The self-identified positive attributes and favourite activities of children on the autism spectrum

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A B S T R A C T

Background: When autism is viewed through a deficit lens the strengths, positive attributes and interests of individuals on the spectrum can be overshadowed. A strengths-based focus counteracts the deficit view that is traditionally associated with developmental disabilites. More strength-based research is needed in the field to shift the emphasis from difficulties, to the positive attributes and interests of individuls on the autism spectrum.

Method: Eighty-three children on the autism spectrum (aged 8 to 15 years) responded to the following questions: "What do you like most about yourself?", "What are you absolutely best at?" and "What do you enjoy the most?"

Results: Similar responses were collated into themes within the data using content analysis. When asked "What do you like most about yourself?" *a good friend or person to be around* ($n = 15$; 18.5 %) and I am *good at particular things* ($n = 14$; 16.8 %) were the most common themes. Children identified that they were "absolutely best at" *physical activity* ($n = 20$; 24 %) and *maths/ science* ($n = 13$; 15.6 %). Overall, *technology and gaming* ($n = 42$; 50.6 %) and *social interaction* were the most endorsed themes ($n = 29$; 34.9 %) in response to "What do you enjoy most?"

Conclusions: Self-report studies provide individuals on the autism spectrum with a much-needed opportunity to express and share their attributes, strengths and interests with others, adding their voice to the literature. Further work is needed to explore the impact of such positive self-descriptions on an individual's positive sense of self and self-confidence.

1. Introduction

One in 59 children have a diagnosis on the autism spectrum (Centers for Disease Control & Prevention, 2018), experiencing difficulties with their social communication and restricted, repetitive behaviours and patterns of interest. As many as 84 % of individuals on the spectrum are also affected by at least one anxiety disorder (van Steensel, Bogels, & Dirksen, 2012; White, Oswald, Ollendick, & Scahill, 2009) which can impact across home, school, and community settings (Adams, Young, Simpson, & Keen, 2018) from as young as five years of age (Keen, Adams, Simpson, den Houting, & Roberts, 2017). In light of these difficulties, it is unsurprising that the literature is largely oriented towards deficits for individuals on the spectrum (McCrimmon & Montgomery, 2014). However, a deficit focus can overshadow the positive attributes (i.e., strengths, positive qualities, and assets) and favourite activities of individuals on the spectrum. Insight into these positive attributes, strengths and favourite activities is highly valuable and can increase understanding of each child on the spectrum, particularly when sought directly from children themselves.

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1.1. Activities and interests of children on the autism spectrum

The activities and interests of children on the spectrum have been explored within the participation literature, using both parent and child self-report. According to parents of children on the autism spectrum (aged 5 and 9–10 years), children most frequently engaged with technology (computer and videogames, TV, video's and DVDs) at home, while classroom activities and getting together with peers was the most common activity within the school environment (Simpson, Keen, Adams, Alston-Knox, & Roberts, 2018). Children were most likely to participate in neighbourhood outings and unstructured physical activities in both age groups within the community. Parents expressed a desire for their children to engage in a greater diversity of activities across all settings. A three year follow-up of the older cohort indicated little change in their profile of activities across home, school and community (Simpson, Adams, Bruck, & Keen, 2019). Enjoyment in leisure activities of children on the autism spectrum (aged 6–13) was also explored by Eversole et al. (2016), this time capturing the experiences of the children themselves. Children rated *computer games*, *watching TV or movies* and *visiting places* as their top three favourite activities. Similarly, *computer/video games*, was also the preferred activity for Typically Developing (TD) children with *going to a party* and *visiting places* their second and third preferred activities. Children on the spectrum enjoyed going swimming significantly more than their peers.

1.2. Parent-reported strengths and assets of children on the spectrum

Strengths are defined as attributes that enable an individual to do certain things well (Clifton & Anderson, 2002). Strengths are individual and subjective, and will vary from person to person and across different stages of development (Jones-Smith, 2011). The strengths of children on the autism spectrum are often viewed through the perspective of their parents rather than the children themselves (Teti, Cheak-Zamora, Lolli, & Maurer-Batjer, 2016), consequently, the voice of children on the spectrum remains underreported in the literature. Carter et al. (2015) documented the parent identified strengths of 422 youth on the autism spectrum (with and without intellectual disability [ID]). Parents reported between one and 26 positive traits, with '*my child is happy*', '*when I am sad, my child responds to my feelings*' and '*my child seems to enjoy life and is thankful for simple pleasures*' amongst the most common. Parent's perceptions of strengths were further explored with qualitative interviews, yet, this study did not solicit the self-perception of positive traits from the young people on the spectrum themselves. This limits the ability to understand if parents' perceptions of positive traits align with or vary from the young people's subjective perception of positive traits. Arguably, the best way to identify the self-perceived positive traits of children on the autism spectrum is to engage the children themselves in the research using self-report methods.

1.2.1. Strengths, positive qualities, and assets reported by adults on the autism spectrum

Few studies have reported the self-identified positive attributes of adults on the autism spectrum. Comparison of the self-identified occupational strengths of individuals with Asperger's disorder ($n = 136$) and neurotypical individuals ($n = 155$) revealed that individuals with Asperger's self-identified strengths in attention to detail, logical reasoning, focus, systemizing, consistency, visual skills, retentiveness, repetitive tasks, numbers, and auditory skills, while neurotypical individuals reported greater strengths in flexibility, social skills, multitasking, empathy, teamwork, and verbal skills (Lorenz & Heinitz, 2014). However, participants were required to select their strengths from a pre-determined list of 26 possible strengths, which does not allow for the self-identification of individual and possibly idiosyncratic strengths. Kirchner, Ruch, and Dziobek (2016) captured the self-identified character strengths of adults on the spectrum using the standardised Values in Action Inventory. Intellectual strengths (i.e., open-mindedness, creativity, and a love of learning) were identified as "signature strengths" for individuals on the spectrum, with the neurotypical group, reporting more strengths in the emotional (humour, love) and interpersonal (kindness, fairness) categories. Interestingly, the interpersonal and emotional strengths had the highest positive associations with subjective well-being within the group of individuals on the autism spectrum. This highlights the clinical importance of understanding the strengths identified by individuals on the spectrum, an important avenue for future research.

Teti et al. (2016) used photovoice methodology with 11 adults on the spectrum who photographed and discussed things that were meaningful in their lives. Three sub-themes emerged from thematic analysis: special interests cultivating positive emotions and coping strategies, skills and activities evoking pride, and reframing autism as special versus a disadvantage. Participants reportedly valued participation in the study and benefited from the opportunity to define their strengths in their own terms and not just as a counterpart to their deficits.

1.3. The importance of self-report

Parent report is often used to understand the lives of children on the autism spectrum, yet this method has its limitations when reporting upon internal constructs, which are subjective and therefore arguably best captured from the individual themselves (Egilson, Olafsdottir, Leosdottir, & Saemundsen, 2017; Shipman, Sheldrick, & Perrin, 2010). In the words of Maslow (1966) and discussed in Goodwin (2019) "there is no substitute for experience, none at all". Therefore, how do we really learn about children on the autism spectrum if not from the children themselves? There is a need for more self-report studies to provide children with autism a much needed voice in the litertature, as they express and define themselves, their strengths and interests in their *own* words.

The use of self-report in autism research remains limited due to the ongoing scepticism around its validity within the autism population (Mazefsky, Williams, & Minshew, 2008; White et al., 2009). Nonetheless, self-report is valuable for understanding the subjective constructs of individuals on the spectrum. For example, comparisons of the self-perceptions of youth with and without High

Functioning Autism Spectrum Disorder (HFASD) revealed more similarities than differences – youth with HFASD only differed from their TD peers in two of the six subscales on the self-perception profile for children; *social acceptance* and *athletic competence* (Bauminger, Shulman, & Agam, 2004). The argument for greater self-report in children on the spectrum (rather than parent report) was extended by Keith, Jamieson, and Bennetto (2018), revealing a high correlation between self-reported anxiety and sympathetic arousal levels using electrocardiogram (ECG) signals. They also found that adolescents on the spectrum reported significantly higher sensory sensitivity and anxious arousal than their parents reported for them, suggesting that adolescents on the spectrum had a unique perspective on their internal experiences that could not be captured to the same extent by their parents.

There is growing support for the use of self-report methods within the autism population with evidence that children, adolescents and adults on the spectrum are able to provide accurate and valid insight into their own experiences, difficulties and symptomatology (Gernsbacher, Stevenson & Dern, 2017; Schriber, Robins, & Solomon, 2014; Shipman et al., 2010). These studies reiterate the importance of allowing for genuine differences in perspectives, shifting from the "right" and "wrong" perspective towards an understanding that each informant has a valid role when reporting their own perspective on the topic of enquiry (Adams et al., 2018; De Los Reyes et al., 2015).

1.4. The current study

Given the strong deficit focus of autism research (Burnham Riosa et al., 2017), there has been little focus on self-reported strengths and favourite activities, with the few available studies reporting on adults. Self-identified strengths have been associated with positive subjective well-being in adults on the spectrum (Kirchner et al., 2016), yet with no self-reported strength studies conducted with children on the autism spectrum, it is unclear whether the self-identificaition of strengths, assets and favourite activities have positive implications for the well-being of children on the spectrum also. Given the high incidence of mental health difficulties that co-occur with autism, this may be the first step in protecting children against some of the difficulties they encounter. For example, these findings may inform interventions to align with the self-identified strengths and interests to re-instil confidence and support children during times of anxiety, to improve mental health, well-being and learning outcomes.

As highlighted by Teti et al. (2016), unless children on the spectrum are provided with the opportunity to identify and express their own strengths, important aspects of their own self-concepts will be missed and not be visible within the research. The current study aims to address this gap in the literature by being the first (to the authors' knowledge) to provide children on the spectrum, a voice to share their self-perceived positive qualities; specifically, their best qualities, their strengths/skills, and their and favourite activities, to provide answers to the following research questions:

1.5. Research questions

1. What do children on the autism spectrum between the ages of 7 and 14 years identify as the qualities they like best about themselves?
2. What do children on the autism spectrum between the ages of 7 and 14 years think they are best at?
3. What are the activities that children on the autism spectrum between 7 and 14 years enjoy the most?

2. Method

Ethical approval for this study was obtained from all participating universities and health authorities. This study reports on data collected as part of the Longitudinal Study of Australian Students with Autism (LASA; see Roberts et al., 2018 for the full protocol) focused upon the educational outcomes for students on the autism spectrum. Inclusion of children in the study was determined by a diagnosis of autism. Upon enrollment into the larger longitudinal study, parents were asked to provide copies of their child's diagnostic reports and asked to complete the Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2008). Children with an SCQ score below 15 were only included in the sample if detailed diagnostic reports were available to confirm a diagnosis on the autism spectrum. Of the 83 children that participated in the child self report, eight children scored below 15 on the SCQ but remained in the study due to an accompanying diagnostic report to verify diagnosis.

The Vineland Adaptive Behaviour Scales – Second Edition (VABS II; Sparrow, Balla, & Cicchetti, 2005) assessed adaptive behaviour skills, namely Communication, Daily Living Skills and Communication. The self-report questionnaire was introduced at the third annual data collection of the LASA. Parents were emailed information about the self-report study and invited to discuss it with their child. Parents of children whom expressed interest and consented, were emailed a link to an online questionnaire to share with their children which included the three questions on positive qualities. Parents were instructed that they could offer assistance by typing their child's verbatim responses on the computer if needed but were to refrain from assisting their child in the formulation of their responses

2.1. Participants

Eighty-three children (81.9 % male and 18.1 % female) completed the online self-report questionnaire. Twenty seven children (38 %) had at least one co-occurring condition, with ADHD and Anxiety the two most prevalent diagnoses. Child characteristics and VABS domain scores for the year that they completed the self-report questionnaire are presented in Table 1.

Table 1
Child characteristics including co-occurring conditions and Vineland Adaptive Behaviour Scale Standard Scores.

Measure	Domain	Range of scores	Mean Score	SD
Vineland	Communication	50–136	88.88	(19.13)
Adaptive	Daily living Skills	59–133	88.31	(19.40)
Behaviour Scales	Socialisation	47–129	79.86	(20.03)

Co-occurring conditions	Number of children affected	Percentage
ADHD	$n = 13$	15.6 %
Anxiety	$n = 6$	7.2 %
Sensory Processing Disorder	$n = 5$	6 %
OCD	$n = 1$	1.2 %
ID	$n = 2$	2.4 %

Note: $n = 83$.
ADHD: Attention Deficit Hyperactivity Disorder.
OCD: Obsessive Compulsive Disorder.
ID: Intellectual Disability.

2.2. Questionnaire

Children were asked to respond with free-text to the following three questions: "What do you like most about yourself?", "What are you absolutely best at?", and "What do you enjoy the most?".

2.3. Data analysis

The data were analysed using content analysis. The responses were coded using the four-step procedure outlined by Dey (1993): (1) data were divided into manageable parts, (2) responses related to the areas or questions of interest were collated, (3) categories were created that described similar responses, and (4) categories were combined or split where data could best be described by a rearranged structure. An independent reviewer coded 20 % of the responses that were selected at random into categories to assess reliability. Inter-rater agreement was calculated using Kappa. Agreement was reached when both raters coded a given answer into the same category. Kappa for the first round of inter-rater reliability was 1.0 for answers to "what do you enjoy the most?", .92 for the answers to "what is the one thing you are absolutely best at?", and .82 for "what do you like most about yourself", all of which indicate "near perfect" agreement. A third rater was assigned for the 2 % of responses that could not be agreed upon where the inter-rater process was repeated. Raters met for further discussion and clarification of category names where a final inter-rater agreement reached 100 %.

3. Results

Exploration of the data revealed a range of themes for each of the three questions answered. The themes within each of the questions will be presented as well as the most common items within each theme.

3.1. What do you like most about yourself?

Ninety-six different responses were provided to this question (two responses on average, range 1–5 responses), and coded into nine different themes. A large proportion of children ($n = 50$, 60.2 %), provided responses that were coded within the same theme (e.g., "I am friendly", "I care about people" would be two responses, but both coded within the single theme of *a good friend or person to be around*). Nine (10.8 %) children's responses were coded into two themes (13.2 %). The maximum number of themes that one child's responses were coded into was six. For a full list of themes and example verbatim child responses to the question "What do you like most about yourself?" refer to Table 2.

3.2. What are you absolutely best at?

Children provided 116 different responses to this question (range 1–6 responses), that were coded into nine themes (range of themes 1–6). The majority (69.2 %) of children provided multiple responses that were all coded within one theme; nine children (10.8 %) provided responses that were coded into two themes; responses from eight children (9.6 %) were coded into four themes; and one child (1.2 %) provided responses that aligned with six of the nine themes. A full list of the themes and sample verbatim responses can be found in Table 3.

Table 2
Themes and example responses relating to the question "what do you like most about yourself?" themes sorted from most to least frequently reported theme.

Themes	Example child responses (verbatim)	Number of children responding within each theme
A good friend or person to be around	I am friendly, I am a good person, I have a big heart, I am kind, I care about people, I am a good/nice friend	15 (18 %)
Good at particular things	Good with the computer, my ability to soak up information in a particular area, my huge knowledge on special area, my skills at soccer, I can do a good stich voice	14 (16.8 %)
Hard-working, smart, successful, and/or intelligent	My intelligence, I am smart, I have a creative brain, I try hard, I am good academically	9 (10.8 %)
Personal physical characteristics	My eyes change colour, my hair, my height, my smile, my eyes, I am big, I am handsome, I am small and cute	8 (9.6 %)
Good sense of humour/make others laugh	Making my mum laugh with my facial expressions, I am funny/have a good sense of humour	8 (9.6 %)
Things or items in their life	Family, friends, my house	7 (8.4 %)
Unique	I am different and a geek, I am different from others, how unique and weird I am	7 (8.4 %)
Perceive self as happy, cool, or fun	I am having fun, I am a pretty cool person, I am happy, I am happy with a smiling face	6 (7.2 %)
Nothing	Nothing, I don't know	6 (7.2 %)
Everything	Everything	1 (1.2 %)

n = 83 children.
Total number of responses provided to this question: *n* = 86.

Table 3
Themes and example responses relating to the question "what are you absolutely best at?" with themes sorted by most to least frequently reported theme.

Themes	Example child responses (verbatim)	Number of children responding within each theme
Physical activity/sports	Sport, cartwheels, shooting, tennis, soccer, swimming, rugby, cricket, basketball, water skiing, horse riding, running, football	20 (24 %)
Maths/science/ engineering	Maths, science, engineering	13 (15.6 %)
Creative outlets	Drawing, colouring in, artwork, creating cards, character making, cooking, making books, clay, drama	12 (14.4 %)
Socialising	Talking, arranging things for me and my friends, friends, being friendly/kind	9 (10.8 %)
Technology/ gaming	Video games/gaming, games, electronics, technology	8 (9.6 %)
Constructing things	Construction, building and making things, building Lego, building trainsets	8 (9.6 %)
Instruments/ music	Drumming, singing, bopping, guitar, instrumental music, trombone, music	3 (3.6 %)
Special interests	Playing with traffic signs, telling cars and investigations, knowledge of special topic (e.g., Sonic, Ben 10, dinosaurs)	7 (8.4 %)
Reading/writing/ spelling	Reading, writing, spelling	4 (4.8 %)

n = 83.
Total number of responses provided to this question: *n* = 116.

3.3. What do you enjoy most?

All 188 responses to this question (range 1–10 responses), were coded into nine different themes (range of responses fell within 1–7 themes). Approximately one third (35.9 %) of children provided responses within one theme only while 16 children (19.2 %) provided responses in two themes, 17 children responded across three themes (20.4 %), and seven responded across four themes (8.4 %). One child provided 10 responses that were coded into seven of the nine themes (1.2 %). Themes and verbatim responses can be found within Table 4.

4. Discussion

Through subjectively reporting on best qualities, perceived personal strengths, and favourite activities of children on the autism spectrum aged 7–14, this study makes a valuable contribution to the strengths-based literature regarding children on the autism spectrum. Children were able to report responses that were personal to them, therefore ensuring that the child's voice was represented in the literature.

Table 4

Themes and example responses to the question "what do you enjoy most?" sorted by most to least frequently reported theme.

Themes	Example child responses (verbatim)	Number of children responding within each theme
Technology/gaming	Technology/electronics, watching YouTube, playing iPhone games, playing xbox, playing on computer, playing iPad, coding, playing video games	42 (50.6 %)
Social interaction and social play	Playing with friends, playing with animals, spending time with family, talking	29 (34.9 %)
Activities/hobbies	Card/board games, toys, listening to music, fishing, singing, books, reading, gardening	21 (25.3 %)
Creating/making things	Making my own books, making fictional characters, making clay figures, drawing, building train sets, Lego, art, baking	20 (24 %)
Physical activity	Going for walks, sports, biking, scooter, horse riding, dancing, body boarding, tennis, soccer, fencing, AFL, football, swimming, cartwheels	18 (21.6 %)
Going places	The park, water theme parks, special places, having fun at other places	7 (8.4 %)
Special interests	Fashion, stop motion animation, attending science shows or lectures, science, technology, doing voice impressions, being Mario, traffic signs	6 (7.2 %)
School related	When I get an award, when I speak in the microphone at school, when exciting things happen at school	3 (3.6 %)
Alone time	Going to places on my own, being by myself when I feel like it	2 (1.2 %)

n = 83 children.

Total number of responses provided to this question: *n* = 188.

4.1. What do you like most about yourself?

The profile of characteristics associated with the autism spectrum can impact upon a broad range of areas, including communication, socialisation and daily living (Gillham, Carter, Volkmar, & Sparrow, 2000; Klin et al., 2007; Perry, Flanagan, Dunn Geier, & Freeman, 2009). Children's awareness of their own difficulties are thought to contribute to increased mental health difficulties in children on the autism spectrum, including anxiety and depression (Loveland & Tunali-Kotoski, 2005; Meyer, Mundy, Van Hecke, & Durocher, 2006; Seltzer et al., 2003; Ung et al., 2016). It was therefore encouraging that the majority of children (92 %) were able to identify at least one thing that they liked about themselves, with some children reporting up to five responses.

When asked "what do you like most about yourself?", *a good friend or person to be around* was the theme with the most responses which demonstrates a desire to engage with other children. Despite the social communication difficulties frequently experienced by children on the spectrum, both qualitative and quantitative studies have reported that at least 80 % of children on the spectrum have at least one friend (Daniel & Billingsley, 2010; Kuo, Orsmond, Cohn, & Coster, 2011) and that the majority are satisfied with their friendships (Calder, Hill, & Pellicano, 2013; Petrina, Carter, Stephenson, & Sweller, 2017). Kasari, Locke, Gulsrud, and Rotheram-Fuller (2011) postulated that children on the autism spectrum may want to be around other children and make friends but may lack the skills necessary to build and maintain these relationships. The social motivation theory may explain the incongruity between the desire for friendships and the social difficulties experienced by individuals on the spectrum. This theory posits that individuals on the spectrum can find social interactions to be less rewarding from a young age (see review by Chevallier, Kohls, Troiani, Brodkin, & Schultz, 2012). However, the social motivation theory is contradicted in part by the current findings where children "like" and are "best at" social interactions – the work of Carrington, Templeton, and Papinczak (2003) also described how adolescents with Asperger's disorder enjoy social connectedness. Therefore, while the social motivation theory may apply to *some* individuals on the autism spectrum, this needs to be considered in relation to individual and developmental factors. For example, Kirchner et al. (2016) found that interpersonal relationships continue to have an important role in the lives of some adults on the autism spectrum, with interpersonal strengths found to be closely related with their subjective well-being. It is also important to consider the influence of gender on friendships, as a meta-analysis exploring friendship in boys, found that boys on the spectrum self-reported fewer social connections, fewer reciprocal friendships and were less likely to be listed in the top three friends in their class relative to their TD peers (Mendelson, Gates, & Lerner, 2016). These social complexities, combined with the finding that almost one in five children within this study reported their friendship skills as something that they liked about themselves, highlight the need for more research to further understand the role of friendships and social connections for individuals on the spectrum across the lifespan.

A number of children provided statements which suggest a positive perspective of themselves, with responses indicating persistence – "I try hard" and confidence in their abilities – "I am smart". Many of the children's comments indicated that they were embracing of their own unique attributes with one child explaining that one of the things they liked most about themselves was "how unique and weird I am". Another child's response reflected on the positives of their diagnosis, with "my autism" nominated as the thing they liked best about themselves. The importance of a diagnosis on the spectrum for self-identity is an emerging theme within the literature. Accounts from adults on the spectrum are increasingly highlighting how receiving an autism diagnosis provided them with an explanation for many of their unanswered questions and allowed them to find like others within the autism community (Tan, 2018).

4.2. What are you absolutely best at?

Almost a quarter of children perceived that they were "best at" a sporting or physical activity, both team sports (e.g., soccer) and

independent activities (e.g., cartwheels). This contrasts the narrower range of physical activities (Bandini et al., 2013) and lower activity levels (Healy, Haegele, Grenier, & Garcia, 2017; McCoy, Jakicic, & Gibbs, 2016) than TD children reported in the literature. The current study reports on children's perceived strength (or at least perceived competence) which has been identified as an important factor in determining willingness to participate in physical activity and motivation to attend and become involved in the activity (Arnell, Jerlinder, & Lundqvist, 2018). Given the importance of physical activity for good health, particularly good mental health, the possibility of identifying and using perceived strengths in and around physical activity to enhance activity levels could have both short and longer term benefits.

Technology was identified as an important theme in response to this and another question, "what are you absolutely best at?", whereby *technology/gaming* received the most responses per participant within that theme (e.g., eight children provided 22 responses which were coded into the *technology/gaming* theme, an average of 2.75 responses each). Playing with technology/electronics, iPads, video games, and computer games were the most frequently listed forms of technology that most participants "enjoyed most" with *technology/gaming* the most reported activity for more than half of the children. This finding has important implications for the use of technology to educate and support children on the spectrum. Technology is considered to be less socially threatening than face-to-face social interactions, which may explain both the appeal and success of technology with social skills training for children on the autism spectrum (Goodwin, 2008). However, use of technology needs to be considered in relation to parental desire for reduced technology and TV use during leisure time (Simpson et al., 2018), and the risks associated with technology use such as sleep disruptions (Cain & Gradisar, 2010) online harassment and bullying (İçellioğlu & Özden, 2014).

4.3. What do you enjoy most?

The social prominence of children's responses continued, with *social interaction* the second most common theme in response to the question "What do you enjoy most?". However, whilst almost 35 % of children reported a response in this theme, 65 % of children do not find social interaction and/or social play the most enjoyable activity; in fact, two children noted that *alone time* was their favourite activity. These findings suggest that a balance between social time and alone time may contribute to the well-being of children on the autism spectrum, and highlights the importance of understanding each child's social preferences by asking the child themselves, rather than relying on proxy report. Calder et al. (2013) explored the friendship experiences of school children on the autism spectrum and found that some children enjoyed spending their break time engaging with peers, while others needed to balance socialising with time alone to re-charge. Semi-structured interviews with their teachers revealed that teachers understood the social preferences of their students on the autism spectrum and how their preferences differed from other students without autism ("If he was always on his own, there'd be an issue, but I think sometimes he needs to be alone to organise his thoughts" Calder et al. 2013, p. 309), and ("He doesn't seek out other children and would prefer to play on his own or with an adult" Calder et al., 2013, p. 309), while also being mindful of the need to intervene at times to facilitate the social interactions between students (e.g., "Sometimes it's about an adult giving other children a reminder to invite children into their games" Calder et al. 2013, p. 310). As with anyone, on the autism spectrum or not, the best way to establish the personal preference (where possible) is through self-report.

The heterogeneity of responses across each of the questions should be acknowledged. For example, children provided a broader range of responses that were then coded across various themes depicting a broad range of self-identified positive attributes in response to "what do you like most about yourself?". In contrast, a narrower range of responses to the question "what do you enjoy most" mostly clustered around one theme "technology/gaming". Future work could recruit a control group without a diagnosis on the autism spectrum to explore if this relatively high heterogeneity around what children like most about themselves is present across all children.

4.4. Strengths, limitations, and future research directions

As outlined above, the use of self-report was a strength of this study, with self-reports from children on the autism spectrum underrepresented within the research. An additional strength of this study was the inclusion of children with a range of abilities on the VABS, some of whom may have been excluded from other studies because of their low scores. However, it is common for children on the spectrum to have lower adaptive behaviour scores relative to their TD peers, even in samples of children who are considered higher functioning with an IQ greater than 70 (eg., Klin et al., 2007). As such, there is an even greater need to include *all* children in autism research, irrespective of their abilities, to ensure study samples reflect the heterogeneity that is inherent to autism. Four children in the current study scored below 70 on the VABS communication domain and encouragingly, each of these children provided responses that were coded and thus demonstrating that self-report studies are possible even for children with autism with added communication difficulties. However, more research is needed to understand the true extent that children's abilities impact on their participation in self-report studies.

The study methodology allowed children to identify and express their positive qualities and interests in their own words, without the intensity or social demands of interviews or focus group settings. The open-ended style of the questions was a further strength of this study as it provided children the freedom to define their strengths, positive attributes and interests in their own words without the constraint of having to chose from a series of pre-selected responses. The current study focused on identifying the strengths of children on the spectrum, and did not seek to determine the impact of such strengths as this was beyond the scope of the study. Future work would benefit from exploring how the self-identified strengths impact on children's daily lives and whether children identify different positive qualities in different settings (e.g., home, school, community groups) and the factors that can help or hinder them showing such qualities in each setting.

This study is not without its limitations. It is likely that children's perceptions of themselves and their preference for activities would differ by age but the sample size did not allow for exploration of difference by age. A larger cohort would also have allowed for exploration by the child's gender and ability as well as an exploration of the impact of such strengths on social or academic outcomes. Similarly, the lack of a control group did not allow for the strengths, assets and favourite activities of children on the autism spectrum to be compared to those of TD children and children with other neurodevelopmental conditions. While the current study was interested in exploring the self-report strengths, best qualities and activities of children, replication to include parent reported strengths would also be of value. Given the evidence that unique informants often provide unique perspectives on the topic of enquiry (Achenbach, McConaughy, & Howell, 1987; Adams et al., 2018; Clark, Barbaro & Dissanayake, 2019) it would be interesting to compare the parent and self-reported strengths to identify the consensus of positive qualities between the two informants.

This study is an important first step and a follow-up longitudinal design would be useful to explore whether themes change over time. Further, there are subsets of the autism population where it is not possible to obtain self-report (e.g., co-occuring intellectual disability, minimally or non-verbal). Therefore, it is important for future research to investigate alternative ways of exploring subjective life experience for those individuals on the autism spectrum who do not have the capacity to provide verbal accounts.

While the large majority of responses were positive, a small subset of children were unable to identify and articulate what they liked most about themselves. Further research is needed to help children themselves identify their strengths, and to reinforce children's positive qualities despite their diagnosis and the difficulties they encounter. As this is the first study to explore self-reported attributes in children on the spectrum, it is unclear what is driving their self perceived positive strengths. Further research is needed to determine how child abilities (IQ, adaptive skills and co-occurring conditions) impact on the reporting of strengths for children on the spectrum.

4.5. Conclusions

As autism-related research moves towards a strength-based approach, there is a need for children and adults on the autism spectrum to be given a voice in the literature. This allows for individuals on the autism spectrum to express their own thoughts, feelings, and experiences, providing invaluable insight into their personal experiences. The valuable contribution that children on the autism spectrum can offer has been highlighted in this study and the responses they have provided may serve to inspire the parents of children and other individuals themselves living on the autism spectrum. Further self-reported positive qualities research is warranted in the field as strength-based information is needed to inform intervention development. Thus, interventions can build on children's positive attributes identified in the process and can focus on engaging the child in their areas of interest and skill, while still addressing those areas that require remediation. A focus on individual positive qualities, attributes and interests in addition to understanding areas of need will establish a more comprehensive picture of the functioning of children on the autism spectrum.

Author contributions

MC interpreted the data and drafted the manuscript. DA designed the child questions, was involved in the, analysis of the data and assisted with the drafting of the manuscript.

Declaration of Competing Interest

The authors declare that they have no conflict of interest.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.rasd.2020.101512.

References

Achenbach, T., McConaughy, S., & Howell, C. (1987). Child/Adolescent behavioural and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin, 101*(2), 213–232.

Adams, D., Young, K., Simpson, K., & Keen, D. (2018). Parent descriptions of the presentation and management of anxiousness in children on the autism spectrum. *Autism*, 1–13. https://doi.org/10.1177/1362361318794031.

Arnell, S., Jerlinder, K., & Lundqvist, L. O. (2018). Perceptions of physical activity participation among adolescents with autism spectrum disorders: A conceptual model of conditional participation. *Journal of Autism andDevelopmental Disorders, 48*(5), 1792–1802. https://doi.org/10.1007/s10803-017-3436-2.

Bandini, L. G., Gleason, J., Curtin, C., Lividini, K., Anderson, S. E., Cermak, S. A., ... Must, A. (2013). Comparison of physical activity between children with autism spectrum disorders and typically developing children. *Autism, 17*(1), 44–54. https://doi.org/10.1177/1362361312437416.

Bauminger, N., Shulman, C., & Agam, G. (2004). The link between perceptions of self and of social relationships in high-functioning children with autism. *Journal of Developmental and Physical Disabilities, 16*(2), 193–214.

Burnham Riosa, P., Chan, V., Maughan, A., Stables, V., Albaum, C., & Weiss, J. (2017). Remediating deficits or increasing strengths in autism spectrum disorder: A content analysis. *Advances in Neurodevelopmental Disorders, 1*, 113–121. https://doi.org/10.1007/s41252-017-0027-3.

Cain, N., & Gradisar, M. (2010). Electronic media use and sleep in school-aged children and adolescents: A review. *Sleep Medicine, 11*(8), 735–742. https://doi.org/10.1016/j.sleep.2010.02.006.

Calder, L., Hill, V., & Pellicano, E. (2013). 'SOmetimes I want to play by myself': Understanding what friendship means to children with autism in mainstream primary schools. *Autism, 17*(3), 296–316. https://doi.org/10.1177/1362361312467866.

Carrington, S., Templeton, E., & Papinczak, T. (2003). Adolescents with asperger syndrome and perceptions of friendship. *Focus on Autism and Other Developmental Disabilities, 18*(4), 211–218.

Carter, E., Boehm, T., Biggs, E., Annandale, N., Taylor, C., Loock, A., ... Liu, R. (2015). Known for my strengths: Positive traits of transition-age youth with intellectual disability and/or autism. *Research and Practice for Persons With Severe Disabilities, 40*(2), 101–119. https://doi.org/10.1177/1540796915592158.

Centers for Disease Control and Prevention (2018). Prevalence of autism spectrum disorders among children aged 8 years – Autism and developmental disabilities monitoring network, 11 sites, United States, 2014. *Morbidity and Mortality Weekly Report. Surveillance Summaries, 67*, 1–23.

Chevallier, C., Kohls, G., Troiani, V., Brodkin, E. S., & Schultz, R. T. (2012). The social motivation theory of autism. *Trends in Cognitive Sciences, 16*(4), 231–239. https://doi.org/10.1016/j.tics.2012.02.007.

Clark, M., Barbaro, J., & Dissanayake, C. (2019). Parent and teacher ratings of social skills, peer play and problem behaviours in children with autism spectrum disorder. *International Journal of Disability, Development and Education,* 1–14. https://doi.org/10.1080/1034912x.2019.1662891.

Clifton, D. O., & Anderson, E. C. (2002). *Strengths quest: Discover and develop your strengths in academics, career and beyond.* Washington DC: Gallup York: Free Press.

Daniel, L. S., & Billingsley, B. S. (2010). What boys with an autism spectrum disorder say about establishing and maintaining friendships. *Focus on Autism and Other Developmental Disabilities, 25*(4), 220–229. https://doi.org/10.1177/1088357610378290.

De Los Reyes, A., Augenstein, T. M., Wang, M., Thomas, S. A., Drabick, D. A., Burgers, D. E., ... Rabinowitz, J. (2015). The validity of the multi-informant approach to assessing child and adolescent mental health. *Psychological Bulletin, 141*(4), 858–900. https://doi.org/10.1037/a0038498.

Dey, I. (1993). *Qualitative data analysis: A user friendly guide for social scientists.* New York: Taylor and Francis.

Egilson, S. T., Olafsdottir, L. B., Leosdottir, T., & Saemundsen, E. (2017). Quality of life of high-functioning children and youth with autism spectrum disorder and typically developing peers: Self- and proxy-reports. *Autism, 21*(2), 133–141. https://doi.org/10.1177/1362361316630881.

Eversole, M., Collins, D. M., Karmarkar, A., Colton, L., Quinn, J. P., Karsbaek, R., ... Hilton, C. L. (2016). Leisure activity enjoyment of children with autism Spectrum disorders. *Journal of Autism and Developmental Disorders, 46*(1), 10–20. https://doi.org/10.1007/s10803-015-2529-z.

Gernsbacher, M. A., Stevenson, J. L., & Dern, S. (2017). Specificity, contexts, and reference groups matter when assessing autistic traits. *PLoS One, 12*(2), e0171931.

Gillham, J. E., Carter, A. S., Volkmar, F. R., & Sparrow, S. S. (2000). Toward a developmental operational definition of autism. *Journal of Autism and Developmental Disorders, 30*(4), 269–278. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/11039854.

Goodwin, M. S. (2008). Enhancing and accelerating the pace of autism research and treatment: The promise of developing innovative technology. *Focus on Autism and Other Developmental Disabilities, 23*(2), 125–128. https://doi.org/10.1177/1088357608316678.

Goodwin, J. (2019). Qualitative research in childhood neurodisability. *Developmental Medicine & Child Neurology, 61*(12), 1356. https://doi.org/10.1111/dmcn.14277.

Healy, S., Haegele, J. A., Grenier, M., & Garcia, J. M. (2017). Physical activity, screen-time behavior, and obesity among 13-year olds in Ireland with and without autism spectrum disorder. *Journal of Autism and Developmental Disorders, 47*(1), 49–57. https://doi.org/10.1007/s10803-016-2920-4.

İçellioğlu, S., & Özden, M. S. (2014). Cyberbullying: A new kind of peer bullying through online technology and its relationship with aggression and social anxiety. *Procedia - Social and Behavioral Sciences, 116*, 4241–4245. https://doi.org/10.1016/j.sbspro.2014.01.924.

Jones-Smith, E. (2011). The strength mindset: Understanding the nature of strengths. In E. Jones-Smith (Ed.). *Spotlighting the strengths of every single student: Why US. Schools need a bew, strengths-based approach.* United States: Greenwood Publishing.

Kasari, C., Locke, J., Gulsrud, A., & Rotheram-Fuller, E. (2011). Social networks and friendships at school: Comparing children with and without ASD. *Journal of Autism and Developmental Disorders, 41*(5), 533–544. https://doi.org/10.1007/s10803-010-1076-x.

Keen, D., Adams, D., Simpson, K., den Houting, J., & Roberts, J. (2017). Anxiety-related symptomatology in young children on the autism spectrum. *Autism*1362361317734692. https://doi.org/10.1177/1362361317734692.

Keith, J. M., Jamieson, J. P., & Bennetto, L. (2018). The importance of adolescent self-report in autism spectrum disorder: Integration of questionnaire and autonomic measures. *Journal of Abnormal Child Psychology*. https://doi.org/10.1007/s10802-018-0455-1.

Kirchner, J., Ruch, W., & Dziobek, I. (2016). Brief report: Character strengths in adults with autism Spectrum disorder without intellectual impairment. *Journal of Autism and Developmental Disorders, 46*(10), 3330–3337. https://doi.org/10.1007/s10803-016-2865-7.

Klin, A., Saulnier, C. A., Sparrow, S. S., Cicchetti, D. V., Volkmar, F. R., & Lord, C. (2007). Social and communication abilities and disabilities in higher functioning individuals with autism spectrum disorders: The Vineland and the ADOS. *Journal of Autism and Developmental Disorders, 37*(4), 748–759. https://doi.org/10.1007/s10803-006-0229-4.

Kuo, M., Orsmond, G., Cohn, E., & Coster, W. (2011). Friendship characteristics and activity patterns of adolescents with an autism spectrum disorder. *Autism, 17*(4), 481–500. https://doi.org/10.1177/1362361311416380.

Lorenz, T., & Heinitz, K. (2014). Aspergers–Different, not less: Occupational strengths and job interests of individuals with Asperger's Syndrome. *PloS One, 9*(6), e100358. https://doi.org/10.1371/journal.pone.0100358.

Loveland, K., & Tunali-Kotoski, B. (2005). The school-age child with an autism spectrum disorder. In F. R. Volkmar, P. Klin, & D. Cohen (Eds.). *The handbook of autism and pervasive developmental disorders* (pp. 247–287). (3rd ed.). New Jersey: Wiley.

Maslow, A. H. (1966). *The Psychology of Science.* New York: Harper and Row.

Mazefsky, C., Williams, D., & Minshew, N. (2008). Variability in adaptive behavior in autism: Evidence for the importance of family history. *Journal of Abnormal Child Psychology,* (36), 591–599. https://doi.org/10.1007/s10802-007-9202-8.

McCoy, S. M., Jakicic, J. M., & Gibbs, B. B. (2016). Comparison of obesity, physical activity, and sedentary behaviors between adolescents with autism spectrum disorders and without. *Journal of Autism and Developmental Disorders, 46*(7), 2317–2326. https://doi.org/10.1007/s10803-016-2762-0.

McCrimmon, A., & Montgomery, J. (2014). *Resilience-based perspectives for autism spectrum disorder. McCrimmon & Montgomery Resilience interventions for youth in diverse populations.* New York: Springer.

Mendelson, J. L., Gates, J. A., & Lerner, M. D. (2016). *Friendship in school-age boys with autism spectrum disorders: A meta-analytic summary and developmental.* January 11*Process-based model. Psychological bulletin*https://doi.org/10.1037/bul0000041 Advance online publication.

Meyer, J. A., Mundy, P. C., Van Hecke, A. V., & Durocher, J. S. (2006). Social attribution processes and comorbid psychiatric symptoms in children with Asperger syndrome. *Autism, 10*(4), 383–402. https://doi.org/10.1177/1362361306064435.

Perry, A., Flanagan, H. E., Dunn Geier, J., & Freeman, N. L. (2009). Brief report: The Vineland Adaptive Behavior Scales in young children with autism spectrum disorders at different cognitive levels. *Journal of Autism and Developmental Disorders, 39*(7), 1066–1078. https://doi.org/10.1007/s10803-009-0704-9.

Petrina, N., Carter, M., Stephenson, J., & Sweller, N. (2017). Friendship satisfaction in children with autism spectrum disorder and nominated friends. *Journal of Autism and Developmental Disorders, 47*(2), 384–392. https://doi.org/10.1007/s10803-016-2970-7.

Roberts, J. M. A., Adams, D., Heussler, H., Keen, D., Paynter, J., Trembath, D., ... Williams, K. (2018). Protocol for a prospective longitudinal study investigating the participation and educational trajectories of Australian students with autism. *BMJ Open, 8*(1), e017082.

Rutter, M., Bailey, A., & Lord, C. (2008). *Social communication questionnaire.* Los Angeles, CA: Western Psychological Services.

Schriber, R. A., Robins, R. W., & Solomon, M. (2014). Personality and self-insight in individuals with autism spectrum disorder. *Journal of Personality and Social Psychology, 106*(1), 112.

Seltzer, M. M., Krauss, M. W., Shattuck, P. T., Orsmond, G., Swe, A., & Lord, C. (2003). The symptoms of autism spectrum disorders in adolescence and adulthood. *Journal of Autism and Developmental Disorders, 33*(6), 565–581. https://doi.org/10.1023/B:JADD.0000005995.02453.0b.

Shipman, D. L., Sheldrick, C., & Perrin, E. C. (2010). Quality of life in adolescents with autism spectrum disorders: Reliability and validity of self-reports. *Developmental and Behavioural Pediatrics, 32*, 85–89.

Simpson, K., Adams, D., Bruck, S., & Keen, D. (2019). Investigating the participation of children on the autism spectrum across home, school and community: A longitudinal study. *Child: Care, Health and Development,* 1–7. https://doi.org/10.1111/cch.12679.

Simpson, K., Keen, D., Adams, D., Alston-Knox, C., & Roberts, J. (2018). Participation of children on the autism spectrum in home, school, and community. *Child: Care, Health and Development, 44*(1), 99–107. https://doi.org/10.1111/cch.12483.

Sparrow, S., Balla, D., & Cicchetti, D. (2005). *Vineland adaptive behaviour scales: Interview edition, survey from manual.* MN: Circle Pines: American Guidance Service.

Tan, C. D. (2018). "I'm a normal autistic person, not an abnormal neurotypical": Autism Spectrum disorder diagnosis as biographical illumination. *Social Science &*

Medicine, 197, 161–167. https://doi.org/10.1016/j.socscimed.2017.12.008.

Teti, M., Cheak-Zamora, N., Lolli, B., & Maurer-Batjer, A. (2016). Reframing autism: Young adults with autism share their strengths through photo-stories. *Journal of Pediatric Nursing, 31*(6), 619–629. https://doi.org/10.1016/j.pedn.2016.07.002.

Ung, D., McBride, N., Collier, A., Selles, R., Small, B., Phares, V., ... Storch, E. (2016). The relationship between peer victimization and the psychological characteristics of youth with autism spectrum disorder. *Research in Autism Spectrum Disorders, 32*, 70–79. https://doi.org/10.1016/j.rasd.2016.09.002.

van Steensel, F. J., Bogels, S. M., & Dirksen, C. D. (2012). Anxiety and quality of life: Clinically anxious children with and without autism spectrum disorders compared. *Journal of Clinical Child and Adolescent Psychology : the Official Journal for the Society of Clinical Child and Adolescent Psychology, American Psychological Association, Division 53, 41*(6), 731–738. https://doi.org/10.1080/15374416.2012.698725.

White, S. W., Oswald, D., Ollendick, T., & Scahill, L. (2009). Anxiety in children and adolescents with autism spectrum disorders. *Clinical Psychology Review, 29*(3), 216–229. https://doi.org/10.1016/j.cpr.2009.01.003.