that less frequent perspective-taking is associated with poorer functioning in daily life (Horan et al., 2015; Smith et al., 2012, 2014; Struck et al., 2021; Michaels et al., 2014) and more severe psychopathology (Cusi et al., 2011; Ekinci & Ekinci, 2016).

It is worth highlighting that, to our knowledge, all existing research examining the real-world consequences of perspective-taking in psychiatric samples has been cross-sectional, which severely limits our understanding of the nature of this association. Although researchers have speculated that reduced tendency to engage perspective-taking may lead to interpersonal impairments (e.g., Fletcher-Watson et al., 2014; Todd & Galinsky, 2014), an alternative interpretation is that people who have few, and less positive, relationships have less opportunity to engage in perspective-taking, suggesting that interpersonal functioning may predict perspective-taking. Further, it is also possible that *both* interpretations are correct, and that there is a bidirectional relation between perspective-taking and real-world interpersonal functioning. Finally, the association between perspective-taking and functional impairment may not be causally related and instead could be driven by an unmeasured third variable. For example, symptom severity may be related to both perspective-taking and functional impairments, which could cause a spurious correlation between perspective-taking and functional impairments. Better understanding of how perspective-taking and functional impairment are associated is crucial to determine whether perspective-taking should be targeted as a mechanism of change in psychosocial interventions.

In the current study, we investigated the longitudinal association among perspective-taking, functional impairment, relationship problems, and depressive symptom severity in an acute psychiatric population. Our design builds on past research in three important ways. First, the use of a longitudinal design allows us to identify the temporal relation between perspective-taking and functional outcomes, which is necessary to establish causality. Second, our primary analyses model all variables together within one model. Such a design accounts for the theoretical and empirical overlap among functional impairment, relationship problems, and depressive symptoms. Consequently, our results will provide insight into the unique contributions of perspective-taking to each outcome. We focused specifically on depressive symptoms given the robust association with social cognitive impairments (Weightman et al., 2014), high rates of depressive symptoms in our sample, and the large overlap between depressive symptoms and other psychiatric concerns (e.g., Edwards et al., 2019; Gros et al., 2012, Zbozinek et al., 2012). Finally, we tested these associations in a transdiagnostic sample of psychiatric patients with moderate to severe mental illness. This clinically representative sample is ideal to test whether perspective-taking is a transdiagnostic indicator of functional outcomes, and to ensure the generalizability of results. Given prior research on the association between perspective-taking and functional outcomes, we hypothesized that less frequent perspective-taking would prospectively predict greater overall functional impairment, more relational difficulties, and higher levels of depressive symptoms among patients with acute psychiatric conditions.

Method

Participants

Participants were adults seeking psychiatric treatment at a virtual behavioral health Partial Hospital Program (PHP) in the Northeastern United States from January 2021 to March 2022. Participants attended the PHP for an average of 2 weeks ($M_{\text{days}} = 11.52$, $SD = 2.69$). Primary treatment components included three group therapy sessions per day, three individual therapy sessions per week, and medication management as needed. The psychiatric treatment targeted transdiagnostic processes (e.g., cognitive biases, avoidance) and aimed to improve mood and daily functioning (see *<blinded for review>* for more details). Participants met the following inclusion criteria for admission: (1) 18 years of age or older, (2) ability to understand English, and (3) agreement to abstain from substance use for the duration of the program. The PHP treats adult patients with a wide-range of psychiatric disorders (e.g., mood, anxiety, personality, and psychotic-spectrum disorders), and patients typically have high rates of diagnostic comorbidity. All patients who completed the perspective-taking assessment at both time 1 and time 2 were included in the current study.

The final sample included 421 participants. Participants range from 18 to 77 years old ($M = 35.90$, $SD = 13.56$). Approximately half the sample (55.8%) identified as a woman, 41.8% identified as a man, and 1.9% identified as transgender or non-binary. The majority of participants identified as non-Hispanic White (82.4%), followed by Asian (4.0%), Hispanic (4.0%), multi-racial (3.6%), and Black (2.6%). A further 1.7% reported not knowing their race and 1.7% chose not to disclose their race. Forty-six percent of participants were employed full-time, 40% of participants were not employed, and 14% of participants were employed part-time. In terms of highest educational achievement, 36.1% of participants had post-college education, 33% graduated from a four-year college program, 23% had some college education, and 7.9% completed high school or a GED.

As a part of routine clinical care, participants took part in a semi-structured interview to assess common psychological diagnoses. The most common diagnosis was generalized anxiety disorder (56.6%) followed by major depressive disorder (47.6%), bipolar I disorder (32.8%), social anxiety disorder (28.2%), obsessive-compulsive disorder (21.3%), panic disorder (14.6%), excoriation disorder (10.1%), agoraphobia (9.6%), trichotillomania (2.6%), and bipolar II disorder (1.5%). This sample was previously described in a separate manuscript (Hudson et al., 2023).

Procedure

Participants completed self-report questionnaires that assess perspective-taking, overall functional impairment, relationship difficulties, and depressive symptoms on their first day of treatment (time 1) and their last day of treatment (time 2) using Research Electronic Data Capture (REDCap). REDCap is a secure web-based platform for managing and storing online databases and surveys (Harris et al., 2009). All study procedures were approved by the local Institutional Review Board.

Measures

Interpersonal Reactivity Index Perspective Taking Subscale (IRI-PT)

The IRI-PT (Davis, 1980; Davis, 1983) is a self-report measure assessing an individual's perceived ability to shift to another person's perspective or psychological point of view. The IRI-PT consists of seven items (e.g., “*I try to look at everybody's side of the disagreement before I make a decision*”) rated on a 5-point Likert-type scale ranging from 0 (*Does not describe me well*) to 4 (*Describes me very well*). IRI-PT scores range from 0 to 35; higher scores indicate greater propensity to consider others' perspectives. The IRI-PT has demonstrated satisfactory

internal consistency and test-retest reliability (Davis, 1980). In the current sample, Cronbach's alpha of the IRI-PT was .83 and .84 at time 1 and time 2, respectively.

Work and Social Adjustment Scale (WSAS)

The WSAS (Marks, 1986) is a brief 5-item self-report measure assessing functioning in five life domains: (1) work/school, (2) home management, (3) social leisure activities, (4) private leisure activities, and (5) family/relationships. Participants are asked to assess how significantly their mental health affects each domain on a 9-point Likert-type scale ranging from 0 (*Not at all*) to 8 (*Very severely*). Total scores range from 0-40 where higher scores indicate greater impairment. The WSAS has demonstrated good internal reliability and validity (Mundt et al., 2002; Zahra et al., 2014). In the current sample, Cronbach's alpha of the WSAS was .84 and .89 at time 1 and time 2, respectively.

Behavior and Symptom Identification Scale Relationships Subscale (BASIS24-RS)

The BASIS24-RS (Eisen et al., 2007; Cameron et al., 2007) is a 5-item self-report measure assessing relationship problems (e.g., "*How much difficulty do you have getting along well in social situations?*") over the past week. Participants rated their responses on a 5-point Likert-type scale of 0 (*No difficulty*) to 4 (*Extreme difficulty*). Total scores ranged from 0 to 20, with higher scores indicating greater impairment. The BASIS24-RS has demonstrated good validity and reliability (Cameron et al., 2007; Eisen et al., 2004). In the current sample, Cronbach's alpha of the BASIS24-RS was .78 and .82 at time 1 and time 2, respectively.

Patient Health Questionnaire (PHQ-9)

The PHQ-9 (Kroenke et al., 2001) is 9-item self-report questionnaire assessing depression symptom severity. This self-report measure asks participants to rate how frequently they experience each symptom of depression (e.g., "*Feeling tired or having little energy?*") on a

4-point Likert-type scale ranging from 0 (*Not at all*) to 3 (*Nearly every day*). Total scores range from 0 to 27, with higher scores indicating greater symptom severity. The PHQ-9 has been previously validated in this clinical setting as a depression severity measure (Beard et al., 2016). In the current sample, Cronbach's alpha of the PHQ-9 was .86 and .88 at time 1 and time 2, respectively.

Data Analysis

Data analysis was conducted in IBM SPSS Version 27 and MPlus version 8.8 (Muthén & Muthén, 2017). We employed Pearson correlations to assess the zero-order relation among study variables. Further, to determine appropriate covariates in subsequent models, we examined the association between demographic characteristics with primary variables of interest using Pearson correlations (age) and one-way analysis of variance (gender and ethnicity).

To examine whether perspective-taking prospectively predicted overall functional impairment, relationship problems, or depressive symptoms, we conducted three independent cross-lagged panel models (CLPMs). See Figure 1 for a visual depiction of these models. CLPMs estimate the directional influence variables have on each other over time by estimating the relationships from one variable to another and vice versa (i.e., crossed estimates) while also estimating the relationship between variables at different timepoints (i.e., lagged estimates). CLPMs are the most appropriate method to assess temporal precedence in longitudinal correlational data (Deary et al., 2009; Soenens et al., 2008; Wood et al., 2008). Although CLPMs have been recently criticized for not distinguishing between-person and within-person variance (e.g., Hamaker et al., 2015), several researchers have argued that the CLPM is the most appropriate model to assess between-person effects (Lüdtke & Robitzsch, 2021; Orth et al., 2021), which are the focus of the present study. CLPMs are fully saturated (i.e., the number of

parameters is equal to the number of observed variables) and have perfect model fit; therefore, model fit indices are not reported.

In addition to the individual CLPMs, we also conducted an omnibus CLPM, which models all four variables simultaneously, due to the theoretical and empirical overlap among overall functional impairment, relationship problems, and depressive symptoms. See Figure 2 for a visual depiction of the omnibus CLPM. All CLPMs were modeled with and without demographic covariates, with categorical covariates dummy coded. Because the inclusion of covariates did not change the pattern of results, the most parsimonious model without covariates is presented below. This study was not preregistered. De-identified data, and MPlus syntax are available at our OSF website for this project: [<blinded for review>](#).

Results

Preliminary Analyses

Means and standard deviations of perspective-taking, overall functional impairment, relationship problems, and depressive symptoms are presented in Table 1 for each time point. Zero-order correlations among these variables are presented in Table 2. Of note, perspective-taking was significantly cross-sectionally correlated with overall functional impairments and relationship problems at both time-points and with depressive symptoms at time 2.

Neither perspective-taking nor relationship problems were associated with age, gender, or ethnoracial background ($ps > .09$). Older age was associated with worse overall functional impairment (time 1: $r = -.21, p < .001$; time 2: $r = -.11, p = .02$) and less severe time 2 depressive symptoms ($r = -.12, p = .02$). Age was not associated with time 1 depressive symptoms ($p = .22$). Further, women ($M = 10.29; SD = 5.90$) reported significantly more severe depressive symptoms at time 1 relative to men ($M = 8.86; SD = 5.41; p = .01$). Time 2 depression severity did not vary

as a function of gender ($p = .30$). Overall functional impairment was not associated with gender or ethnoracial background ($ps > .12$). Finally, depression symptom severity did not vary as a function of ethnoracial background ($ps > .28$).

Cross-Lagged Panel Models

The results of the initial CLPMs are depicted in Table 3. Consistent with hypotheses, less frequent self-reported levels of perspective-taking at time 1 was significantly associated with greater overall functional impairment and more relationship problems at time 2. Further, results suggest a bidirectional association between perspective-taking and relationship problems; more time 1 relationship problems were significantly associated with less frequent time 2 perspective-taking. Inconsistent with hypotheses, time 1 perspective-taking did not prospectively predict time 2 depressive symptoms.

The results of the omnibus CLPM are depicted in Table 4. Consistent with the individual models, there was a bidirectional relation between perspective-taking and relationship problems that remained significant when controlling for overall functional impairment and depressive symptoms: less frequent time 1 perspective-taking was significantly associated with more relationship problems at time 2; further, more relationship problems at time 1 significant predicted less frequent perspective-taking a time 2. Inconsistent with the individual models, time 1 perspective-taking was no longer a significant predictor of overall functioning at time 2 when controlling for relationship problems and depressive symptoms. Again, the longitudinal associations between perspective-taking and depressive symptoms were not significant.

Discussion

Our results suggest a bidirectional relation between perspective-taking and relationship problems. Consistent with hypotheses, less frequent consideration of others' thoughts, feelings,

or desires (i.e., perspective-taking) prospectively predicted more relationship problems among patients with acute mental illness. These findings are also consistent with the pervasive theoretical standpoint that basic social cognitive skills facilitate interpersonal relationships (e.g., Forgas et al., 2012). The current study extends existing literature by illustrating a temporal relation between perspective-taking and relationship problems across patients with a variety of different mental health concerns. Taken together, our results suggest that perspective-taking deficits are a transdiagnostic risk factor for interpersonal dysfunction in mental illness.

More relationship problems also prospectively predict less frequent perspective-taking. A possible interpretation of this finding is that healthy relationships provide individuals an opportunity to engage in perspective-taking. In contrast, those with few relationships may have less opportunity to engage in perspective-taking. Further, those in turbulent relationships may have more difficulties employing perspective-taking given that acute stress enhances egocentric biases and self-focused attention (e.g., Liao & Masters, 2002; Tomova et al., 2014; Wood et al., 1990). These interpretations suggest that perspective-taking may be a dynamic process that varies depending on the nature of one's relationships with others.

Although our study highlights a temporal link between perspective-taking and interpersonal functioning, it is important to note that a causal association has not yet been established. An important next step in this line of research is to experimentally manipulate perspective-taking to examine the downstream effects on relationship problems. Several therapeutic interventions have been designed to promote perspective-taking and other social cognitive skills, including mentalization-based therapy for borderline personality disorder (Bateman & Fonagy, 2010), interpersonal therapy for major depressive disorder (Weissman et al., 2008), and social skills training for autism spectrum disorder (Laugeson et al., 2012). As

such, aspects of these treatments may be used to experimentally manipulate perspective-taking in research designs. If a causal link is established, perspective-taking may be an important treatment target, that if remediated, could improve interpersonal functioning of those with severe mental illness. Given that interpersonal dysfunction plays a central role in both the development and maintenance of mental illness (Conway et al., 2012; Hammen, 2003), such treatments have the potential to significantly improve the course of mental illness and patients' quality of life.

Consistent with hypotheses, perspective-taking was cross-sectionally and prospectively associated with functional impairments when modelled in isolation; however, this association was no longer statistically significant when controlling for the impact of relationship problems. These findings highlight the importance of modelling related variables concurrently and suggest that perspective-taking only impacts general domains of functioning (e.g., work, school, leisure activities) because of the presence of relationships within each of these domains. For example, less frequent perspective-taking may impact functioning at work because it leads to conflicts or misunderstanding with colleagues. Further, the longitudinal associations between perspective-taking and depressive symptoms were not significant, even though perspective-taking and depressive symptoms were cross-sectionally correlated at time 2. Taken together, these results suggest that the association between relationship problems, functional impairment, and depressive symptoms created a spurious relation with perspective-taking.

The present study has several limitations that present opportunities for future research. First, perspective-taking frequency was measured via self-report, which may be subject to biases in memory and awareness. Future studies may benefit from an ecological momentary design which may reduce biases by capturing moment-to-moment experiences of perspective-taking. Second, we focused exclusively on tendency to engage in perspective-taking. It is possible that

other elements of perspective-taking may facilitate different aspects of real-world functioning. For example, how accurately one can infer others' thoughts or feelings may contribute to interpersonal functioning over and above propensity to consider others' thoughts or feelings. Further, results may differ depending on whose mental states are being inferred (i.e., self vs. other), what types of mental states are being inferred (i.e., affect vs. cognition), and how mental states are being inferred (i.e., based on observable information vs. theory). Indeed, research demonstrates that many of these constructs are orthogonal (e.g., Murphy & Lilienfeld, 2019; Sabbagh et al., 2004), suggesting that the association between each of these constructs and real-world functioning warrants future study. As such, future research may benefit from examining whether behavioral measures of social cognition also demonstrate a unique and bidirectional association with relationship problems.

Third, although the acute treatment setting of this study provides a clinically representative and naturalistic design, we were unable to include a control group to account for confounding variables. Participants in this study were receiving both psychotherapy and psychopharmacology treatments, which may have impacted the observed change in the outcome variables. Future studies could include a non-treatment seeking or waitlist control condition to account for these confounding variables. Additionally, although our longitudinal design was a strength of the current study, our design was limited to a two-week period. Thus, we are unable to draw conclusions about a longer-term impact of perspective-taking on functional impairment. Fourth, our participant sample lacked ethnic, racial, and cultural diversity given our patient population consists of mostly non-Hispanic White people. It is essential to examine perspective taking in a more diverse sample given perspective taking is a social skill and may differ across cultures (Chopik, O'Brien, & Konrath, 2017).

In summary, individual differences in one's tendency to consider others' internal mental states (i.e., perspective-taking) were significantly, prospectively, and bidirectionally associated with relationship problems in a sample of participants with acute mental illness. These results suggest that basic social cognitive processes underlie interpersonal dysfunction, which is central to the experience of many patients with mental illness (e.g., Conway et al., 2012). Further, our results also suggest that stable, healthy relationships may be necessary to facilitate perspective-taking. This research highlights a potential avenue for future intervention that may supplement traditional cognitive and behavioral approaches to help individuals achieve healthy interpersonal relationships.

References

- Aktipis, A., Cronk, L., Alcock, J., Ayers, J. D., Baciú, C., Balliet, D., ... & Winfrey, P. (2018). Understanding cooperation through fitness interdependence. *Nature Human Behaviour*, 2(7), 429-431. <https://doi.org/10.1038/s41562-018-0378-4>
- Bailey, P. E., Henry, J. D., & Von Hippel, W. (2008). Empathy and social functioning in late adulthood. *Aging and Mental Health*, 12(4), 499-503. <https://doi.org/10.1080/13607860802224243>
- Bateman, A., & Fonagy, P. (2010). Mentalization based treatment for borderline personality disorder. *World Psychiatry*, 9(1), 11–15. <https://doi.org/10.1002/j.2051-5545.2010.tb00255.x>
- Beard, C., & Björgvinsson, T. (2013). Psychological vulnerability: An integrative approach. *Journal of Psychotherapy Integration*, 23(3), 281. <https://doi.org/10.1037/a0032361>
- Beard, C., Hsu, K. J., Rifkin, L. S., Busch, A. B., & Björgvinsson, T. (2016). Validation of the PHQ-9 in a psychiatric sample. *Journal of Affective Disorders*, 193, 267-273. <https://doi.org/10.1016/j.jad.2015.12.075>
- Bonfils, K. A., Lysaker, P. H., Minor, K. S., & Salyers, M. P. (2017). Empathy in schizophrenia: A meta-analysis of the Interpersonal Reactivity Index. *Psychiatry Research*, 249, 293-303. <https://doi.org/10.1016/j.psychres.2016.12.033>
- Bora, E., & Köse, S. (2016). Meta-analysis of theory of mind in anorexia nervosa and bulimia nervosa: A specific impairment of cognitive perspective taking in anorexia nervosa? *International Journal of Eating Disorders*, 49(8), 739-740. <https://doi.org/10.1002/eat.22572>

- Cameron, I. M., Cunningham, L., Crawford, J. R., Eagles, J. M., Eisen, S. V., Lawton, K., ... & Hamilton, R. J. (2007). Psychometric properties of the BASIS-24©(behaviour and symptom identification scale–revised) mental health outcome measure. *International Journal of Psychiatry in Clinical Practice, 11*(1), 36-43.
<https://doi.org/10.1080/13651500600885531>
- Carpenter, J. M., Green, M. C., & Vacharkulksemsuk, T. (2016). Beyond perspective-taking: Mind-reading motivation. *Motivation and Emotion, 40*(3), 358-374.
<https://doi.org/10.1007/s11031-016-9544-z>
- Chopik, W. J., O'Brien, E., & Konrath, S. H. (2017). Differences in empathic concern and perspective taking across 63 countries. *Journal of Cross-Cultural Psychology, 48*(1), 23-38. <https://doi.org/10.1177/0022022116673910>
- Conway, C. C., Hammen, C., & Brennan, P. A. (2012). Expanding stress generation theory: test of a transdiagnostic model. *Journal of Abnormal Psychology, 121*(3), 754.
<https://doi.org/10.1037/a0027457>
- Cotter, J., Granger, K., Backx, R., Hobbs, M., Looi, C. Y., & Barnett, J. H. (2018). Social cognitive dysfunction as a clinical marker: A systematic review of meta-analyses across 30 clinical conditions. *Neuroscience & Biobehavioral Reviews, 84*, 92-99.
<https://doi.org/10.1016/j.neubiorev.2017.11.014>
- Cusi, A., MacQueen, G. M., & McKinnon, M. C. (2010). Altered self-report of empathic responding in patients with bipolar disorder. *Psychiatry Research, 178*(2), 354-358.
<https://doi.org/10.1016/j.psychres.2009.07.009>
- Cusi, A. M., MacQueen, G. M., Spreng, R. N., & McKinnon, M. C. (2011). Altered empathic responding in major depressive disorder: relation to symptom severity, illness burden,

- and psychosocial outcome. *Psychiatry Research*, 188(2), 231-236.
<https://doi.org/10.1016/j.psychres.2011.04.013>
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *Catalog of Selected Documents in Psychology*, 10, 85.
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44, 113–126.
[doi:10.1037/0022-3514.44.1.113](https://doi.org/10.1037/0022-3514.44.1.113)
- Deary, I. J., Allerhand, M., & Der, G. (2009). Smarter in middle age, faster in old age: A cross-lagged panel analysis of reaction time and cognitive ability over 13 years in the West of Scotland Twenty-07 Study. *Psychology and Aging*, 24(1), 40.
<https://doi.org/10.1037/a0014442>.
- Devine, R. T., & Apperly, I. A. (2022). Willing and able? Theory of mind, social motivation, and social competence in middle childhood and early adolescence. *Developmental Science*, 25(1), e13137. <https://doi.org/10.1111/desc.13137>
- Dinsdale, N., & Crespi, B. J. (2013). The borderline empathy paradox: evidence and conceptual models for empathic enhancements in borderline personality disorder. *Journal of Personality Disorders*, 27(2), 172-195. https://doi.org/10.1521/pedi_2012_26_071
- Edwards, C. J., Garety, P., & Hardy, A. (2019). The relationship between depressive symptoms and negative symptoms in people with non-affective psychosis: a meta-analysis. *Psychological medicine*, 49(15), 2486-2498.
- Eisen, S. V., Ranganathan, G., Seal, P., & Spiro, A. (2007). Measuring clinically meaningful change following mental health treatment. *The Journal of Behavioral Health Services & Research*, 34(3), 272-289. <https://doi.org/10.1007/s11414-007-9066-2>

- Ekinci, O., & Ekinci, A. (2016). Relationship between empathic responding and its clinical characteristics in patients with major depressive disorder. *Dusunen Adam The Journal of Psychiatry and Neurological Sciences*, 29(2), 145.
<https://doi.org/10.5350/DAJPN2016290206>
- Fletcher-Watson, S., McConnell, F., Manola, E., & McConachie, H. (2014). Interventions based on the Theory of Mind cognitive model for autism spectrum disorder (ASD). *Cochrane Database of Systematic Reviews*, (3). <https://doi.org/10.1002/14651858.CD008785.pub2>
- Forgas, J. P., Fiedler, K., & Sedikides, C. (2013). Social thinking and interpersonal behavior: Classical theories and contemporary approaches. In J. P. Forgas, K. Fiedler, & C. Sedikides (Eds.), *Social Thinking and Interpersonal Behavior* (pp. 1–20). Psychology Press.
- Gros, D. F., Price, M., Magruder, K. M., & Frueh, B. C. (2012). Symptom overlap in posttraumatic stress disorder and major depression. *Psychiatry Research*, 196(2-3), 267-270.
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, 20(1), 102. <https://doi.org/10.1037/a0038889>
- Hammen, C. (2003). Interpersonal stress and depression in women. *Journal of Affective Disorders*, 74(1), 49-57. [https://doi.org/10.1016/S0165-0327\(02\)00430-5](https://doi.org/10.1016/S0165-0327(02)00430-5)
- Happé, F., Cook, J. L., & Bird, G. (2017). The structure of social cognition: In (ter) dependence of sociocognitive processes. *Annual Review of Psychology*, 68, 243-267.
<https://doi.org/10.1146/annurev-psych-010416-044046>
- Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). Research electronic data capture (REDCap)—a metadata-driven methodology and workflow

- process for providing translational research informatics support. *Journal of Biomedical Informatics*, 42(2), 377-381. <https://doi.org/10.1016/j.jbi.2008.08.010>
- Hom, M. A., Weiss, R. B., Millman, Z. B., Christensen, K., Lewis, E. J., Cho, S., ... & Björgvinsson, T. (2020). Development of a virtual partial hospital program for an acute psychiatric population: Lessons learned and future directions for telepsychotherapy. *Journal of Psychotherapy Integration*, 30(2), 366. <https://doi.org/10.1037/int0000212>
- Horan, W. P., Reise, S. P., Kern, R. S., Lee, J., Penn, D. L., & Green, M. F. (2015). Structure and correlates of self-reported empathy in schizophrenia. *Journal of Psychiatric Research*, 66, 60-66. <https://doi.org/10.1016/j.jpsychires.2015.04.016>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606-613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Laugeson, E. A., Frankel, F., Gantman, A., Dillon, A. R., & Mogil, C. (2012). Evidence-based social skills training for adolescents with autism spectrum disorders: The UCLA PEERS program. *Journal of Autism and Developmental Disorders*, 42, 1025-1036. <https://doi.org/10.1007/s10803-011-1339-1>
- Lewis, P. A., Rezaie, R., Brown, R., Roberts, N., & Dunbar, R. I. (2011). Ventromedial prefrontal volume predicts understanding of others and social network size. *Neuroimage*, 57(4), 1624-1629. <https://doi.org/10.1016/j.neuroimage.2011.05.030>
- Liao, C. M., & Masters, R. S. (2002). Self-focused attention and performance failure under psychological stress. *Journal of Sport and Exercise Psychology*, 24(3), 289-305. <https://doi.org/10.1123/jsep.24.3.289>

- Lüdtke, O., & Robitzsch, A. (2021, July 29). A Critique of the Random Intercept Cross-Lagged Panel Model. <https://doi.org/10.31234/osf.io/6f85c>
- Marks, I. (1986). *Behavioural psychotherapy* Bristol: John Wright, now published by I. Marks, Institute of Psychiatry, London.
- Michaels, T. M., Horan, W. P., Ginger, E. J., Martinovich, Z., Pinkham, A. E., & Smith, M. J. (2014). Cognitive empathy contributes to poor social functioning in schizophrenia: evidence from a new self-report measure of cognitive and affective empathy. *Psychiatry Research, 220*(3), 803-810. <https://doi.org/10.1016/j.psychres.2014.08.054>
- Mundt, J. C., Marks, I. M., Shear, M. K., & Greist, J. H. (2002). The Work and Social Adjustment Scale: a simple measure of impairment in functioning. *The British Journal of Psychiatry, 180*(5), 461–464. <https://doi.org/10.1192/BJP.180.5.461>
- Murphy, B. A., & Lilienfeld, S. O. (2019). Are self-report cognitive empathy ratings valid proxies for cognitive empathy ability? Negligible meta-analytic relations with behavioral task performance. *Psychological Assessment, 31*(8), 1062. <https://doi.org/10.1037/pas0000732>
- Muthén, L. K., & Muthén, B. O. (2017). 1998–2017. *Mplus User's Guide*. Los Angeles, CA: Muthén & Muthén.
- Orth, U., Clark, D. A., Donnellan, M. B., & Robins, R. W. (2021). Testing prospective effects in longitudinal research: Comparing seven competing cross-lagged models. *Journal of Personality and Social Psychology, 120*(4), 1013. <https://doi.org/10.1037/pspp0000358>
- Péloquin, K., & Lafontaine, M. F. (2010). Measuring empathy in couples: Validity and reliability of the interpersonal reactivity index for couples. *Journal of Personality Assessment, 92*(2), 146-157. <https://doi.org/10.1080/00223890903510399>

- Rogers, K., Dziobek, I., Hassenstab, J., Wolf, O. T., & Convit, A. (2007). Who cares? Revisiting empathy in Asperger Syndrome. *Journal of Autism and Developmental Disorders*, 37(4), 709-715. <https://doi.org/10.1007/s10803-006-0197-8>
- Rueda, P., Fernández-Berrocal, P., & Baron-Cohen, S. (2015). Dissociation between cognitive and affective empathy in youth with Asperger Syndrome. *European Journal of Developmental Psychology*, 12(1), 85-98. <https://doi.org/10.1080/17405629.2014.950221>
- Sabbagh, M. A. (2004). Understanding orbitofrontal contributions to theory-of-mind reasoning: implications for autism. *Brain and Cognition*, 55(1), 209-219. <https://doi.org/10.1016/j.bandc.2003.04.002>
- Schreier, S., Pijnenborg, G. H. M., & Aan Het Rot, M. (2013). Empathy in adults with clinical or subclinical depressive symptoms. *Journal of Affective Disorders*, 150(1), 1-16. <https://doi.org/10.1016/j.jad.2013.03.009>
- Smith, M. J., Horan, W. P., Karpouzian, T. M., Abram, S. V., Cobia, D. J., & Csernansky, J. G. (2012). Self-reported empathy deficits are uniquely associated with poor functioning in schizophrenia. *Schizophrenia Research*, 137(1-3), 196-202. <https://doi.org/10.1016/j.schres.2012.01.012>
- Smith, M. J., Horan, W. P., Cobia, D. J., Karpouzian, T. M., Fox, J. M., Reilly, J. L., & Breiter, H. C. (2014). Performance-based empathy mediates the influence of working memory on social competence in schizophrenia. *Schizophrenia Bulletin*, 40(4), 824-834. <https://doi.org/10.1093/schbul/sbt084>
- Soenens, B., Luyckx, K., Vansteenkiste, M., Luyten, P., Duriez, B., & Goossens, L. (2008). Maladaptive perfectionism as an intervening variable between psychological control and

- adolescent depressive symptoms: a three-wave longitudinal study. *Journal of Family Psychology*, 22(3), 465. doi: 10.1037/0893-3200.22.3.465
- Stiller, J., & Dunbar, R. I. (2007). Perspective-taking and memory capacity predict social network size. *Social Networks*, 29(1), 93-104.
<https://doi.org/10.1016/j.socnet.2006.04.001>
- Struck, N., Gärtner, T., Kircher, T., & Brakemeier, E. L. (2021). Social cognition and interpersonal problems in persistent depressive disorder vs. episodic depression: the role of childhood maltreatment. *Frontiers in Psychiatry*, 1471.
<https://doi.org/10.3389/fpsy.2020.608795>
- Todd, A. R., & Galinsky, A. D. (2014). Perspective-taking as a strategy for improving intergroup relations: Evidence, mechanisms, and qualifications. *Social and Personality Psychology Compass*, 8(7), 374-387. <https://doi.org/10.1111/spc3.12116>
- Tomova, L., von Dawans, B., Heinrichs, M., Silani, G., & Lamm, C. (2014). Is stress affecting our ability to tune into others? Evidence for gender differences in the effects of stress on self-other distinction. *Psychoneuroendocrinology*, 43, 95-104.
<https://doi.org/10.1016/j.psyneuen.2014.02.006>
- Weightman, M. J., Air, T. M., & Baune, B. T. (2014). A review of the role of social cognition in major depressive disorder. *Frontiers in Psychiatry*, 5, 179.
- Weissman, M. M., Markowitz, J. C., & Klerman, G. (2008). *Comprehensive Guide to Interpersonal Psychotherapy*. Basic Books.
- Wood, A. M., Maltby, J., Gillett, R., Linley, P. A., & Joseph, S. (2008). The role of gratitude in the development of social support, stress, and depression: Two longitudinal studies.

Journal of Research in Personality, 42(4), 854-871.

<https://doi.org/10.1016/j.jrp.2007.11.003>

Wood, J. V., Saltzberg, J. A., Neale, J. M., Stone, A. A., & Rachmiel, T. B. (1990). Self-focused attention, coping responses, and distressed mood in everyday life. *Journal of Personality and Social Psychology*, 58(6), 1027–1036. <https://doi.org/10.1037/0022-3514.58.6.1027>

Zahra, D., Qureshi, A., Henley, W., Taylor, R., Quinn, C., Pooler, J., Hardy, G., Newbold, A., & Byng, R. (2014). The work and social adjustment scale: Reliability, sensitivity and value. *International Journal of Psychiatry in Clinical Practice*, 18(2), 131–138.

<https://doi.org/10.3109/13651501.2014.894072>

Zbozinek, T. D., Rose, R. D., Wolitzky-Taylor, K. B., Sherbourne, C., Sullivan, G., Stein, M. B., ... & Craske, M. G. (2012). Diagnostic overlap of generalized anxiety disorder and major depressive disorder in a primary care sample. *Depression and Anxiety*, 29(12), 1065-1071.

Table 1*Descriptive Statistics of Primary Study Variables*

	Time 1			Time 2		
	<i>M (SD)</i>	Range	<i>n</i>	<i>M (SD)</i>	Range	<i>n</i>
IRI-PT	17.99 (5.47)	0-28	421	18.87 (4.97)	4-28	421
WSAS	23.01 (8.68)	0-40	420	17.40 (9.04)	0-40	416
BASIS24-RS	1.35 (0.82)	0-3.84	415	1.06 (0.82)	0-4	416
PHQ-9	9.64 (5.71)	0-25	414	7.31 (5.24)	0-25	418

Note. IRI-PT = Interpersonal Reactivity Index, Perspective Taking subscale; WSAS = Work and Social Functioning; BASIS24-RS = Behavior and Symptom Identification Scale, Relationship Subscale; PHQ-9 = Patient Health Questionnaire-9

Table 2*Zero-Order Correlations Among Primary Study Variables*

	T2	T1	T2	T1	T2	T1	T2
	IRI-PT	WSAS	WSAS	BASIS24-RS	BASIS24-RS	PHQ-9	PHQ-9
T1 IRI-PT	.72***	-.14**	-.16**	-.23***	-.20***	-.03	-.08
T2 IRI-PT	---	-.14**	-.23***	-.25***	-.26***	-.06	-.18***
T1 WSAS	---	---	.61***	.34***	.34***	.57***	.43***
T2 WSAS	---	---	---	.22***	.32***	.51***	.70***
T1 BASIS24-RS	---	---	---	---	.47***	.33***	.28***
T2 BASIS24-RS	---	---	---	---	---	.22***	.33***
T1 PHQ-9	---	---	---	---	---	---	.61***

Note. IRI-PT = Interpersonal Reactivity Index, Perspective Taking subscale; WSAS = Work and Social Functioning; BASIS24-RS = Behavior and Symptom Identification Scale, Relationship Subscale; PHQ-9 = Patient Health Questionnaire-9

p < .01, *p < .001

Table 3*Individual Cross-Lagged Panel Models Results*

DV	IV	β	<i>SE</i>	<i>p</i>	95% CI
Figure 1a					
T2 WSAS	T1 IRI-PT	-.08	.04	.046	-.25, -.002
T2 IRI-PT	T1 WSAS	.04	.03	.23	-.06, .02
T2 WSAS	T1 WSAS	.61	.03	< .001	.54, .67
T2 IRI-PT	T1 IRI-PT	.71	.02	< .001	.67, .76
Figure 1b					
T2 BASIS24-RS	T1 IRI-PT	-.11	.05	.02	-.19, -.02
T2 IRI-PT	T1 BASIS24-RS	-.09	.04	.01	-.16, -.02
T2 BASIS24-RS	T1 BASIS24-RS	.45	.04	< .001	.37, .53
T2 IRI-PT	T1 IRI-PT	.70	.03	< .001	.65, .75
Figure 1c					
T2 PHQ-9	T1 IRI-PT	-.07	.04	.06	-.14, .004
T2 IRI-PT	T1 PHQ-9	-.03	.03	.36	-.09, .03
T2 PHQ-9	T1 PHQ-9	.61	.03	< .001	-.15, .004
T2 IRI-PT	T1 IRI-PT	.72	.02	< .001	.67, .77

Note. IRI-PT = Interpersonal Reactivity Index, Perspective Taking subscale; WSAS = Work and Social Functioning; BASIS24-RS = Behavior and Symptom Identification Scale, Relationship Subscale; PHQ-9 = Patient Health Questionnaire-9

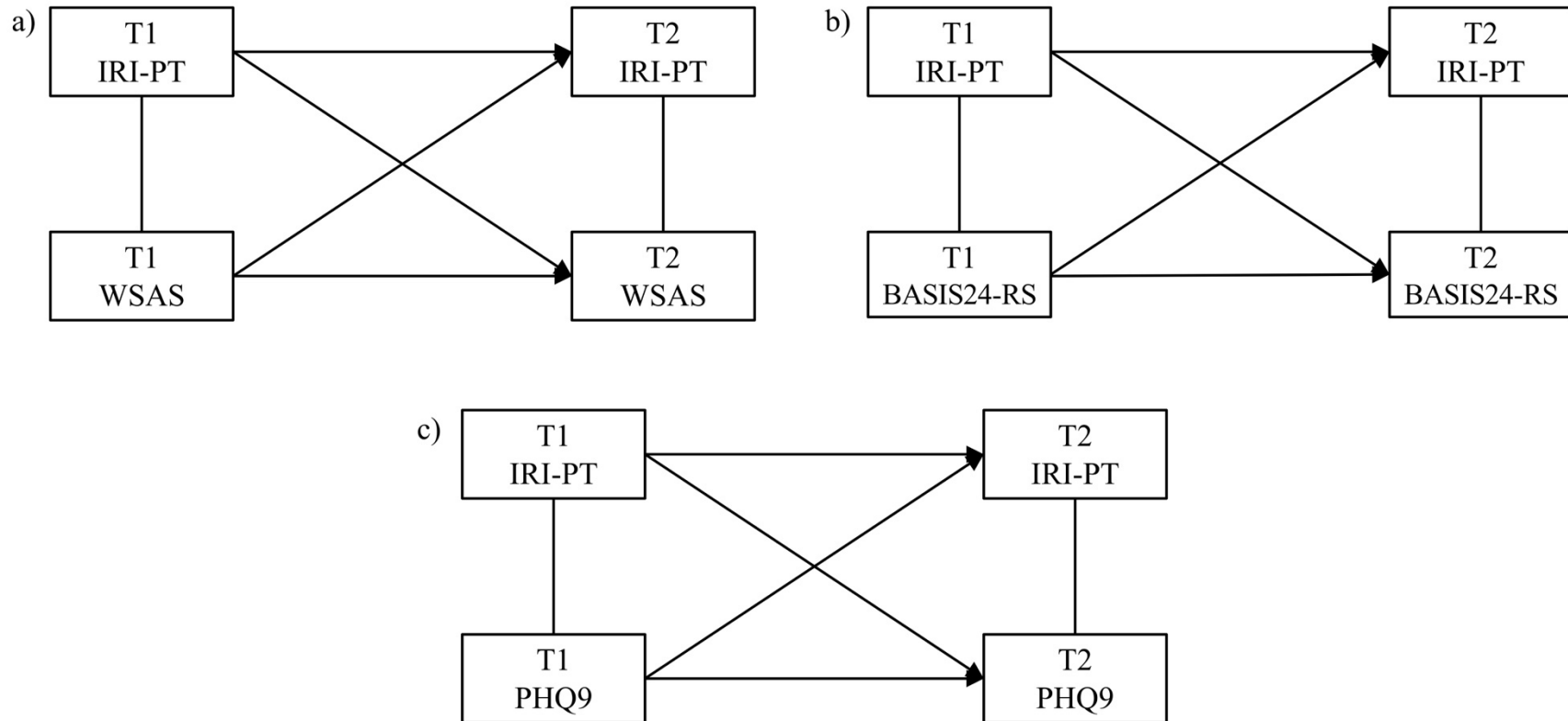
Table 4*Omnibus Cross-Lagged Panel Models Results*

DV	IV	β	<i>SE</i>	<i>p</i>	95% CI
T2 IRI-PT					
	T1 IRI-PT	.70	.03	< .001	.65, .74
	T1 BASIS24-RS	-.09	.04	.02	-.16, -.01
	T1 WSAS	-.02	.04	.69	-.10, .07
	T1 PHQ-9	.01	.04	.90	-.08, .09
T2 WSAS					
	T1 IRI-PT	-.07	.04	.07	-.14, .01
	T1 BASIS24-RS	.10	.04	.01	.02, .18
	T1 WSAS	.45	.04	< .001	.36, .53
	T1 PHQ-9	.22	.05	< .001	.13, .31
T2 BASIS24-RS					
	T1 IRI-PT	-.11	.04	.02	-.19, -.02
	T1 BASIS24-RS	.41	.04	< .001	.33, .50
	T1 WSAS	.02	.05	.72	-.09, .13
	T1 PHQ-9	.08	.05	.15	-.03, .18
T2 PHQ-9					
	T1 IRI-PT	-.05	.04	.26	-.12, .03
	T1 BASIS24-RS	.06	.04	.15	-.02, .14
	T1 WSAS	.10	.05	.03	.01, .20
	T1 PHQ-9	.53	.04	< .001	.45, .62

Note. IRI-PT = Interpersonal Reactivity Index, Perspective Taking subscale; WSAS = Work and Social Functioning; BASIS24-RS = Behavior and Symptom Identification Scale, Relationship Subscale; PHQ-9 = Patient Health Questionnaire-9. Results correspond with path depicted in Figure 2.

Figure 1

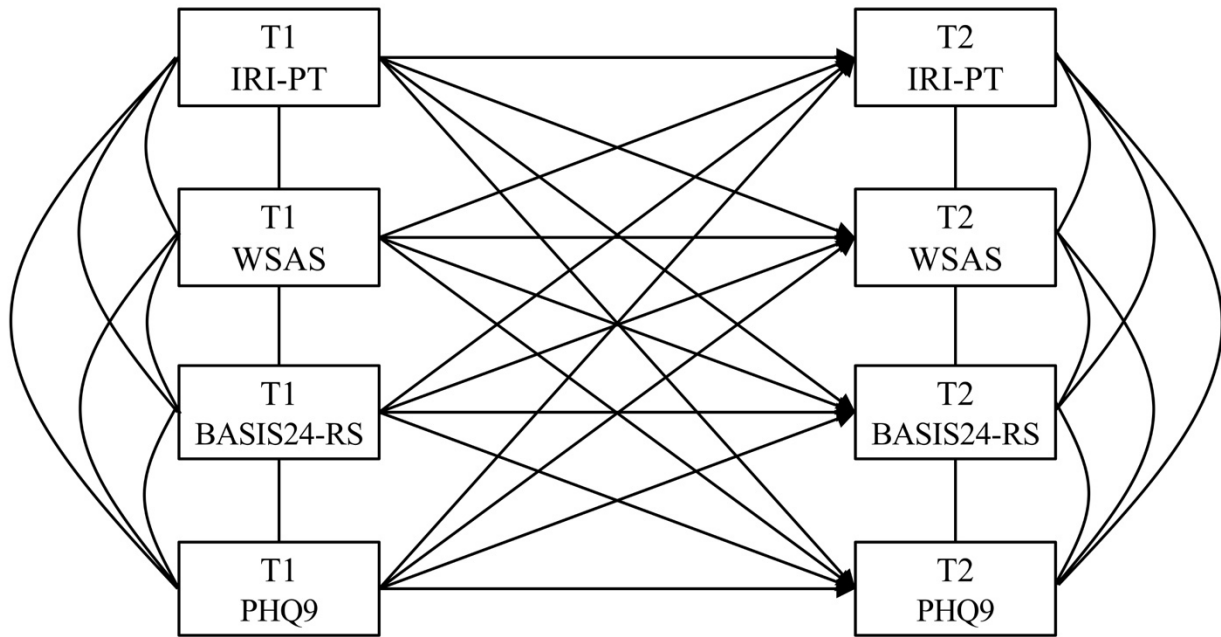
Individual Cross-Lagged Panel Models Examining the Longitudinal Association of Perspective Taking and a) Overall Functional Impairment b) Relationship Problems and c) Depressive Symptoms



Note. IRI-PT = Interpersonal Reactivity Index, Perspective Taking subscale; WSAS = Work and Social Functioning; BASIS24-RS = Behavior and Symptom Identification Scale, Relationship Subscale; PHQ-9 = Patient Health Questionnaire-9

Figure 2

Omnibus Cross-Lagged Panel Model Examining the Longitudinal Association Among Perspective Taking, Overall Functional Impairment, Relationship Problems, and Depressive Symptoms



Note. IRI-PT = Interpersonal Reactivity Index, Perspective Taking subscale; WSAS = Work and Social Functioning; BASIS24-RS = Behavior and Symptom Identification Scale, Relationship Subscale; PHQ-9 = Patient Health Questionnaire-9