FLOURISHING AND MENTAL HEALTH PROBLEMS IN AUTISTIC AND NON-AUTISTIC YOUTH WITH INTELLECTUAL DISABILITY

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Abstract

Autistic youth and youth with intellectual disability (ID) are at increased risk of experiencing mental health problems, yet little is known about how co-occurring autism impacts overall wellbeing, or which individual and environmental factors may contribute to differences in outcomes. In the present study, positive and negative mental health outcomes were compared between autistic and non-autistic youth with ID between the ages of 12-22 ($N = 97$). Results indicate that autistic youth with ID experienced significantly less positive mental health outcomes, and more mental health problems, than youth with ID alone. Community involvement and family relationship quality emerged as key mediators of group differences. Interviews with youth surrounding their experiences of mental health were conducted, with results highlighting the importance of both self-directed activities and positive social connection to promote wellbeing. Findings underscore the importance of establishing inclusive environments for youth with ID to allow them to thrive.

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Flourishing and Mental Health Problems in Autistic and Non-Autistic Youth with Intellectual Disability

Intellectual disability (ID) and autism, each present in an estimated 1-3% of the general population (Centre for Disease Control & Prevention, 2022; Patel et al., 2020), are developmental conditions that both have complex symptomatology and put youth at risk for experiencing negative mental health outcomes. Intellectual disability is defined as a significant impairment in cognitive and adaptive functioning (Patel et al., 2018). Conversely, autism is characterized by social differences, restrictive interests, and repetitive behaviours (American Psychiatric Association, 2025). For both those with ID and autistic individuals, mental health problems are experienced at high rates; individuals with ID experience mental health problems three to four times more frequently than their peers without ID (Einfeld et al., 2006), and autistic youth are similarly four times more likely to experience mental health problems than the general population (Hudson et al., 2019). Further, autism and ID are conditions that frequently co-occur; it is estimated that 30 to 70% of autistic youth also have an ID (Thurm et al., 2019), highlighting that youth with both autism and ID may be particularly at risk for poor mental health outcomes.

Despite this, youth with ID are rarely included in studies examining mental health and wellbeing in autism. This was investigated in further detail by a meta-analysis that synthesized all research published in 2016 that included autistic participants (in journals with an impact factor score of 3 or higher; Russell et al., 2019). They found that 94% of autistic participants across the 301 studies did not have co-occurring ID. This exclusion highlights that youth with co-occurring autism and ID are a particularly marginalized group with respect to empirically

driven knowledge of wellbeing outcomes, and further exploration in this area is crucial to inform effective mental health support.

1.1 Theoretical Framework for Wellbeing

Keyes (2010) posits that wellbeing is not simply the absence of mental health problems, but also the presence of happiness, satisfaction and meaningful experiences; referred to as the Two-Continua Model of Wellbeing. The model suggests that mental health problems and positive mental health are distinct but related constructs along separate dimensions. Positive mental health is comprised of both *hedonic wellbeing*, defined as the experience of positive emotions, and *eudaimonic wellbeing*, defined as purpose, meaning and social belonging. The model terms the presence of high levels of positive mental health as "flourishing", and the low levels of positive mental health as "languishing". A similar construct explored in the literature related to high positive mental health is 'thriving'. Thriving has been defined as exercising individual strengths in pursuit of self-improvement and a meaningful, purposeful life (Benson & Scales, 2009), and can be conceptualized as capturing eudaimonic components of positive mental health as described by Keyes in the Two-Continua Model of Wellbeing. Further, Keyes (2010) theorizes that, while higher positive mental health is related to lower levels of mental health problems, an individual can also experience both positive mental health and mental health problems at the same time. Additionally, it has been suggested that both positive mental health and mental health problems can be impacted by the degree of congruence between an individual's environmental demands/resources and unique personal characteristics or abilities (Benson & Scales, 2009; Mandy & Lai, 2016).

Though these previous theories contend that enjoyable or satisfying emotions and meaningful experiences are key components of "being well", previous research on mental health and wellbeing for youth with ID has predominantly focused on negative emotions or outcomes rather than positive emotions and experiences (Dykens, 2006). Most previous theory on flourishing has focused on youth in the general population (Benson & Scales, 2009), limiting what can be concluded about the wellbeing of youth with complex support needs or high risk for mental health problems. Moreover, previous work including autistic youth or youth with ID has often relied on measures filled out by proxies on behalf of the youth (Bradley et al., 2004; Einfeld et al., 2008; Morán et al., 2019; Weiss & Burnham Riosa, 2015), which may not capture components of their personal perspective regarding their wellbeing.

1.2 Mediators of Wellbeing Outcomes

Lerner (1991) contends that psychological research must take on a *developmental contextual* perspective; that is, account for diversity in human psychological traits and behaviours, as well as individual variability in ecological circumstances. Variability in behaviour may be captured by the extent to which an individual uses Adaptive Behaviour, defined as social, conceptual and practical skills that allow one to meet societal expectations (Schalock et al., 2021). Adaptive behaviour is particularly germane to consider for autistic and non-autistic youth with ID, as it is a critical component for assessing the level of support an individual may need to function effectively in society. Further, Balboni and colleagues (2019) found that participants with intellectual or developmental disabilities who had higher adaptive behaviour scores were more likely to report higher overall perceived quality of life, whereby quality of life

encompassed the domains of personal development, self-determination, social inclusion, interpersonal relationships, rights, and emotional, physical and material wellbeing.

The social determinants of health (SDHs), defined as social factors related to health outcomes, including access to resources, inclusive social policy, and the ability to exercise personal autonomy (Krumeich & Meershoek, 2014), can be used to operationalize contextual factors that are linked to wellbeing. In the general population, negative SDHs, such as poverty, social disadvantage, and poor family functioning have been linked to mental health problems (Behere et al., 2017; Kirkbride et al., 2024; Wadsworth & Achenbach, 2005), and community involvement/strong peer relationships have been associated with positive mental health outcomes (An et al., 2024; Keyes et al., 2010; Mužík et al., 2025). It is well established that autistic individuals and those with ID are more likely to experience disadvantages concerning SDHs than the general population, including difficulty accessing care or necessary resources, difficulty connecting with peers, and increased risk of family stressors and socioeconomic disadvantage (Blacher et al. 2005; Holmes, 2022; Iadarola et al., 2019; Kogan et al., 2008; Merrells et al., 2019; Rimmerman, 2024). Moreover, the odds of having an emotional disorder may be reduced by up to 51% when controlling for between-group differences in exposure to socio-environmental risk factors between youth with and without ID (Emerson & Hatton, 2007).

Autistic youth with ID may be at particular risk for mental health problems and a lack of positive mental health compared to peers with ID alone. Bradley and colleagues (2004) found that rates of psychiatric disorders and behavioural disturbances are higher in autistic youth with ID than non-autistic youth with ID. Further, work by Weiss and Burnham Riosa (2015) suggest that both individual and contextual factors may differentially impact wellbeing autistic youth

with ID compared to youth with ID alone; they found that autistic youth with ID experienced less thriving than non-autistic youth with ID, and this association was mediated by differences in socio-communicative challenges and participation in home, school and community activities. Notably however, this study was limited by sampling youth with ID registered with community Special Olympics, and by relying solely on parent-report.

Current Study

The objective of the current project was to compare positive and negative mental health outcomes between autistic and non-autistic youth with ID through both self-report and parent-report measures, in a sample from Canada and the US. Additionally, this project investigated which factors uniquely mediate these outcomes between groups. The specific aims were as follows:

Aim 1: Apply a Two-Continua Model framework to compare positive and negative mental health outcomes between autistic and non-autistic youth with ID.

Aim 2: Identify whether within-participant variables (i.e., adaptive behaviour), and contextual variables (i.e., SDH-related factors) mediate positive and negative mental health outcomes between autistic and non-autistic youth with ID.

Aim 3: Explore how participants in each group describe their emotions, as well as which people, activities, and contexts they relate to their positive and negative mental health outcomes. Given that current wellbeing theories and measurement tools were created for the general population, participant interviews were conducted to capture possible missing components of wellbeing for autistic and non-autistic youth with ID that may not be represented by previous theories or tools.

Method

Design

A mixed-methods, explanatory sequential design (Ivankova et al., 2006) was used to capture the experience of youth with ID with and without autism. In line with this framework, quantitative data were analyzed first, including the comparison of positive and negative mental health outcomes between autistic and non-autistic youth with ID, as well as SDH factors that may mediate these outcomes for each group. Data collected from interviews with youth participants was then synthesized using a Natural Language Processing program to provide further context to build on quantitative results.

Participants

This project included data from 97 youth/parent dyads. Youth participants were between the ages of 12 and 22, with 37 (38.1%) being autistic as well as having an ID, and 60 (61.9%) being non-autistic with ID. Of 97 youth, 41 (42.3%) identified as ethnically diverse, 42 (43.3%) identified as women/girls, 49 (50.5%) as men/boys, and 4 (6.2%) indicated they identified with another gender. Further, 91 (93.8%) of caregivers included in the study identified as women, 4 (4.1%) as men, and 2 (2.1%) identified as another gender identity. Youth ID caregiver reported severity ranged between Mild (n = 32; 33.0%), Moderate (n = 37; 38.1%), Severe (n = 7; 7.2%), and Profound (n = 1; 1.0%), while 20 (20.6%) participants were reported as unsure of ID severity.

Specific diagnoses of youth participants included 37 (38.1%) individuals with autism, 39 (40.2%) with ADHD, 31 (32.0%) with Global Developmental Delay, 22 (22.7%) with Down syndrome, 1 (1.0%) with William's syndrome, 7 (7.2%) with Fetal Alcohol Spectrum Disorder

(FASD), and 5 (5.2%) with Cerebral Palsy. These were not mutually exclusive. Further, 46 (47.4%) youth had one neurodevelopmental disorder (NDD), 24 (24.7%) youth had 2 NDDs occurring simultaneously, and 26 (26.8%) had 3 or more. In addition, 48 (49.5%) youth participants had at least one co-occurring mental health problem. Co-occurring mental health problems included 43 (44.3%) youth with anxiety, 10 (10.3%) with depression, 6 (6.2%) with obsessive compulsive disorder, 4 (4.1%) with bipolar disorder, 5 (5.2%) with eating disorder, 6 (6.2%) with oppositional defiant disorder, 8 (8.2%) with PTSD, and 2 (2.1%) with another mental health disorder not listed.

Procedure

Dyads were recruited through email and Facebook in both Canada and the US. Once participants expressed interest, they were invited to fill out a sign-up sheet on Qualtrics. Caregivers then participated in a telephone call to confirm ID, age and interest, and were scheduled for a Zoom meeting with a researcher. Consent and assent to participate was confirmed during the Zoom meeting. The researcher interviewed youth to guide them through verbal responses to self-report questionnaires while sharing visual aids to support comprehension. Following the completion of self-report scales, youth underwent an interview, where they were asked to answer questions about their positive and negative emotions, and circumstances that contributed to those emotions. The interview could be completed with or without parent support. Zoom sessions were recorded for later review by the research team.

Parents of youth received surveys (described below) on Qualtrics to be completed as proxies for their youth. They were also asked to complete a demographic questionnaire which included information about the youth (i.e., age, gender, race, ethnicity, disability, mental health

diagnoses, living situation), as well as themselves (i.e., age, gender, ethnicity, education, employment status, and household income).

Measures

Positive Mental Health

Youth Self-Report.

Stirling Children's Well-being Scale (SCWBS; Liddle & Carter, 2015) was used to measure wellbeing through positive outlook and emotional states. It is a 15-item questionnaire, with a 5-point Likert scale (from *Never* to *All the time*) and two sub-categories: Positive Outlook and Positive Emotional State. Liddle and Carter (2015) found that the internal reliability of the total scale was Cronbach $a = .85$, and test-retest reliability correlation was strong ($r = 0.75$, $N = 232$, $p < 0.01$). This tool has been previously used by Anggraini and Novitasari (2022) to measure wellbeing in children with special needs. In the current sample, the internal reliability of the total scale was $a = .81$ for the non-autistic group, and $a = .84$ for the autistic group. This measure also showed construct validity when compared to other similar measures (WHO-5; $r = 0.70$, and the Dubois Self-Esteem Scale; $r = 0.69$).

Parent Report.

Adolescent Mental Health Continuum Short-Form (Adolescent MHC-SF; Keyes, 2009) measured psychological, emotional, and social categories of wellbeing. This questionnaire includes 14 items chosen from the full 40-item long-form questionnaire, and measures three different categories of wellbeing (psychological, emotional, and social) using a 6-point Likert scale ranging from *never* to *always.* The questions are rated on a 5-point Likert scale from "not at all" to "very much". In a study focused on Dutch adolescents, this measure was found to have an

overall internal consistency of Cronbach *a* = .91, and showed construct validity with the PANAS-C, Kidscreen-27, SPF-ILs, and Cantril's ladder measures (Lujten et a., 2019). In the current sample, the internal reliability of this measure was Cronbach *a* = .88 for the non-autistic group, and Cronbach *a* = .91 for the autistic group of youth with ID. Though this measure was originally validated as a youth self-report measure, it was adapted to a parent-report survey for the purposes of this study to capture responses for youth with ID, given that this population may require additional communication support.

Mental Health Problems

Youth Self-Report.

How I'm Feeling: Self-Report Measure for Adolescents with Intellectual Disability (HIF, Gray et al., 2021) measured negative emotions with emotive visuals to support self-reporting for adolescents with ID. This is an 81-item measure with a 3-point scale and visuals to help with comprehension. It includes both anxiety and depression as sub-scales. Gray and colleagues (2021) found that the overall measure showed a *a* = .86, and test-retest reliability after two weeks showed strong intraclass correlation coefficients ranging from .88 - .92 across Anxiety, Depression and Total Scores. Within the sample of participants in the current project, the internal reliability for the entire measure was *a* = .91 in the non-autistic group, and *a* = .93 in the autistic group.

Parent Report.

Anxiety, Depression & Mood Scale (ADAMS; Esbensen et al., 2003) measured mental health problems, and has five sub-scales including Manic/Hyperactive Behaviour, Depressed Mood, Social Avoidance, General Anxiety, and Compulsive Behaviour. The questions use a 3-

point Likert scale from *not a problem* to *severe problem*. Esbensen et al. (2003) found the interrater reliability was .48 for the total scale based on scores from two independent respondents (e.g., caretaker, professional, relative, teacher, etc.) rating the same individual. They also found high test-retest reliability for this measure at .81. Further, the internal reliability of the total scale was Cronbach a = .90 for the non-autistic group, and Cronbach a = .94 for the autistic group in the current sample.

Mediators of Mental Health Outcomes

Within-Participant Variable; Adaptive Behaviour.

Waisman Activities of Daily Living Scale (W-ADL; Maenner et al., 2013) was used to measure youth's ability to independently complete daily living activities. This measure was completed by parents, with a 3-point Likert scale (0 = *does not do at all*, 1 = *does with help*, 2 = *independent*). This measure has previously shown internal consistency across various neurodevelopmental conditions (Cronbach's α = 0.88-0.94) and showed reliability over time with weighted kappas ~ 0.93, as well as construct validity with the Vineland Screener Composite (r = 0.78) and Daily Living sub scales (r = 0.82; Maenner et al., 2013). In the current sample, the internal reliability of the total scale was Cronbach a = .86 for the non-autistic group, and Cronbach a = .84 for the autistic group.

Contextual Variables; Social Determinants of Health.

The Community sub-scale of the *Participant and Environment Measure — Children and Youth* (PEM-CY; Coster et al., 2011) measured youth engagement with their environment and community activities. The PEM-CY is a 5-point Likert scale assessing involvement of activities from 5 = *Very involved* to 1 = *Minimally involved*, and frequency of involvement on an 8-point

scale from *Daily* to *Never*. This test has previously shown good test-retest reliability (r = .79) and internal consistency (Cronbach α = .75; Coster et al., 2011). The internal reliability of the total scale was Cronbach a = .80 for the non-autistic group, and Cronbach a = .83 for the autistic group in the current sample of youth with ID.

PROMIS *Family Relationships* (Short Form; 4-item; Ravens-Sieberer et al., 2014) measured family connectedness. The Family Relationships scale uses a 5-point Likert scale from *Never* to *Almost Always*. There has been previously found to be a moderate correlation between youth and parent scores on various short forms, 0.66-0.68 (Forrest et al., 2017). Within the sample of participants for the current project, the internal reliability was Cronbach a = .89 for the non-autistic group, and Cronbach a = .91 for the autistic group. Notably, this scale captures the quality of a child's relationship within their entire family system, and is not isolated only to the caregiver-child relationship. While this introduces potential variability in family composition between participants, it may capture potential sources of comfort or strain within the family system that could be overlooked if caregiver relationships were measured alone.

Participant Interview

Youth participants were asked to answer questions regarding their positive and negative emotions, and circumstances/people that contributed to those emotions. These questions included variations of the following: "What makes you happy, or what makes your life great?", "Are there any people that make you happy?", "Everyone feels sad sometimes. What sorts of things make you feel sad?", "Everyone is worried or nervous sometimes. What sort of things make you feel worried?", and "Is there anything else you want to mention that makes you feel happy or makes

your life great?". Youth were also asked about their coping strategies through the question: "If you're feeling sad, worried or angry, what helps you to feel better?".

Data Analysis

Quantitative analyses were performed using R Studio. Descriptive statistics were calculated for both Group 1 (i.e., youth with autism and an ID) and Group 2 (youth with an ID and no autism). This included measures of central tendency (mean, median, mode), spread of the distribution (standard deviation and interquartile range) and descriptors of the distribution shape (skew and kurtosis). Histogram and boxplot graphs were generated to visualize the range of the distribution.

Mean differences were compared for both positive mental health and mental health problem variables between autistic and non-autistic groups. Mann Whitney-*U* tests were selected to compare groups to maintain robustness against data-non normality. Further, correlations were run between each mediator and outcome variable. Multiple mediations (using bootstrapping to maintain robustness against normality violations) were then calculated to examine adaptive behaviour, community involvement, and family relationship quality as potential mediators of group differences in outcomes related to positive mental health and mental problems. Some data were missing from the SCWBS (Liddle & Carter, 2015; $n = 24$), HIF (Gray et al., 2021; $n = 17$), MHC-SF (Keyes, 2009; $n = 1$) and PEM-CY (Coster et al., 2011; $n = 1$). For much of these missing data, participants were unable to respond to self-report questionnaires due to challenges with understanding or verbal communication. Given that these data were not missing at random, the analysis was run based on the available complete data.

To analyze interview data, participant responses were transcribed and uploaded into Python, where a Natural Language Processing (NLP) approach was used to analyze the text. Natural Language Processing can be defined as a form of Artificial Intelligence using principles from linguistics to systematically understand, and derive meaning from, written English language (Khurana et al., 2023). Using this approach, top bigrams (i.e., word pairs) using Text Frequency x Inverse Document Frequency (TF-IDF) scoring. The TF-IDF approach aims to capture bigrams that are semantically meaningful and distinctive across text documents by combining the frequency of a term (bigram) within participant responses, with how rare that term is across participant responses. Prior to analysis, data were cleaned using the NLTK package to remove common English filler words (Madnani, 2007; McHugh et al., 2020). Additional custom filler words were removed, including feeling words that may have been repeated components of the question prompt: *'happy', 'sad', 'mad', 'angry', 'worried', 'scared', 'anxious', 'feel', 'calm'*; as well as the following discourse markers: *'like', 'yeah', 'yes', 'almost', 'always', 'maybe', 'sometimes', 'also', 'still'*.

Results

As shown in *Table 1*, Autistic youth with ID (n =37) and youth with ID alone (n = 60) had similar mean demographic characteristics. Group comparisons revealed that groups did not significantly differ in terms of age, gender, ethnicity, caregiver age, caregiver gender or community type (i.e., remote or rural).

Table 1

Participant Demographics

	Total: *M* (*SD*) or *n* (%)	AID: *M* (*SD*) or *n* (%)	ID: *M* (*SD*) or *n* (%)	*t,* OR, X^2	df	*p*
Child age	16.68 (2.82)	16.81 (2.98)	16.60 (2.74)	0.35	72	0.73
Child gender (male)	49 (51%)	19 (51%)	30 (50%)	0.64	1	0.42
Ethnically diverse	41 (43%)	19 (51%)	22 (37%)	1.6	1	0.21
Caregiver age	49.57 (6.71)	49.19 (6.02)	49.80 (7.1)	0.44	84	0.66
Caregiver gender (male)	4 (4%)	2 (5%)	2 (3%)	1.65	-	0.63
Community (Remote/ Rural)	24 (25%)	7 (19%)	17 (28%)	0.6	1	0.44

Note. Autism and Intellectual Disability (*n* = 37); Intellectual Disability (ID; *n* = 60); Overall *N* = 97. For continuous variables “Child age” and “Caregiver age”, *t*-tests were conducted. Chi-Squared Tests were conducted for the binary categorical variables “Child gender”, “Ethnically Diverse” and “Community”. Fisher’s Exact Test was conducted for “Caregiver Gender”.

In Table 2, mediator variables showed moderate to strong correlations with different outcome variables across both groups combined. Adaptive Behaviour was moderately negatively correlated with parent-reported mental health problems ($r = -.38$, $p < .001$). Community Involvement had a moderate positive correlation with youth-report positive mental health ($r = .36$, $p = .002$) and a moderate negative correlation with parent-reported mental health problems ($r = -.44$, $p < .001$). Family relationships had a moderate positive correlation with youth-report

positive mental health (r = .39, p < .001), and a strong positive correlation with parent-reported positive mental health (r = .52, p < .001).

Table 2

Spearman Correlations Between Mediator and Outcome Variables

Variable	1	2	3	4	5	6
1. YR - PMH	—					
2. PR - PMH	.33*	—				
3. YR - MHP	-.54*	-.18	—			
4. PR - MHP	-.37*	-.55*	.36*	—		
5. Adaptive Behaviour	.13	.24*	-.02	-.38*	—	
6. Community Involvement	.36*	0.33	-.24*	-.44*	.18	—
7. Family Relationships	.39*	.52*	-.19	-.26*	.04	.17

Note. * = p < .01.

Mental Health Outcome Group Differences

As shown in Table 3, Mann-Whitney U tests revealed that non-autistic youth with ID had higher levels of positive mental health than autistic youth with ID, according to both self-report, z = -2.64, p = .008, r = .31, and parent proxy-report , z = -3.31, p < .001, r = .34. Non-autistic youth with ID had significantly lower levels of overall mental health problems according to youth self-report , z = -2.07, p = .03, r = .23, and parent proxy-report ; z = -4.32, p < .001, r = .44.

Table 3

Mann-Whitney U Tests Comparing Outcome Variables and Mediators

	Autism and ID Rank *M; M*(*SD*)	ID alone Rank *M; M*(*SD*)	Mann-Whitney *U z*-score	*p*
Positive Mental Health - Youth Report	29.77; 56.67(8.89)	42.96; 62.75(7.60)	-2.64	.008
Positive Mental Health - Parent Report	36.61; 39.54(13.05)	55.96; 48.71(10.79)	-3.31	< .001
Mental Health Problems - Youth Report	46.60; 57.69(20.73)	35.76; 47.67(17.65)	-2.07	.04
Mental Health Problems - Parent Report	64.72; 39.08(17.16)	39.31; 23.30(12.63)	-4.32	< .001
Adaptive Behaviour	39.49; 18.46(5.23)	54.87; 21.43(5.18)	-2.62	.009
Community Involvement	40.39; 68.25(12.57)	53.58; 73.94(11.43)	-2.26	.02
Family Relationship Quality	39.31; 11.68(2.89)	54.98; 13.22(2.55)	-2.68	.007

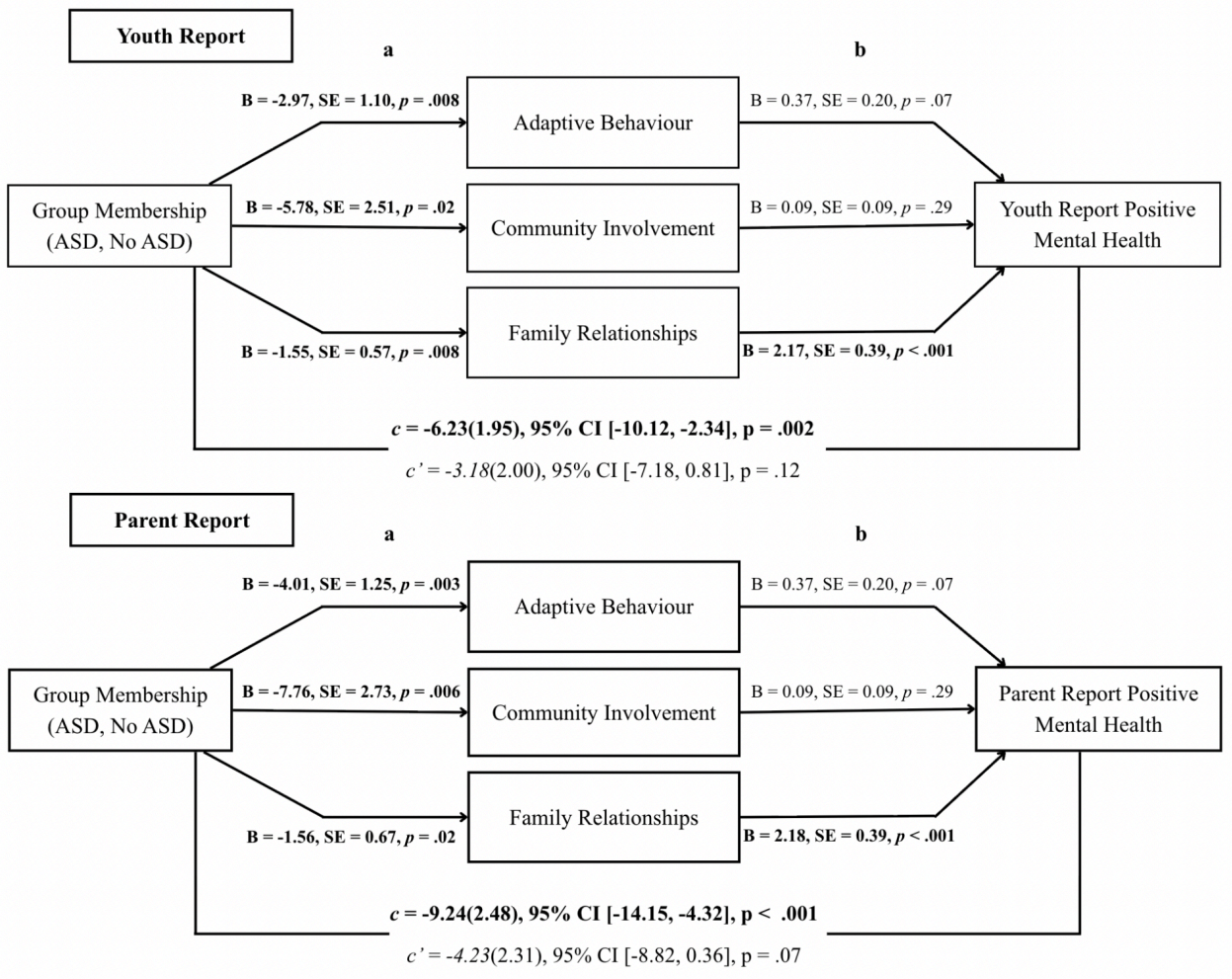
Mediators of Positive Mental Health Outcomes

Figure 1 shows that for youth-report positive mental health, the original direct effect was significant c = -6.23(1.95), p = .002, indicating that autistic youth reported lower levels of positive mental health than those who were not autistic. After including the mediators, this direct effect was no longer significant c' = -3.18(2.00), p = .12, indicating a full mediation. Path a across all mediation models in Figures 1 and 2 indicates that autistic youth with ID had significantly lower adaptive behaviour, less community involvement and lower family relationships than non-autistic youth with ID (all $p < .05$). Both community involvement and

family relationship quality emerged as significant mediators (B = -1.40, 95% CI [-3.11, -0.10]; B = -1.66, 95% CI [-3.83, -0.11]), respectively. Similarly, for parent-report mental health, the original direct effect was significant c = -9.24(2.48), p < .001, and was no longer significant after accounting for the mediators c' = -4.23(2.31), p = .07, indicating a full mediation. Family relationship quality emerged as a significant mediator B = -3.37, 95% CI [-6.29, -0.91].

Figure 1

Mediation Models for Positive Mental Health



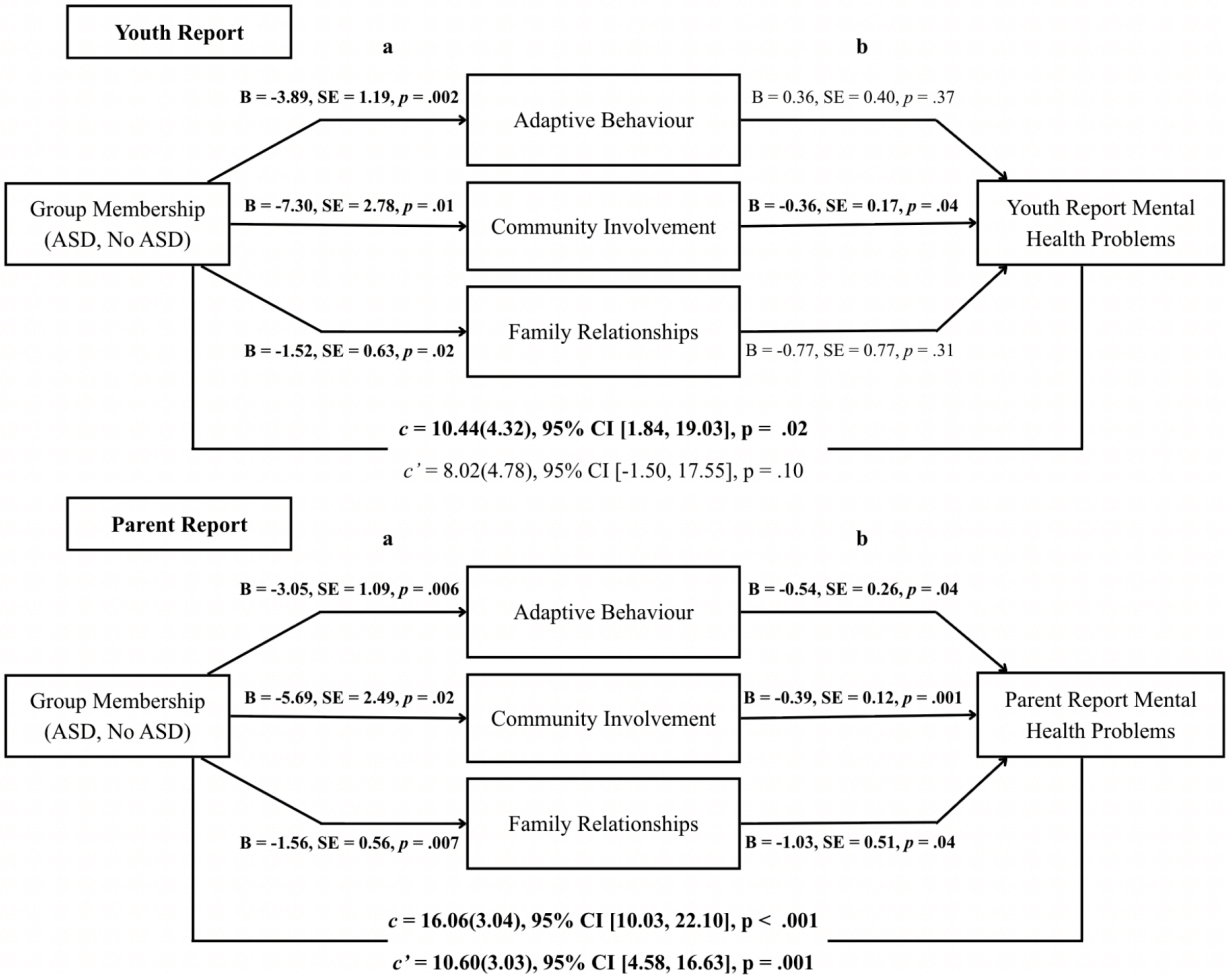
Note. Paths a, b, c and c' for each outcome variable.

Mediators of Negative Mental Health Outcomes

In *Figure 2*, For youth-report mental health problems, the original direct effect was significant $c = 10.44(4.32)$, $p = .02$, indicating that autistic youth reported higher levels of mental health problems than those who were not autistic. After including the mediators, this direct effect was no longer significant $c' = 8.02(4.78)$, $p = .10$, showing a full mediation. Community involvement emerged as a significant mediator $B = 2.64$, 95% CI [0.04, 5.96]. For parent-report mental health problems, both the original direct effect $c = 16.06(3.04)$, $p < .001$ and the direct effect after accounting for mediators $c' = 10.60(3.03)$, $p = .001$ were significant, indicating a partial mediation. Adaptive behaviour $B = 1.64$, 95% CI [0.05, 3.60], community involvement $B = 2.22$, 95% CI [0.20, 4.55] and family relationship quality $B = 1.61$, 95% CI [0.08, 3.81] all emerged as partial mediators.

Figure 2

Mediation Models for Mental Health Problems



Note. Paths a, b, c and c' for each outcome variable.

Interview Responses

Using the Term Frequency Inverse Document Frequency (TF-IDF) analysis, 15 top bigrams were generated for positive mental health, mental health problems and coping strategies. Bigrams that were composed of the same word repeated twice were removed for the final analysis. Parent responses that were endorsed by youth were included in the analysis to account

for potential barriers to verbal communication. Autistic and non-autistic ID were grouped to generate top bigrams, given the brevity of some text responses due to communication challenges.

Positive Mental Health Outcomes

Table 4 shows the top bigrams generated from transcripts of positive mental health interview responses. When participants were asked about things that made them happy, the bigrams *video game, play video, video watch* and *youtube video* suggested enjoyment of media entertainment. One participant described their enjoyment of breadth of media-related activities: "I have things that entertains me, and I have things that I can do here, I keep busy. So, watching TV, playing video games, watching movies upstairs in my room, sometimes YouTube" (Participant 32). The bigrams *spending time, play friend, daytime dad, friend play,* and *family play* indicated enjoyment of social time with both peers and family members. Another participant indicated enjoyment of spending time with both their family members and family pets: "One of them is my grandma, but I also like spending time with my dad… I also really enjoy spending time with probably my animals as well. And I especially like spending time with [my dogs]" (Participant 66). Further, play was also indicated by many top participant bigrams, such as *play video, play board, play game, play friend, play ball, friend play, family play,* and *game make*. One participant indicated that they play in a variety of ways: "Play basketball, play with my friends, ride my bike. Play with water guns in the summer. Then, I do … sledding on ice when I with winter" (Participant 82). Additional bigrams included *make life* and *get safe*; these do not seem to fit into semantic patterns with other bigrams, though may be slight indicators of a preference for having a sense of personal agency and safety.

Table 4

Positive Mental Health Bigrams

Bigram	TFIDF	Count	Frequency
video game	1.831	5	0.004
play video	1.662	8	0.006
spending time	1.393	9	0.007
make life	1.294	12	0.009
play board	1.129	3	0.002
play game	1.000	1	0.001
play friend	1.000	1	0.001
get safe	1.000	1	0.001
daytime dad	1.000	1	0.001
play ball	1.000	1	0.001
friend play	1.000	1	0.001
family play	0.871	3	0.002
video watch	0.845	4	0.003
youtube video	0.792	1	0.001
game make	0.792	1	0.001

Note. Top bigrams based on TF-IDF analysis, count and frequency score for participant responses to the positive mental health questions.

Mental Health Problems

The top bigrams for mental health problems are listed in Table 5. Bigrams *step family, family brother, dead family, family school*, and *nanna someone* indicated that youth experienced distress related to their families in certain contexts. One youth highlighted that both family conflict and concern around the wellbeing of their family members elicited negative emotions: “My family being sad for one ... my brother who smokes (Participant 97)”. Similarly, social

interactions with other people were highlighted as distressing at times through the bigrams *lot pester, someone hit, around lot, people around,* and *someone get*. One participant described distress around crowds: “More people around ... yeah” (Participant 43). Further, the bigrams *day need, want something*, and *get something* indicated that youth linked their negative emotions to unmet wants or needs, or events that were unexpected or unpredictable. Participant 80 endorsed their caregiver’s description of what frustrated them: “Frustrated if (she) wants to do something and brothers don’t let her” (Caregiver of Participant 80). Bigrams *someone hit* and *hit punch* were also highlighted; one participant indicated feeling negative emotions following violence from others: “When someone hits or punch me” (Participant 65). Finally, the bigram *thing make* was included in top bigrams, but is too general to draw meaning.

Table 5

Mental Health Problem Bigrams

Bigram	TFIDF	Count	Frequency
step family	1.000	1	0.001
lot pester	1.000	1	0.001
family brother	1.000	1	0.001
day need	1.000	1	0.001
thing make	0.979	6	0.006
want something	0.843	2	0.002
get something	0.723	3	0.003
someone hit	0.707	1	0.001
hit punch	0.707	1	0.001
around lot	0.707	1	0.001
dead family	0.707	1	0.001
people around	0.707	1	0.001
family school	0.707	1	0.001
someone get	0.577	1	0.001
nanna someone	0.577	1	0.001

Note. Top bigrams based on TF-IDF analysis, count and frequency score for participant responses to questions about mental health problems.

Coping Strategies

Table 6 summarizes the top bigrams from youth responses to questions surrounding what helps them feel better when they are experiencing distress. Some of the top bigrams included *take deep, deep breath*, and *take second,* demonstrating intentional coping strategies youth are

using in moments of emotional difficulty. One participant described their mindset when being distressed: “When I feel sad, I take some deep breaths. Yeah, when I feel worried, I tell myself that it's out of my control. It's up to teacher. When teacher will come back, I always tell myself I can only control my decision” (Participant 12). Other bigrams, such as *watch movie, listen singing, play video, read book, watch show,* and *alone watch*, indicated participants’ enjoyment of media entertainment in various forms, with one participant stating: “Video games, listening to music, watching movies like, that's like my number one thing I love to do” (Participant 51). Interpersonal comforts were also highlighted by youth, with bigrams *talk mom*, *pray family* and *kiss time*, as well as other comforts such as toys and beverages, with bigrams *drink coca* and *baby doll*. One participant described the importance of their comfort toy: “Or maybe baby doll, my baby doll. I still have her” (Participant 10). The bigram *make take* was too general to meaningfully group with others.

Table 6

Coping Strategy Bigrams

Bigram	TFIDF	Count	Frequency
take deep	2.705	8	0.013
deep breath	1.702	3	0.005
watch movie	1.477	3	0.005
talk mom	1.025	3	0.005
pray family	1.000	1	0.002
kiss time	1.000	1	0.002
listen singing	1.000	1	0.002
take second	1.000	1	0.002
baby doll	1.000	1	0.002
alone watch	1.000	1	0.002
play video	0.858	4	0.007
read book	0.854	2	0.003
make take	0.816	1	0.002
watch show	0.707	1	0.002
drink coca	0.707	1	0.002

Note. Top bigrams based on TF-IDF analysis, count and frequency score for participant responses when asked about coping strategies.

Discussion

This study sought to compare both positive and negative mental health outcomes between autistic and non-autistic youth with ID, in line with the Two-Continua Model of mental health and wellbeing (Keyes, 2010). Results indicated that autistic youth with ID experience lower levels of positive mental health and higher levels of mental health problems compared to non-autistic youth with ID, both through self- and parent-reports. These results are consistent with

evidence from previous work indicating that autistic youth with ID experience less overall thriving compared to youth with ID alone according to parent report only (Weiss & Burnham Riosa, 2015).

A developmental-contextual perspective was applied to explore both individual (i.e., Adaptive Behaviour) and environmental characteristics (i.e., Community Involvement and Family Relationship Quality) as potential mediators of group differences. Findings suggested that autistic youth having lower levels of community involvement partly explained group differences between youth-reported positive mental health, as well as both parent and youth-reported mental health problems. These findings are consistent with the work of Andrews and colleagues (2015), who found that community integration interventions predicted higher quality of life and self-esteem for youth with ID when investigating the relationship between community involvement on overall wellbeing. Top bigrams generated within the current project also highlighted the importance of community-based activities for youth with ID through an emphasis on play and spending time with one's peers. Further, top bigrams from interview responses during the mental health problem questioning elucidated the potential harms related to negative social interactions with others.

This evidence underscores the importance of addressing the facilitators and barriers to meaningful community involvement in autistic youth with ID. Factors such as vocational and social skill coaching, accessible transportation, and welcoming/inclusive environments, can support youth with ID to be involved with their communities (Hall, 2017). Importantly, one area that may pose a substantial barrier to inclusion in community-based activities for autistic youth with ID are experiences of social stigma. Autism has been previously shown to be a risk factor

for experiencing social stigma from peers among autistic youth without ID (Han et al., 2022), and Ng and colleagues (2020) found that stigma experienced by caregivers had adverse effects on their autistic children's involvement in community activities. Further research is crucial to understand the experience of stigma for autistic youth with ID, how this may influence their community involvement, and the subsequent relationship of these factors with mental health outcomes. Early work in this area suggests that structured facilitation of social inclusion within community programs through activity planning and participant training can work to further improve inclusion outcomes for youth with ID (Louw et al., 2020).

Our results also indicate that autistic youth with ID have worse parent-reported family relationship quality than non-autistic youth with ID, which partially explained group differences for youth and parent-reported positive mental health, as well as youth-reported mental health problems. The content of top bigrams was consistent with these mediation results, with youth noting that the quality of their interactions with family could have a significant impact on experiencing both positive and negative emotions. Specifically, spending time with family emerged when youth were asked about what makes them happy or helped them cope with negative emotions, and family conflict or health concerns and/or death were noted as contributors to distress. Family relationship quality is a key contributor to youth wellbeing in general; one study demonstrated lower family intimacy and higher family conflict as risk factors for poor mental health among youth in the general population (Yang et al., 2023). Further, the impact of family relationship quality on wellbeing may be especially salient for youth with ID; the interdependence between youth with ID and their families is well documented (Lambert et al., 2010), reflecting a developmental context in which family relationships play a central role in

daily functioning and social experience. Youth with ID are more likely to rely on family support than same age peers without ID, and are more likely to be homeschooled (Paulauskaite et al., 2022), to feel isolated or rejected by peers (Dubé et al., 2024), and to require ongoing support at home (Lahaije et al., 2024). Together, these patterns highlight the critical importance of fostering strong familial support systems for this group and underscore the need for targeted research in this area.

Interestingly, despite autistic youth having lower adaptive behaviour than their peers with ID alone, this did not explain the group differences in youth or parent-report positive mental health outcomes, or youth-report negative mental health outcomes. It is possible that positive mental health outcomes are more likely related to social functioning rather than general daily living skills. In previous research, lower positive mental health outcomes (i.e., thriving) in autistic youth with ID compared to non-autistic youth with ID was partially explained by lower socio-communicative abilities in autistic youth (Weiss & Burnham Riosa, 2015). Further, a systematic review conducted in 2022 found that social communication difficulties were associated with earlier onset mental health problems in the general population, and youth with mental health problems were more likely to have higher difficulties in social communication (Dall et al., 2022). Notably, top bigrams for positive mental health and mental health problems did not highlight adaptive behaviours, though adaptive coping strategies emerged, including deep breaths, taking time for oneself, and leaning on loved ones for comfort. Together, these findings suggest that positive mental health in this group may be more closely tied to relational and socio-communicative processes than to adaptive functioning in general.

Furthermore, these findings highlight co-occurring autism as a risk factor for experiencing worse overall wellbeing among youth with ID, and suggest that treatment options for these youth require additional consideration for their environmental circumstances over and above support needs at the individual level. At the family level, interventions for autistic youth with ID may benefit from increased emphasis on consistency. Routine at the family level has been shown to predict lower levels of externalizing behaviour for youth with neurodevelopmental disabilities (Hatherly et al., 2023), and top bigrams suggested distress resulting from unexpected or uncontrolled circumstances, such as expectations not being met, or aggressive behaviour from others. Further, when youth with ID were asked about coping with distress, they indicated preference for leaning on loved ones and completing solitary activities (such as watching videos or listening to music), suggesting that environments that foster emotional and physical safety, access to comforting activities, and consistency/routine are likely to be beneficial. Despite this, current interventions for autistic youth are more frequently tailored towards improving everyday functioning and practical skills rather than altering environmental circumstances; in a systematic review published in 2021 which included 28 different evidence-based interventions delivered to autistic individuals, Hume and colleagues found that behaviour and communication were the most highly targeted intervention outcomes for this population (Hume et al., 2021). To enhance wellbeing for youth with ID, with and without co-occurring autism, further research is needed to inform the development of evidence-informed, comprehensive interventions that address both needs at the behavioural level and deliver environmental supports.

Limitations

The current study has several limitations. First, mediators were collected through parent-proxy surveys. This may have limited the reliability of data collected, given that previous work has shown some inconsistency between parent and youth report surveys among those with ID (Santorro et al., 2022). Additionally, the large majority of caregiver responders were women (i.e., 96%), though this may reflect the gender imbalance previously shown to occur among parent responders within children's health research (Hagerman et al., 2020). Further, our measurement of adaptive behaviour was based heavily on daily living skills. Data on social abilities or academic difficulties are additional components of adaptive behaviour that were not captured by this project, though may be meaningful mediators of group differences. Family conflict (Yang et al., 2023) and internalized stigma (Han et al., 2022) are additional variables may have impacted group differences in mental health outcomes, though these were not explored in the current study.

Moreover, the current project included participants with ID regardless of severity, as we did not want to exclude the perspectives of those with the highest support needs. We additionally did not account for differences in ID severity in our analyses to maintain statistical power given the sample size ($N = 97$). However, it is important to note that a wide range of abilities and symptomatology fall under the continuum of ID. Further research is necessary to explore whether positive and mental health outcomes vary by ID severity.

Due to barriers in communication ability, some participant responses used in the NLP analysis were shorter than others, which limited the amount of text the TF-IDF approach could use in the analysis. Additionally, using bigrams to interpret the content of interview responses can be useful for extracting meaningful information from large datasets. However, it is worth

noting that taking this approach can limit the amount of context captured by only pulling two words at a time, rather than entire phrases. For example, ‘take deep’ and ‘deep breath’ were captured as two separate bigrams, though ‘take deep breath’ may have emerged as a trigram in a full sentence analysis. Finally, we decided to include parent suggestions in cases where a youth participant had limited verbal communication if the youth endorsed their parent's suggestion. This may have brought in some bias in capturing accurate youth perspectives due to potential parental influence.

Conclusion

The current study explored group differences between autistic and non-autistic youth with ID in both positive and negative mental health outcomes. Autistic youth with ID were found to have significantly less positive mental health than youth with ID alone across both youth self-report and parent proxy-report surveys, and significantly more mental health problems according to both youth and parent proxy-report surveys. Group differences in youth-report positive mental health were explained by community involvement and family relationship quality, and group differences in parent-report positive mental health were explained by family relationship quality. Youth-report mental health problem group differences were explained by community involvement, and parent-report mental health problems were partially explained by adaptive behaviour, community involvement, and family relationship quality.

Top bigrams indicated that watching videos, play, and spending time with family contributed to experiencing positive emotions for youth with ID. Experiencing negative emotions was linked to negative interactions with peers, conflict with/loss of family members, and unpredictable environmental circumstances. Coping strategies included taking deep breaths or

time to oneself, spending time with loved ones, and using various forms of media entertainment. To improve wellbeing for youth with ID, future intervention efforts should account for co-occurring autism being a risk factor for worse overall wellbeing outcomes and would benefit from structuring supportive and inclusive environments for these youth.

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