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Positive predictors of life satisfaction for autistic college students and their neurotypical peers

Karís Casagrande, M.A., Michigan State University, [casagra3@msu.edu](mailto:casagra3@msu.edu)

Kyle M. Frost, M.A., Michigan State University, [frostky1@msu.edu](mailto:frostky1@msu.edu)

Kathryn M. Bailey, B.S., Vanderbilt University, [kathryn.m.bailey@vanderbilt.edu](mailto:kathryn.m.bailey@vanderbilt.edu)

Brooke R. Ingersoll, Ph.D., Michigan State University, [ingers19@msu.edu](mailto:ingers19@msu.edu)

Corresponding Author: Brooke Ingersoll, PhD, BCBA-D

E-mail: [ingers19@msu.edu](mailto:ingers19@msu.edu), Phone: 517-432-8412

316 Physics Rd., Room 105B, East Lansing, MI 48824

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Karís Casagrande contributed to the study design, data analysis, and writing of this manuscript. Kyle Frost contributed to the study design, data analysis, writing of the results, and manuscript preparation and revision. Kathryn Bailey contributed to the study design and assisted with manuscript revision. Brooke Ingersoll contributed to the study design and assisted with manuscript preparation and revision. All authors and co-authors have reviewed this manuscript prior to submission. This manuscript has been submitted solely to this journal and is not published, in press, or submitted elsewhere

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### Abstract

*Background:* Positive psychological traits are associated with higher life satisfaction, academic success, and fewer mental health problems in neurotypical college students. However, it is unclear whether this is similar for autistic students. This study explores college-specific positive traits, including academic satisfaction, self-efficacy, gratitude, and school connectedness, and their relationship to life satisfaction in autistic college students and their neurotypical peers.

*Method:* Autistic (n=42) and neurotypical (n=50) college students completed an online survey containing measures of autistic traits, college well-being, and life satisfaction. We explored differences in life satisfaction and college well-being between groups using ANOVAs and explored these relationships based on self-reported autistic traits across groups using correlations. We assessed whether a relationship between college-specific well-being and life satisfaction was moderated by autistic traits using linear regression.

*Results:* Results showed emerging differences in school connectedness such that autistic students were less likely to report feeling connected despite similar scores on other domains of college well-being and life satisfaction; correcting for multiple comparisons this difference was no longer significant. However, autistic traits were significantly related to life satisfaction and school connectedness across the full sample. Differences in school connectedness also explained a significant amount of variance in life satisfaction over and above the influence of autistic traits. The interaction between connectedness and autistic traits was not significant.

*Conclusions:* Results suggests that students who experience higher levels of connection with their university and peers, regardless of the number of autistic traits they endorse, report higher satisfaction with life. Given the importance of social connectedness in college-specific and overall well-being, significant attention should be paid to the protective role of social support systems in addition to academic services when understanding how to support autistic

individuals as well as individuals who do not meet diagnostic criteria, but share some similar clinical traits.

## Introduction

Inclusion in postsecondary education is important, as it can improve quality of life and employment opportunities for autistic individuals.<sup>1,2</sup> As greater numbers of autistic students are being identified on college campuses, there has been an increasing focus on how to best support these students throughout their college experience.<sup>3-5</sup> While in college autistic students experience a variety of challenges, such as difficulty with academics, social isolation and rejection, and mental health issues such as anxiety and depression.<sup>6</sup> However, most research with autistic college students has focused primarily on these challenges<sup>6,7</sup> despite a variety of strengths that autistic students can bring to college campuses.<sup>8-10</sup> A shift toward positive over negative outcomes, especially psychological well-being and life satisfaction, is becoming more common in evaluating the experiences of college students with and without disabilities.<sup>7,11,12</sup> A growing body of research with neurotypical (NT) college students has suggested that positive psychological traits, such as school satisfaction, gratitude, self-efficacy, and belonging, predict greater life satisfaction, fewer mental health problems, and increased academic success in college.<sup>13-17</sup> These traits are also linked to academic success, college persistence, and positive social experiences for students with intellectual and learning disabilities.<sup>18-21</sup> Positive psychological traits are also being used as a focus for novel areas of preventative and strengths-based interventions for individuals with and without disabilities.<sup>22</sup>

It is important that research with autistic students also shifts to reflect these growing trends in understanding the influence of positive psychological traits and interventions on college success. Given shared challenges with loneliness, stress, anxiety, and depression in college for autistic students,<sup>6</sup> NT students,<sup>23-25</sup> and students with autistic traits,<sup>26-28</sup> it is possible that the psychological traits which support positive outcomes for NT college students also support positive outcomes for autistic college students. However, there has been limited work examining positive psychological traits among autistic college students, and even less

work comparing these constructs in autistic and non-autistic students making it difficult to predict how these variables affect outcomes for autistic students.

We were only able to locate two studies that directly compared the college experiences and outcomes of autistic and NT students; both found worse outcomes for autistic students in terms of academic performance, social relationships, and overall mental health.<sup>10,29</sup> While Gurbuz et al.<sup>10</sup> included a qualitative exploration of strengths and experiences of autistic students, neither of these studies evaluated the influence of potential positive, protective factors on student outcomes. An additional study compared autistic young men at a therapy center to their college-aged male peers.<sup>30</sup> This study looked at self-efficacy as a potential positive predictor of life satisfaction, alongside stress and loneliness. They found that autistic young men experienced similar levels of stress but reported more loneliness and lower self-efficacy, which resulted in lower life satisfaction.

Comparing autistic and NT students based on diagnosis is only one way to assess differences; individual differences based on the level of autistic traits is also important. For example, White and colleagues<sup>3</sup> found that college students who self-reported more autistic traits, regardless of diagnostic status, were more likely to experience anxiety and depression and less likely to be satisfied with college and life overall. Furthermore, the features associated with autism that make the college experience challenging and exhausting for autistic students<sup>7</sup> also create similar challenges for students with subclinical autistic traits.<sup>26-28</sup> Thus, it is important to understand if and how positive psychological traits relate to outcomes for those who both meet for a diagnosis of autism and those who experience similar traits regardless of diagnostic status. As the current literature directly comparing the experiences and well-being of autistic college students and their NT peers is minimal and focuses primarily on the challenges, it is difficult to assess how positive psychological traits relate to positive outcomes for autistic students. This study focused on using validated measures of college well-being and life satisfaction to explore the following questions in a matched sample of autistic and NT college

students: 1) How does college-specific well-being and life satisfaction in autistic students compare to their NT peers? and 2) Do autistic traits moderate the relationship between college-specific well-being and life satisfaction across groups? We hope that this exploratory study can provide initial ideas for future researchers in understanding how to better understand and support autistic college students using a strengths-based approach.

## Methods

### Participants

Participants in this study were part of a larger mixed methods study exploring social and academic experiences in autistic college students.<sup>31</sup>

We recruited 42 autistic students through disability resource centers at degree-granting Midwestern universities. We contacted 28 public and private institutions, including doctoral, master's, baccalaureate, and associate's programs. Twelve of 28 centers (42.8%), primarily 4-year public universities with doctoral programs, distributed information directly to students registered with accommodations for autism; the average caseload was 40.8 students (8.6% response rate). We recruited 82 NT peers through an undergraduate research pool at one of the participating universities; students who reported having a current or past history of social, emotional, or developmental conditions ( $n=6$ ) were excluded from the NT sample. A subset of NT participants ( $n=50$ ) was included in the comparison sample based on frequency matching for gender, race/ethnicity, first-generation student status, and age. We were able to match all demographics across group level except for age ( $p=0.046$ , Cohen's  $d=0.420$ ), as we did not have enough older participants in the NT sample. There were also small, trending group differences in GPA ( $p=0.077$ , Cohen's  $d=-0.362$ ) which we controlled for in later analyses (see Table 1).

[Insert Table 1 here]

### Measures

Participants completed an online survey containing the following measures:



**Demographics.** We asked participants to report their age, gender identity, racial and ethnic background, status as a first-generation college-student, and grade point average (GPA).

**Autistic Traits.** We measured autistic traits using the Autism Spectrum Quotient (AQ), a 50-item measure of autistic traits validated for adults with average intellectual functioning.<sup>32</sup> On the AQ, participants rate a series of statements that may describe them on a 4-point scale (*definitely disagree* to *definitely agree*). Items are dichotomized and summed to provide an overall score, with higher scores indicating more autistic traits. Internal consistency was adequate across both groups (NT:  $\alpha=.707$ ; ASD:  $\alpha=.675$ ; Combined:  $\alpha=.667$ ).

**Life Satisfaction.** We measured life satisfaction using the Satisfaction with Life Scale (SWLS).<sup>33</sup> The SWLS includes 5 items rated on a 7-point likert scale, with higher scores indicating higher well-being. This scale has been validated in samples of college students with and without disabilities.<sup>18</sup> Internal consistency was high for both groups (NT:  $\alpha=.912$ ; autism:  $\alpha=.890$ ; Combined:  $\alpha=.904$ ).

**College-Specific Well-Being.** The College Student Subjective Well-being Questionnaire (CSSWQ)<sup>17</sup> includes 16 items rated on a 7-point scale across 4 domains: academic satisfaction (e.g., “I am happy with how I’ve done in my classes”), academic efficacy (e.g., “I am an organized and effective student”), school connectedness (e.g., “I can really be myself at this school,” “Other students here like me the way I am.”), and college gratitude (e.g., “I feel thankful for the opportunity to learn so many new things”). Internal consistency was high across both groups for the overall questionnaire (NT:  $\alpha=.928$ ; autism:  $\alpha=.897$ ; Combined:  $\alpha=.915$ ), as well as the individual domains (Sat:  $\alpha=.907-.916$ ; Eff:  $\alpha=.918-.940$ ; Conn:  $\alpha=.834-.840$ ; Grat:  $\alpha=.849-.868$ ).

## Analysis

First, we assessed group differences on life satisfaction as measured by the SWLS and the four CSSWQ domains through a series of ANOVAs. We also explored these differences based on level of autistic traits across the whole sample using Pearson correlations. We

adjusted our  $\alpha$  levels to account for inflated type I error due to multiple exploratory comparisons using Bonferroni corrections. Second, we explored the degree to which autistic traits and individual CSSWQ domains predicted SWLS scores, as well as potential interactions between each CSSWQ domain and autistic traits, using moderated regression. We grand-mean centered continuous variables and effect coded categorical variables; we computed interaction terms using centered variables.

## Results

### **How does college-specific well-being and life satisfaction in autistic students compare to their NT peers?**

We found that life satisfaction as measured by the SWLS did not differ significantly across groups ( $F(1,90)=2.23, p=0.14, \eta^2=0.02$ ). In terms of college subjective well-being, only the School Connectedness domain showed emerging differences between groups ( $F(1,90)=4.25, p=0.04, \eta^2=0.05$ ), such that NT students reported somewhat greater levels school connectedness than their autistic peers. However, with Bonferroni adjustments to account for multiple comparisons, this group difference was no longer significant. See Table 2 for all means, standard deviations, F-statistics, and effect sizes.

[Insert Table 2 here]

Given wide variation in symptom presentation for autistic individuals, an exploration of differences in life satisfaction and college well-being based on autistic traits as opposed to diagnostic status may be more sensitive to emerging differences. In fact, self-reported autistic traits were significantly correlated with life satisfaction ( $r=-0.336, p=0.001$ ) and the School Connectedness domain of the CSSWQ ( $r=-.421, p<.001$ ); the relationship between AQ and other domains of the CSSWQ was not significant (Academic Satisfaction:  $r=-.092, p=.382$ ; Academic Efficacy:  $r=.024, p=.818$ ; College Gratitude:  $r=-.087, p=.412$ ).

### **Do autistic traits moderate the relationship between college-specific well-being and life satisfaction across groups?**

After controlling for demographics, college-specific well-being ( $\Delta R^2=0.358$ ,  $p<0.001$ ) explained a significant amount of variance in life satisfaction over and above the effect of autistic traits alone ( $\Delta R^2=0.046$ ,  $p=0.027$ ), which were also a significant independent predictor. Specifically, the School Connectedness domain drove this result ( $\beta=0.435$ ,  $p<0.001$ ); no other domains of the CSSWQ were significant in the model. Furthermore, the interaction between CSSWQ domains and autistic traits was not significant ( $\Delta R^2=0.023$ ,  $p=0.335$ ). See Table 3. An analysis of standard residuals showed that the data contained no outliers (Std. Residual: Min=-3.09, Max=2.05), were normally distributed (Shapiro-Wilk:  $p>.18$ ), and met assumptions of collinearity (VIF: Min=1.05, Max=2.47; Tolerance: Min=.41, Max=.95) and independent errors (Durbin-Watson=1.99).

[Insert Table 3 here]

## Discussion

This current study is the first to our knowledge to focus mainly on positive psychological traits and outcomes for autistic students and their NT peers. While we know that autistic college students experience similar challenges with academics, social isolation, and mental health as their NT peers,<sup>6,23–25</sup> there is little research and growing interest in understanding positive psychological traits and outcomes for autistic college students.<sup>7,11,12</sup> Understanding how positive psychological traits and outcomes present across the spectrum of neurodiversity regardless of diagnostic status is also important, as sub-clinical autistic traits in college students are related to similar academic and social challenges.<sup>3,26–28</sup> As such, the goals of this study were to 1) compare well-being in terms of college-specific well-being and life satisfaction in autistic students and their NT peers; and 2) evaluate whether autistic traits moderated the relationship between college-specific well-being and life satisfaction across groups.

We found no significant difference in life satisfaction or college well-being between autistic college students and their NT peers in our sample. This is somewhat surprising given previous research which has found lower subjective well-being among autistic compared to NT

young adults.<sup>30</sup> One possible explanation is that our measure focused on the cognitive component of well-being, which is thought to reflect a long-term perspective involving conscious values and goals.<sup>34</sup> This may make it less likely to reflect negative affective experiences associated with anxiety and depression, which are higher among autistic individuals.<sup>3</sup> It is also possible that college students on the spectrum experience higher subjective well-being than autistic young adults who do not attend college, or that our use of a matched sample of NT peers controlled for confounds present in previous studies as demographic variables like age, race, or gender influence college outcomes.<sup>35-37</sup> Lastly, we may lack adequate power to detect this difference at the group level. It should be noted that when we combined our sample, we found a significant relationship between autistic traits and life satisfaction, indicating that individuals who endorsed more autistic traits reported lower life satisfaction. This is consistent with previous research showing a relationship between autistic traits and quality of life,<sup>38</sup> suggesting that higher levels of autistic traits may be related to lower life satisfaction; it may also suggest that a dimensional measure is more sensitive for capturing this association in a college population.<sup>39</sup>

When we examined domains of college-specific well-being, we found that students with fewer autistic traits reported feeling more socially connected to their university and peers. This is consistent with findings of other studies that have shown that students with autistic traits report more social isolation, lower quality friendships, and poorer social functioning.<sup>26,27</sup> Interestingly, there were no differences in the other domains, including academic satisfaction, academic efficacy, and college gratitude, suggesting that differences in college-specific well-being may be limited to the social domain.

We also found that school connectedness, above and beyond autistic traits and to the exclusion of the other domains of college-specific well-being, was responsible for a large amount of the variance in life satisfaction. There were no interactions between domains of college-specific well-being and autistic traits in predicting life satisfaction, suggesting that the

influence of positive psychological traits on life satisfaction may be similar for students with varying levels of autistic traits. Taken together, both autistic traits and school connectedness should be considered as critical, but separate, components for understanding life satisfaction in college students.

### **Limitations**

The current study has several limitations to consider. First, while we used psychometrically validated measures of college well-being and life satisfaction, there are concerns regarding the use of the AQ despite previous validation of the measure. A recent study comparing different ways of scoring the AQ for neurotypical college students suggests that individual factors rather than a total score provide a more stable and interpretable measure of autistic traits.<sup>40</sup> However, the authors also indicate that there is limited research available to understand this in clinically diagnosed autistic individuals. Another study looking at the validity of the AQ in both autistic and non-autistic adults shower adequate performance despite poor unidimensionality.<sup>41</sup> Greater attention should be paid to identifying psychometrically sound measures of autistic traits that can be used with both autistic and neurotypical college students.

Second, our sample was small and homogenous, limiting statistical power and the ability to draw generalizable conclusions. Despite these challenges, our sample was similar to other studies that compare autistic individuals to their NT peers<sup>10,29,30</sup> and the demographics are similar to the population of autistic college students.<sup>5</sup> Knowing this, we matched our sample to a group of NT peers based on a variety of demographic characteristics to reduce the impact of this sample bias on our interpretations.

Lastly, our sample included students that were enrolled in a 4-year, degree granting institution who disclosed their diagnostic status to college disability centers despite reaching out to a variety of difference types of institutions including private and community colleges. As autistic students may be more likely to attend community college<sup>42</sup> or may not disclose their

diagnostic status,<sup>43</sup> future studies should recruit from a wider variety of institutions both through and outside of disability resource centers.

### **Recommendations and future directions**

Our findings highlight the importance of school connectedness in life satisfaction for college students with varying levels of autistic traits. Research with NT college students also highlights the importance of school connectedness in academic performance and student wellness. This work has led to the development of “light-touch” social belonging interventions that use attitude-change procedures early in the college experience, to encourage students from disadvantaged backgrounds (i.e., racial/ethnic minorities, first generation college students), to attribute social adversity to common and transient aspects of the college experience rather than fixed deficits.<sup>44,45</sup> Research has shown immediate positive effects on social belonging and well-being, positive effects on academic performance and health three years later among African-American college students who participated in an identity-affirming writing assignment or received information about how students from their background experienced and overcame the challenges of college.<sup>44,45</sup> Future research might consider whether a similar approach to identity affirmation and sharing of the success of other autistic students may be beneficial at increasing well-being in autistic college students and those with related social challenges. However, social exclusion from peers<sup>8,46–48</sup> combined with social communication challenges associated with the diagnosis of autism<sup>7</sup> create a significant barrier to success in integrating into a college community that may require more intensive intervention.

Peer mentorship programs are another potential way to support social integration and increase perceptions of school connectedness. However, it is important to understand the factors related to effective peer mentoring models, as there has been little research on effective practices.<sup>49</sup> For example, one program increased social support and integration by matching students with specialist peer mentors, who were graduate students in professional speech or occupational therapy programs that were aware of the unique challenges facing autistic

students.<sup>50</sup> This program emphasized weekly individual meetings between mentors and mentees, weekly social groups with other mentors and mentees in the program, and off-campus social outings. Another promising model of peer mentorship utilized NT peers who received training around ASD and support from a clinician to accompany autistic students to social events.<sup>51</sup> This model provided a more naturalistic approach to increasing social integration, as autistic students chose activities based on their own motivations and interests, received training in organizational and social skills relevant to that setting, and were supported by their mentor discretely throughout the activity. Compared to once weekly unstructured meetings with a peer mentor, this model improved social integration, academic performance, and college satisfaction.

While both of these mentorship programs utilized NT peers with an awareness and understanding of autism, it is also important to consider the potential role of autistic peer mentors in social support interventions. In one study, autistic students expressed a preference for one-on-one mentorship as described above compared to social skills groups, but also discussed the importance of being able to share experiences with and get support from other autistic students.<sup>52</sup> When asking mentors and mentees about what made their peer mentorship experience beneficial, both autistic students and their mentors emphasized the importance of a tailored fit and strong personal relationship regardless of the mentorship model.<sup>53</sup> As such, interventions designed to increase social integration and belongingness should include the input and preferences of autistic students.

## **Conclusions**

Given the influence of the social experience on both college well-being and overall life satisfaction, significant attention should be paid to the protective role of social support systems in addition to academic services when understanding how to support individuals in college. There were significant, but distinct, impacts of autistic traits and school connectedness on life satisfaction that make it important to attend not just to individuals who disclose a diagnosis of autism, but to those that exhibit autistic traits or feel disconnected from their peers. The

CSSQW, particularly the School Connectedness subscale, may be a useful screening tool to identify students who are struggling to feel connected and accepted at their college and may thus be at higher risk for lower life satisfaction. Students who are showing risks, regardless of diagnostic status, can then be connected to supports to improve their integration into the college social experience.



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