

Research Article

Implicit Social Competence and Self Worth in Adults with Autism

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Abstract

Background: Typically, constructs such as self-worth and social competence are examined using either self- or parent-report behavioral questionnaires. This approach to assessment is subject to social desirability bias and other demand characteristics that can affect validity. Additionally, among adults with Autism Spectrum Disorder (ASD), the ability to self-report on internalized constructs such as self-worth may be challenging, due in part to limited verbal expression and emotional insight.

Method: The present study examined the constructs of self-worth and social competence implicitly, to address these concerns, and examined the relation between these constructs and loneliness and depression among adults with ASD (n=14), a demographically matched neurotypical (NT) sample (n=28), and a group of NT young adults whose implicit social competence fell into the lowest quintile of the NT sample (n=40).

Results: Preliminary findings did not indicate group differences on any measured variables. However, loneliness and implicit social competence (ISC) were moderately correlated in the ASD group ($r=0.42$), but not in either NT group.

Conclusions: Further exploration of these constructs, measured both explicitly and implicitly, may contribute to a more nuanced understanding of contributors to quality of life in people diagnosed with ASD.

Keywords: *autism, depression, loneliness, self-worth, social competence, IAT*

Introduction

Mood disturbance is common in Autism Spectrum Disorder (ASD). Research has shown that individuals with ASD report higher rates of depression [1], loneliness [2,3], and are more likely to be excluded from peer interactions [4] than are neurotypical (non-ASD) adults. Yet, we know little about the mechanisms that give rise to elevated comorbidity in ASD. Perceived low social competence and self-worth may predict or mediate psychiatric comorbidity in ASD and thus warrant considerable attention insofar as they inversely relate to depression and loneliness.

Although social disability is a hallmark diagnostic criterion of ASD, research has found this population inconsistently perceives deficits in social competence when self-reporting their social abilities [5]. There are also developmental effects; specifically, young adults are typically more accurate than children [6]. Additionally, these individuals typically report significantly lower self-worth than same-age peers [7]. Transdiagnostically, diminished social competence and self-worth both contribute to increased rates of depressive symptomatology [8]. Social

competence has also been found to contribute to variance in self-reported loneliness of neurotypical young adults [9,10]. Curiously, little attention has been paid to a potentially unique pattern of loneliness and social skill in an ASD sample.

Self-worth and social competence are most commonly measured using self-report or other-report questionnaires which may not fully capture the identified constructs. Less attention has been given to social competence and self-worth as latent and/or reticently reported constructs. The Implicit Associations Test (IAT) [11] allows for the study of implicit cognition, which the developers define as unconscious mental processes that underlie knowledge, perception and memory. Greenwald and colleagues [11] proposed to measure implicit cognitions using a series of computer-based tests to gauge the strength of targeted mental associations. The test-taker is instructed to rapidly categorize paired concepts based on a given attribute. Users are instructed in the correct pairings, so analyses consider latency time, rather than accuracy, to determine the strength of the association between constructs. The IAT has been validated as a measure of several constructs and behaviors which may pose challenges for explicit measurement, including anxiety [12], suicidality [13], and self-worth [14], though less attention has focused on social competence [15]. Those studies which have examined implicit self-worth tend to report discrepancies between measures of implicit and explicit self-worth, suggesting that these measures may capture the latent construct of self-worth through demonstrably different lenses [16,17]. Assessment of implicit cognitions offers an alternative way to measure constructs; given that the IAT does not require introspection and is less influenced by social demand characteristics, it may prove a more valid assessment for some constructs [17].

The present study examined implicit self-worth and social competence in relation to depression and loneliness among adults with ASD. The primary aim was to compare adults diagnosed with ASD and neurotypical (NT) peers on measures of depression, loneliness, implicit self-worth (ISW), and implicit social competence (ISC). It was hypothesized that adults with ASD would report greater depression and loneliness; and lower ISW and ISC. The second aim was to examine the influence of ISW and ISC on depression and loneliness; it was hypothesized that the implicit predictors would be negatively associated with depression and loneliness.

Materials and Method

Participants

Participants in the ASD sample were recruited through the Interactive Autism Network (IAN) Research Database at Kennedy Krieger Institute in Baltimore, MD. The IAN database consists of a registry of families of individuals with ASD who have indicated interest in participating in ASD research. Families in the registry have at least one child with an ASD diagnosis provided by a professional, reside in North America, and represent a wide range of age and functioning levels. Total enrollment in the registry exceeds 5,000 individuals, though for the current study, recruitment was restricted to parents of individuals between the ages of 18-27; this age group was selected as broadly representative of the “emerging adulthood” age range, a period of substantial growth and change [18]. Parents provided contact information for their adult child, and participants completing the study were offered the opportunity to enter a raffle for a \$25.00 Amazon gift card. A total of 42 participants with ASD were ultimately enrolled in the study.

The NT sample (n=398) consisted of undergraduate students, at least 18 years of age, enrolled at a large public university in the South-eastern United States. Participants in the NT group signed up for the study using the university’s online platform for research participation (SONA Systems) and were compensated with course extra credit.

Measures

University of California Los Angeles Loneliness Scale, three item version (UCLALS) [19]: The UCLALS consists of three items, requiring participants to rate on a three-point scale (1=hardly ever, 3=often) how

frequently one experiences lack of companionship, feeling left out, and feeling isolated from others. This scale has demonstrated convergence with the 20-item R-UCLA as well as measures assessing related constructs (e.g., depression) [19].

Patient-Reported Outcome Monitoring System (PROMIS) [20]: The PROMIS item bank was developed as a comprehensive assessment system for self- and parent-reported measures of physical and mental health. Self-reported depression was reported for both the ASD and NT samples via the 28-item PROMIS version 1.0 Emotional Distress – Depression scale. The items in this measure have demonstrated satisfactory psychometric properties [20].

Implicit Association Test (IAT) [11]: The IAT was modified from its original form to evaluate self-worth (ISW) [14] and social competence (ICS) [15]. The ISW IAT task included pairings of me/not me and valuable/worthless attributes, while the ISC IAT task included pairings of me/them and rejected/liked attributes. This construct of peer inclusion was intended to capture social competence more concretely, such that individuals with increased social competence would report a stronger association with inclusion (i.e., ‘liked’) than rejection from peer interactions. Each IAT featured practice trials and two test blocks, counterbalanced to eliminate order effects. Analysis procedures followed a standardized scoring algorithm, available upon request [21], which eliminated extended latency trials (0.2% of trials; 263 total responses) and low accuracy rates (34 participants excluded) and included latency penalties for incorrect responses. Difference scores were computed for each IAT task: larger negative numbers indicate greater ISC (i.e., average response time for me/liked pairing was less than me/rejected pairing) and greater ISW (i.e., average response time for me/good pairing was less than me/bad pairing).

Procedures

All participants completed a secure online survey containing UCALS and PROMIS. Following completion of the survey, participants were directed to complete the IAT assessment. Of those who enrolled in the study, 14 of the 42 ASD participants and 228 of the 398 NT participants completed the IAT.

Twenty-eight NT participants matched 2:1 with ASD participants on age and gender, were randomly selected from the full NT sample ($N=228$) to conduct group comparisons. When possible, all NT participants were age-matched within one year of NT participants. All matches were no more than three years apart in age. In addition to the ASD and matched NT groups, a third group was created comprised of 40 NT participants who obtained ISC scores falling within the lowest 15% of the full NT sample. Given that all statistical analyses were significantly underpowered as a result of these small sample sizes further consideration will be given to effect sizes in spite of nonsignificant results.

Results

Demographic and descriptive information is presented in Table 1. Significant gender and age differences emerged between groups; the ASD group was older than both the comparison group and the Low ISC group, and both the ASD and NT comparison group included different proportions of males and females compared to the Low ISC group. There were no statistically significant group differences on depression, loneliness, ISW or ISC. Although non-significant, the NT group reported greater ISC than the ASD group, producing a moderate effect size (Cohen’s $d=0.39$).

Bivariate correlations within the ASD and NT groups did not support a relationship between ISC or ISW and depression (Table 2). ISW was not significantly correlated with depression ($r=-0.10-0.11$) or loneliness ($r=0.17-0.42$) in either the ASD or NT group, respectively. However, there was a modest, though non-significant, relationship between ISC and loneliness in the ASD group ($r=0.42$, $p=0.134$) and in the Low ISC ($n=40$, $r=0.14$, $p=0.364$). In the NT group, this relationship was weaker and negative, though also non-significant ($n=28$, $r=-0.17$, $p=0.383$).

Table 1: Demographic and descriptive data

Mean (SD)	ASD n=14	NT- Matched n=28	NT- Low ISC n=40	Possible Range
Age	21.36 ^a (2.37)	19.82 ^b (1.76)	19.08 ^c (1.12)	18-27
Gender	Male: 11 ^a (78.6%) Female: 3 (21.4%)	Male: 22 ^a (78.6%) Female: 6 (21.4%)	Male: 5 ^b (12.5%) Female: 35 (87.5%)	
Loneliness	5.93 (1.54)	5.64 (1.72)	5.13 (1.88)	0-60
Depression	51.89 (7.71)	50.78 (9.01)	50.92 (7.55)	<i>t</i> -score (0-100)
ISW	-0.34 (0.41)	-0.38 (0.40)	-0.36 (0.43)	
ISC	-0.47 ^a (0.18)	-0.56 ^a (0.27)	-0.12 ^b (0.29)	
Note: Differing superscripts(^{a,b,c}) within rows indicate significant differences at the $p < 0.05$ level				

Table 2: Bivariate within-group correlations

	Depression	Loneliness	Self-worth	Social Comp.
Depression	*****	0.32 (p=0.260)	-0.13 (p=0.652)	0.09 (p=0.754)
Loneliness	0.52 (p=0.005)	*****	0.11 (p=0.704)	0.42 (p=0.134)
Self-worth	-0.23 (p=0.246)	-0.23 (p=0.231)	*****	-0.04 (p=0.887)
Social Comp.	-0.10 (p=0.618)	-0.17 (p=0.383)	0.29 (p=0.138)	*****
Note: ASD group (n=14) above the stars, Matched NT group (n=28) below the stars				

Discussion

The first aim of the current study was to replicate and extend prior explorations of differences between individuals with and without ASD on measures of depression, loneliness, implicit social competence, and implicit self-worth. No significant differences emerged between NT and ASD groups with respect to any of these group variables. This is inconsistent with prior work on these phenomena in children, which has found that youth with ASD report greater loneliness [2,3] and more symptoms of depression [22] than individuals without ASD.

With regard to the IAT tasks, predicted associations between implicit self-worth, implicit social competence and depression did not emerge. However, we did find a notable discrepancy in the relationship between implicit social competence and loneliness in individuals with ASD as compared to NT adults; loneliness and implicit social competence were moderately related in ASD, and unrelated in the comparison sample and Low ISC NT sample. It can therefore be inferred that this relationship is not merely a function of comparatively lower ISC scores in individuals with ASD. We propose that it may reflect a divergent presentation of loneliness and ISC in young adults with ASD. This interpretation is made cautiously, as the correlations noted are nonsignificant. These results expand on the work of Jobe and White [9], who found that social competence uniquely contributed to loneliness in a NT sample. The current findings suggest that the relationship between loneliness and social competence may be stronger in individuals with ASD.

A number of factors may have contributed to the current study's pattern of nonsignificant results. First, analyses including the ASD group were substantially underpowered. The 14 ASD adults with complete IAT data represent a subset of 42 ASD participants who provided complete questionnaire data. This rate of attrition may be attributable to the amount of time required to complete the IAT, along with the tedious nature of the task. Technical difficulties associated with attempting to complete the IAT on an outdated browser or mobile device likely further limited complete participation. Given the moderate effect size and differing effect sizes across groups, we suspect a larger sample would produce significant results and that group differences may emerge; preliminary power analyses utilizing G*Power software suggest that a correlation of 0.4 would be significant ($\alpha=0.05$, power=0.8) in sample size of

34 [23]. Alternatively, these analyses may reflect truly nonsignificant group differences (i.e., adults with and without ASD) and relationships between internalizing symptoms, implicit social competence and implicit self-worth in our sample. This conflict with prior work might well be attributable to sampling bias. Although the individuals with ASD who completed the IAT did not report significantly lower levels of depression compared those who did not complete the task, it is possible that those enrolled in this study may have displayed unusually low levels of symptomatology, given the patience and ability necessary to complete the online surveys independently.

Differing methodology may also be responsible, in part, for inconsistent findings. Prior research has examined explicit reports of social competence, and it is possible the current study captured an element of social competence unaddressed by explicit self-report measures. Despite differences between the current pattern of results and extant literature on internalizing symptoms in ASD, our use of an IAT in an ASD sample represents a novel application of this methodology, and the results suggest further investigation of the utility of IAT measures in adults with ASD.

The results of this pilot study suggest future research on the IAT in ASD samples is warranted. A replication with a larger sample would better reflect population-level variance in the constructs of interest. Our results also suggest that implicit and explicit measures should be directly compared, in part to validate use of the IAT. Finally, the current study highlights the importance of examining these constructs using a multimethod approach. The majority of the research in our field relies on use of a single method, potentially limiting the validity of results [24]. Potential discrepancies between different methods, such as those identified here, highlight the importance of capturing constructs of interest comprehensively. This is critical as it pertains to explorations of social competence, loneliness, and self-worth, given that in these domains, an individual's internal experience may be highly discrepant from their report or behavior, as well as from others' perceptions of their behavior.

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Data Availability Statement

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

Conflict of Interest

The authors declare no conflicts of interest.

References

1. Ghaziuddin M, Ghaziuddin N, Greden J (2002) Depression in persons with autism: implications for research and clinical care. *J Autism Dev Disord* 32: 299-306.
2. Bauminger N, Shulman C, Agam G (2003) Peer interaction and loneliness in high-functioning children with autism. *J Autism Dev Disord* 33: 489-507.
3. Whitehouse AJ, Durkin K, Jaquet E, Ziatas K (2009) Friendship, loneliness and depression in adolescents with Asperger's Syndrome. *J Adolesc* 32: 309-322.

4. Storch EA, Larson MJ, Ehrenreich-May J, Arnold EB, Jones AM, et al. (2012) Peer Victimization in Youth with Autism Spectrum Disorders and Co-occurring Anxiety: Relations with Psychopathology and Loneliness. *J Dev Phys Disabil* 24: 575-590.
5. Williamson S, Craig J, Slinger R (2009) Exploring the Relationship Between Measures of Self-Esteem and Psychological Adjustment Among Adolescents with Asperger Syndrome. *Autism* 12: 391-402.
6. DeRosier ME, Swick DC, Davis NO, McMillen JS, Matthews R (2011) The efficacy of a Social Skills Group Intervention for improving social behaviors in children with High Functioning Autism Spectrum disorders. *J Autism Dev Disord* 41: 1033-1043.
7. Burrows CA, Usher LV, Mundy PC, Henderson HA (2017) The Salience of the Self: Self-referential Processing and Internalizing Problems in Children and Adolescents with Autism Spectrum Disorder. *Autism Res* 10: 949-960.
8. Barnhill GP, Myles BS (2001) Attributional Style and Depression in Adolescents with Asperger Syndrome. *J Posit Behav Interv* 3: 175-182.
9. Jobe LE, White SW (2007) Loneliness, Social Relationships, and a Broader Autism Phenotype in College Students. *Pers Individ Dif* 42: 1479-1489.
10. Zeedyk SM, Cohen SR, Eisenhower A, Blacher J (2016) Perceived Social Competence and Loneliness Among Young Children with ASD: Child, Parent and Teacher Reports. *J Autism Dev Disord* 46: 436-449.
11. Greenwald AG, McGhee DE, Schwartz JL (1998) Measuring Individual Differences in Implicit Cognition: The Implicit Association Test. *J Pers Soc Psychol* 74: 1464-1480.
12. Egloff B, Schmukle SC (2002) Predictive validity of an Implicit Association Test for assessing anxiety. *J Pers Soc Psychol* 83: 1441-1455.
13. Glenn JJ, Werntz AJ, Slama SJK, Steinman SA, Teachman BA, et al. (2017) Suicide and Self-Injury-Related Implicit Cognition: A Large-Scale Examination and Replication. *J Abnorm Psychol* 126: 199-211.
14. Greenwald AG, Farnham SD (2000) Using the implicit association test to measure self-esteem and self-concept. *J Pers Soc Psychol* 79: 1022-1038.
15. Emeh CC, Mikami AY, Teachman BA (2018) Explicit and Implicit Positive Illusory Bias in Children With ADHD. *J Atten Disord* 22: 994-1001.
16. Bosson JK, Swann WB Jr, Pennebaker JW (2000) Stalking the perfect measure of implicit self-esteem: the blind men and the elephant revisited? *J Pers Soc Psychol* 79: 631-643.
17. Buhrmester MD, Blanton H, Swann WB Jr (2011) Implicit self-esteem: nature, measurement, and a new way forward. *J Pers Soc Psychol* 100: 365-385.
18. Arnett JJ (2000) Emerging adulthood. A theory of development from the late teens through the twenties. *Am Psychol* 55: 469-480.
19. Hughes ME, Waite LJ, Hawkey LC, Cacioppo JT (2004) A Short Scale for Measuring Loneliness in Large Surveys: Results From Two Population-Based Studies. *Res Aging* 26: 655-672.
20. Pilkonis PA, Choi SW, Reise SP, Stover AM, Riley WT, et al. (2011) Item Banks for Measuring Emotional Distress from the Patient-Reported Outcomes Measurement Information System (PROMIS®): Depression, Anxiety, and Anger. *Assessment* 18: 263-283.
21. Greenwald AG, Nosek BA, Banaji MR (2003) Understanding and using the implicit association test: I. An improved scoring algorithm. *J Pers Soc Psychol* 85: 197-216.

22. Mahan S, Matson JL (2011) Children and Adolescents with Autism Spectrum Disorders Compared to Typically Developing Controls on the Behavioral Assessment System for Children, Second Edition (BASC-2). *Res Autism Spectrum Disord* 5: 119-125.
23. Erdfelder E, Faul F, Buchner A (1996) GPower: A General Power Analysis Program. *Behav Res Methods, Instrum Comput* 28: 1-11.
24. Podsakoff PM, MacKenzie SB, Podsakoff NP (2012) Sources of method bias in social science research and recommendations on how to control it. *Annu Rev Psychol* 63: 539-569.