The Broad Autism Phenotype: Birth Order as it Relates to
Pragmatic Language and Self-Competence in Siblings

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Abstract

One in 68 children in the United States were diagnosed with Autism Spectrum Disorder in 2014 (CDC, 2014). This is a 55% increase from 2002, in which 1 in 150 children in the U.S. were diagnosed. Using U.S. census data, this means that around 300,000 parents and siblings are living with the challenge of raising and growing up alongside a child with autism. This study delves into the sibling experience, examining birth order as it relates to pragmatic language functioning and self-competence in typically developing siblings of children with autism. There was no effect of birth order on the pragmatic language subset of the BAPQ; however, there was a significant negative correlation between pragmatic language scores, where higher scores indicate lower pragmatic function, and parent-reported scores of their typically-developing child’s self-competence. Together, these findings suggest that typically-developing siblings who don’t use social language as proficiently as other children may have lower levels of self-competence and be targeted for increased support.

Keywords: autism, siblings, self-competence, pragmatic language, Broad Autism Phenotype, birth order
ACKNOWLEDGEMENTS

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The Broad Autism Phenotype: Birth Order as it Relates to Pragmatic Language and Self-Competence in Siblings

With the rise of autism spectrum disorder (ASD) diagnoses, more and more children are being targeted for intervention and support. The families of these children are also in need of support. While much research has focused on the implications of the ASD diagnosis on parents, there has been less focus on its effect on siblings.

The sibling relationship is one of the most influential relationships for children during development. At present, more children grow up in a home with a sibling than in a home with a father (McHale, Updegraff, & Whiteman, 2012). Most children, therefore, are exposed to a sibling relationship and the consequent effects on their development. Sibling relationships provide the basis through which social, emotional, and cognitive skills are generalized to interactions with others across the lifespan through interactions like turn-taking and sharing. The nature of sibling interactions can especially impact how a child creates peer relations.

Sibling relationships where one member has a developmental disability show marked differences from typical sibling dyads. The sibling relationship including a child with ASD plays an integral role in the typically developing (TD) child’s development and adjustment (Petalas et al., 2012). These results point towards a need for sibling support and an increased understanding of the complex factors involved. TD siblings of children with ASD exhibit higher stress levels than either TD siblings of TD children or children with Down Syndrome (McHale, Sloan, & Simeonsson, 1986). High stress levels can have a negative effect on general health and functioning, putting these siblings at risk for these outcomes. As compared to these same groups, siblings of children with ASD have less social interaction (Kaminsky & Dewey, 2001). If siblings of children with ASD are also living with many other demographic risk factors, including low socioeconomic status, they are at risk for negative
psychosocial and emotional adjustment as compared to children of a TD sibling (Macks & Reeve, 2007). Understanding the effects that children with ASD have on their siblings is a critical step in the study of any other sibling outcomes.

One factor involved in sibling relationship quality within a TD-ASD dyad is the Broad Autism Phenotype (BAP). The BAP contains subtle personality and language characteristics that resemble those of ASD, in a milder but quantitatively similar way in non-autistic relatives of individuals with ASD (Hurley et al., 2007; Petalas et al., 2012). These characteristics can generally go undetected, presenting themselves as idiosyncrasies in specific domains. These areas include aloof personality, rigid personality, and pragmatic language deficits (Hurley et al., 2007). For example, individuals who exhibit BAP characteristics often display untactful behavior and have trouble adapting to changes in the environment (Losh et al., 2008). The three subsets of functioning mirror those of the ASD diagnosis: social deficits, stereotyped-repetitive behaviors, and communication deficits. Research indicates that 10-20% of TD siblings of children with autism exhibit BAP characteristics (Bolton, MacDonald, Pickles & Rios, 1994).

The BAP has been examined through both a genetic and environmental lens, as it is believed that a diagnosis of autism includes both genetic and environmental etiological components. TD siblings of children with ASD can be influenced both by sharing genes and sharing environments with a child with autism. TD siblings of multiplex families, ones containing more than one child with autism, have significant differences in conversation and expressiveness than TD siblings of simplex families (Gerdts et al., 2013). As the amount of shared genetics increases, the more BAP traits are exhibited. Many researchers assert that these component factors, genetics and environment, cannot be separated, and the influence should be looked at as a whole. To explain the differences found in ASD-like traits between simplex and multiplex families, either the genetic cause of ASD or the shared
environmental effects affect behavioral presentation (Gerdts et al., 2013).

At present, there is no way to determine the relative impact of these possibilities; therefore, the study of the BAP must be conducted with reference to an integration of genetics and environment. One theory of genetic-environment interaction in the BAP operates using the diathesis-stress model, where genetic predisposition interacts with environmental stress to produce a specific outcome (Bauminger & Yirmiya, 2001). Because TD siblings have similar genetics to their sibling with autism coupled with environmental events that exacerbate genetic predisposition lead to the presentation of more BAP traits. The amount of these ASD-like traits exhibited by TD siblings of children with autism can affect sibling functioning.

One very important area of development that can be affected by having a sibling with ASD is pragmatic language use. Pragmatics refers to the use of language in communication, namely in social settings. This skill is one of the three areas of impairment for individuals with autism. It is also one of the three areas of comparison when examining the BAP using the Broad Autism Phenotype Questionnaire (BAPQ) (Hurley et al., 2007). In fact, pragmatics seems to be the only linguistic ability impaired by the presence of BAP characteristics (Ben-Yizhak et al., 2011). A person with BAP characteristics and no co-existing language deficits would have a normal control of the inner workings of their language, such as syntactic structure, but may have difficulties using their language to communicate with others socially. Research indicates that 25% of TD siblings of children with autism had a history of delayed language development, increasing to 75% if their sibling also had mental retardation (Chuthapisith et al., 2007). These results clearly indicate that genetic predisposition related specifically to IQ can influence TD siblings’ pragmatic language abilities.

Having a sibling with ASD can also impact the way a TD sibling feels about his or her own
abilities. In order to assess children’s feelings about themselves over a variety of contexts, one can measure perceived competence. Perceived competence in school-aged children refers to how they believe they function in domains such as academic, social, and physical competence (Harter, 1982). Children usually do not feel equally competent in each of these domains, so breaking up the broad concept of perceived competence into discrete modules can capture this competence discrepancy. One must note that self-competence, perceived competence, and self-concept are interchangeable terms, which are vague and unclear in the literature, as they are not concretely defined. For the purposes of this study, self-competence is the term given to refer to children’s evaluation of their abilities, although other studies may refer to this same term as “perceived competence” or “self-concept”.

There are mixed results associated with studying the self-competence of TD siblings of children with autism. Some results assert that there is no difference in self-competence between TD siblings of children with ASD, Down Syndrome, or TD children (Rodrique, Geffken, & Morgan, 1993). Other studies find that adolescent TD female siblings of children with high-functioning autism have more positive-self concept than TD siblings of TD children (Verte et al., 2003). This disparity could be because of the variance in definition of the variable of interest and the measures used.

Another variable noted for its effect on siblings is birth order. Birth order effects found for TD siblings of children with autism can be used as evidence for environmental impact in susceptibility to autism (Spiker et al., 2001). If ASD could be explained by a purely genetic mechanism, then birth order would not have much of an effect on outcomes on the expression of BAP characteristics. Outcomes tend to be more positive when the TD sibling is older than the child with autism. Older TD siblings report lower conflict scores and describe their siblings with ASD more favorably than do younger TD siblings of a child with autism (Petalas et al., 2012; Pilowsky et al., 2004). Younger TD siblings exhibit poorer pragmatic language performance and worse social scores than do older TD
siblings of a child with autism (Ben-Yizhak et al., 2011; Reichenberg et al., 2007). Younger TD siblings of a child with autism also exhibit higher externalizing behaviors, outward behavior problems, when their sibling with ASD has had externalizing behaviors (Tomeny et al., 2014). These results point towards environmental context due to birth order as a factor in development of a TD sibling of a child with autism, one that favors older TD siblings. This trend may be because the older TD sibling generally spends ample time with parents, allowing for proper scaffolding of developmental skills, such as self-regulation and sociability. However, a younger TD sibling of a child with autism may have to sacrifice this time, as parents tend to be very busy caring for their older child with ASD. This could shift the younger TD sibling’s role to one of an additional caretaker, which could have consequences for that sibling’s development. This point is especially true for younger siblings looking for a role model from which to adapt behavior.

In order to incorporate the aforementioned variables into a cohesive model of sibling functioning, two research questions were examined: What are the effects of birth order on the pragmatic language use in siblings of children with ASD? Based on existing research, the hypothesis states that younger TD siblings of children with ASD will have higher BAPQ pragmatic language subset scores, indicating lower pragmatic function. The second question asks, does the pragmatic language use as indicated by score on the subset of the BAPQ predict perceived self-competence scores? Is birth order a moderator of this effect? Prior research leads to the hypothesis that higher pragmatic language scores on the BAPQ will be correlated with lower perceived self-competence scores, with the effect being stronger for younger TD siblings of a child with autism.

Method

Participants
Thirty-two parents and TD siblings of a child with autism completed this study. Six parent/sibling pairs participated in the pilot study and twenty-six parent/sibling pairs participated in the formal data collection. The data collected from the pilot study was not used for analysis because the surveys were modified according to their feedback before the surveys were sent out to the North Carolina Autism Registry via email. Eighteen reported on a female TD sibling, while eight reported on a male TD sibling. Five reported on a female ASD sibling, while twenty-one reported on a male ASD sibling. This reflects the general autism population gender distribution, the 4:1 ratio of boys to girls diagnosed. In ten out of the twenty-six cases, the TD sibling gender matched that of the ASD sibling gender. Eleven reported on older TD siblings, while twelve reported on younger TD siblings, and three parents reported on twins. Participants were recruited through the North Carolina Autism Registry and were sent emails inviting those who have typically developing children age 10-14 years with a full-blooded sibling with autism with no dual-diagnoses to visit the study website and complete the surveys.

**Measures**

The Pragmatic Language Subset of the Broad Autism Phenotype Questionnaire (BAPQ), along with a section based on top-down construct validity of additional BAPQ items (Pragmatics+), comprises the pragmatic language measure. The survey includes the informant-report version of the BAPQ for the parents of the TD siblings. There are 17 items, with 5 of those being in Pragmatics+. Pragmatics+ items are those items that were categorized within other constructs in the BAPQ, but were deemed part of a pragmatic construct by the PI of this study. Items are designed to assess the degree of deficits in social aspects of language (Hurley et al., 2007). For example, one item in the Pragmatic Language Subset of the informant-version reads, “My child seems disconnected or ‘out of sync’ in conversations with others.” This item in particular targets the difficulties in social
communication exhibited with individuals with BAP characteristics. Cronbach’s $\alpha$ for the Pragmatic Language Subset is 0.85, inferring high inter-item reliability (Hurley et al., 2007). These items are rated according to how frequently statements like the one above describe their child. This 6-point scale measures responses from 1-very rarely, 2- rarely, 3-occasionally, 4- somewhat often, 5-often, and 6-very often. Several items were reverse coded (see Appendix A).

The Self-Description Questionnaire (SDQ) is a multidimensional measure intended to elicit information about a child’s self-concept (Marsh et al., 1981). Seven separate factors are included within this 70 question measure, including “Relationships with Peers,” “Relationships with Parents,” “Physical Abilities,” and “All School Subjects.” These four factors are used both individually and compositionally for analysis. Separate factor analyses were similar for each construct and demonstrated the areas the SDQ is designed to measure, showcasing high construct validity. The reliability of each factor is also in the 0.8-0.9 range (Marsh et al., 1981). The “Relations with Peers” construct includes items such as, “Other kids want me to be their friend,” while the “All School Subjects” construct includes items like, “I look forward to all school subjects.” These items are scored on a scale of False, Mostly False, Sometimes False, Sometimes True, Mostly True, and True. There are 36 items in this edited construct (see Appendix B).

**Procedures**

The North Carolina Autism Registry recruited 2,361 families who received informational emails regarding the purpose of the study and the link to the study website. They were instructed via the email to visit the website if they have a TD child between 10 and 14 years of age. Once they entered the website and read the information on the top of the screen, they clicked the parent portal. They were immediately directed to an informed consent text for both themselves and their TD child.
Once completing this consent form, they were immediately directed to a brief demographic survey, including items about gender of the siblings, age of the TD sibling, and the birth order of the siblings. Next, they were directed to the Pragmatic Language survey. When the parents completed this survey, they were directed to the SDQ informant-version. When the parents finished their surveys, the TD children were asked to complete an assent form and were then directed to the self-report version of the SDQ.

**Results**

**Hypothesis Testing**  In order to test the hypothesis that younger TD siblings have higher pragmatic language scores on the BAPQ, indicating poorer pragmatic function, we ran a single sample t-test that compared birth order status on both the Pragmatic Language Subset of the BAPQ and Pragmatics+ variables. Older TD siblings did not report differences in Pragmatic Language Subset scores from younger TD siblings, \( t(21) = -0.61, p = 0.547 \). Similarly there were no reported differences between birth order groups on the Pragmatics+ measure, \( t(21) = -0.44, p = 0.664 \).

A simple correlation tested the hypothesis that pragmatic language scores predicted self-competence (i.e., lower pragmatic functioning predicted lower self-competence) score. This correlation included tests on both the Pragmatic Language Subset of the BAPQ and Pragmatics+ with a composite self-competence score and all four individual constructs from the SDQ from both the parent and sibling reports. The results of this test are listed in Table 1. The correlations between the Pragmatic Language Score and overall self-competence, the “Relationships with Peers” construct, and the “Relationships with Parents” construct were significant for the parent report of the SDQ. These correlations were significant with Pragmatics+ as well, with the addition of a significant correlation between Pragmatics+ and the “Physical Abilities” construct in the parent report.
**Exploratory Analysis** In order to examine the claims by Verte et al. (2003) that adolescent TD female siblings of children with high-functioning autism have more positive self concept than TD siblings of TD children, we ran single sample t-tests comparing TD gender and self-competence outcomes to look at gender outcomes in this clinical sample. Female TD siblings did not report higher overall self competence, \( t(23) = 0.45, p = 0.65 \), or pragmatic language functioning on either the Pragmatic Language Subset of the BAPQ, \( t(24) = 0.26, p = 0.80 \), or Pragmatics+, \( t(24) = 0.36, p = 0.724 \) than did male TD siblings.

To test the effect of shared gender between siblings on self-competence and pragmatic language use, we ran single sample t-tests to examine whether the fact that siblings are the same gender has an effect on the outcome variables. There was no effect on either the parent report of self-competence, \( t(24) = 0.83, p = 0.412 \), or the child report, \( t(24) = 0.36, p = 0.719 \). Nor was there an effect of same gender on the Pragmatic Language Subset of the BAPQ, \( t(24) = 0.12, p = 0.902 \), or Pragmatics+, \( t(24) = 0.57, p = 0.573 \).

To examine any effect that age of the TD sibling would have on the outcome measures of self-competence and pragmatic language use, we ran additional correlations. There was a moderately strong positive correlation between age and overall self-competence on the parents measure, \( r(26) = 0.3096, p = 0.124 \) and weak negative correlations between age and self-competence on the child measure, \( r(25) = -0.085, p = 0.686 \), the Pragmatic Language Subset of the BAPQ, \( r(26) = -0.163, p = 0.428 \), and Pragmatics+, \( r(26) = -0.135, p = 0.510 \).

In order to interpret the parent and child self-competence measure as one entity, we ran correlations of the overall measures and each of the constructs for the parent and child reports. The results of this test are found in Table 2. The overall measures were significantly highly positively
Discussion

**Birth Order and BAPQ** There were no differences between younger and older TD siblings on either pragmatic language measure, failing to confirm the hypothesis that younger TD siblings of children with autism would have lower pragmatic language abilities. These findings are consistent with those found by Spiker et al. (2011), in which there was no birth order effects on social impairment. However Spiker et al. (2011) found birth order effects for language functioning. If the results from this study are analyzed within this context, perhaps the Pragmatic Language Subscale from the BAPQ targets social functioning more than language functioning, which can explain the pattern of results. However, the results found in this study are not consistent with those found by Reichenberg et al. (2007). In their study assessing the effect of birth order on ASD domains, they found that 1st born ASD siblings had higher useful phrase speech and better social scores than 2nd born ASD siblings. The results from their study taken concurrently with the present study suggest that it is not a matter of measures, but a matter of methodology. Both Spiker et al. (2001) and Reichenberg et al. (2007) focused on autism multiplex families, rather than families with one child with autism and one TD child. This must be taken into account when interpreting the results of this study, as birth order effects may change based on diagnosis or lack thereof.

**Self-Competence and BAPQ** There exist statistically significant correlations between both pragmatic language scales and parent reports of overall, “Relationships with Peers”, and “Relationships with Parents” self-competence. These results support the hypothesis that lower pragmatic language abilities, exhibited by higher pragmatic language subset scores, correlate with lower self-competence scores. This phenomenon is not exhibited by TD siblings of TD children in this study, and therefore, cannot
be generalized to results found by Rodrigue, Geffken, and Morgan (1993). However, the implications of this study’s findings can inform interested parties concerning a TD sibling’s well being. For instance, if they have trouble communicating socially, this behavior can be seen as an indicator of low self-competence.

**Limitations** Although there are practical implications from the results of this study, limitations were present. As stated previously, self-competence is a vague term in the literature. This can lead to confusion regarding the generalizability of results. Also, the SDQ is a thirty-year-old measure, which can lead to some pragmatic difficulties interpreting the questions. For instance, one parent contacted the study because she thought the wording “my child is dumb in all school subjects” must have been a mistake. A more recent measure could bypass these issues to create a more streamlined participant experience.

Another constraint on the strength of this study’s findings is the small sample size. Although the study website link was sent to 2,361 families, only twenty-six parent/child pairs completed the survey. Because of this, there is a lesser ability to generalize findings to the siblings of the broader clinical population. Also, because only 10-20% of TD siblings of children with autism exhibit the BAP according to Bolton, MacDonald, Pickles & Rios (1994), the twenty-six child sample size would only include one or two siblings exhibiting BAP characteristics in pragmatic language. An increased sample size would ensure that a greater number of children exhibiting BAP characteristics would complete the measures.

**Future Directions** Further research should investigate the birth order effect in a larger sample and replicate the self-competence findings in order to understand the support that siblings may need. A study examining multiplex autism families and simplex families with a TD sibling would be beneficial.
to understand if the trends of one can be generalized to the other. The results of such a study could inform even more studies in the future about the BAP and TD siblings of children with autism, such that more appropriate hypotheses can be constructed and systematically tested.

**Implications** Although there are limitations on the generalizability of this study’s findings, there is still a takeaway: although there may not be birth order differences among TD siblings of children with autism, there should be self-competence support available for those who exhibit pragmatic language difficulties. This support could take the form of sibling-inclusive therapies in order to give the sibling a feeling of sovereignty. It could also take the form of sibling support groups, in which TD siblings of children with autism meet with one another to discuss their struggles and triumphs with their siblings. These groups could also serve another purpose: fostering social skills between these siblings. More socially adept siblings can scaffold those who may have pragmatic language difficulties, thereby increasing their social language use practices and possibly the correlated variable of self-competence.
Table 1

*Summary of Correlations between Pragmatic Language Use and Self-Competence*

<table>
<thead>
<tr>
<th></th>
<th>Pragmatic Language Subset</th>
<th>Pragmatics+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>df</td>
</tr>
<tr>
<td>Overall PSDQ</td>
<td>-0.495</td>
<td>26</td>
</tr>
<tr>
<td>Peer Relations PSDQ</td>
<td>-0.42</td>
<td>26</td>
</tr>
<tr>
<td>Parent Relations PSDQ</td>
<td>-0.391</td>
<td>26</td>
</tr>
<tr>
<td>School Subjects PSDQ</td>
<td>-0.283</td>
<td>26</td>
</tr>
<tr>
<td>Physical Ability PSDQ</td>
<td>-0.366</td>
<td>26</td>
</tr>
<tr>
<td>Overall CSDQ</td>
<td>-0.201</td>
<td>25</td>
</tr>
<tr>
<td>Peer Relations CSDQ</td>
<td>0.054</td>
<td>25</td>
</tr>
<tr>
<td>Parent Relations CSDQ</td>
<td>-0.109</td>
<td>25</td>
</tr>
<tr>
<td>School Subjects CSDQ</td>
<td>-0.275</td>
<td>25</td>
</tr>
<tr>
<td>Physical Ability CSDQ</td>
<td>-0.122</td>
<td>25</td>
</tr>
</tbody>
</table>

* p≤0.05
** p≤0.01
*** p≤0.001
**** p≤0.0001
Table 2

**Summary of Correlations between Child and Parent Measures of Self-Competence**

<table>
<thead>
<tr>
<th></th>
<th>Overall PSDQ</th>
<th>Peer Relations PSDQ</th>
<th>Parent Relations PSDQ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r$</td>
<td>df</td>
<td>$\beta$</td>
</tr>
<tr>
<td>Overall CSDQ</td>
<td>0.646</td>
<td>25</td>
<td>0.0005***</td>
</tr>
<tr>
<td>Peer Relations CSDQ</td>
<td>0.349</td>
<td>25</td>
<td>0.088</td>
</tr>
<tr>
<td>Parent Relations CSDQ</td>
<td>0.429</td>
<td>25</td>
<td>0.033*</td>
</tr>
<tr>
<td>School Subjects CSDQ</td>
<td>0.603</td>
<td>25</td>
<td>0.001***</td>
</tr>
<tr>
<td>Physical Ability CSDQ</td>
<td>0.446</td>
<td>25</td>
<td>0.025*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>School Subjects PDSQ</th>
<th>Physical Ability PDSQ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r$</td>
<td>df</td>
</tr>
<tr>
<td>Overall CSDQ</td>
<td>0.603</td>
<td>25</td>
</tr>
<tr>
<td>Peer Relations CSDQ</td>
<td>0.252</td>
<td>25</td>
</tr>
<tr>
<td>Parent Relations CSDQ</td>
<td>0.342</td>
<td>25</td>
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<tr>
<td>School Subjects CSDQ</td>
<td>0.922</td>
<td>25</td>
</tr>
<tr>
<td>Physical Ability CSDQ</td>
<td>0.112</td>
<td>25</td>
</tr>
</tbody>
</table>

* $p \leq 0.05$
** $p \leq 0.01$
*** $p \leq 0.001$
**** $p \leq 0.0001$
Appendix A:

Pragmatic Language Survey

<table>
<thead>
<tr>
<th>1-Very Rarely</th>
<th>2-Rarely</th>
<th>3-Occasionally</th>
<th>4- Somewhat Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>5- Often</td>
<td>6- Very Often</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. My child finds it hard to get his/her words out smoothly. 1 2 3 4 5 6
2. It is hard for my child to avoid getting sidetracked in the conversation. 1 2 3 4 5 6
3. My child would rather talk to people to get information than to socialize. 1 2 3 4 5 6
4. My child is ‘in tune’ with other people during conversation.* 1 2 3 4 5 6
5. My child’s voice has a flat or monotone sound to it. 1 2 3 4 5 6
6. My child seems disconnected or “out of sync” in conversations with others.* 1 2 3 4 5 6
7. People ask my child to repeat things he/she said because they don’t understand. 1 2 3 4 5 6
8. My child talks too much about certain topics. 1 2 3 4 5 6
9. When my child makes conversation, it is just to be polite.* 1 2 3 4 5 6
10. My child speaks too loudly or too softly. 1 2 3 4 5 6
11. My child can tell when someone is not interested in what he/she is saying.* 1 2 3 4 5 6
12. My child is good at making small talk.* 1 2 3 4 5 6
13. Conversation seems to bore my child.* 1 2 3 4 5 6
14. My child leaves long pauses in conversations. 1 2 3 4 5 6
15. My child tends to lose track in his/her original point when talking to people. 1 2 3 4 5 6
16. My child can tell when it is time to change topics in conversation.* 1 2 3 4 5 6
17. My child enjoys chatting with people.*

Bolded responses comprise items on the BAPQ not included in the Pragmatic Language Subscale (Pragmatics+)

*casual interactions with acquaintances

Reverse scoring: 4, 11, 12, 16, 17
Appendix B:

Self-Competence Survey- Parent Edition

<table>
<thead>
<tr>
<th></th>
<th>1-FALSE</th>
<th>2-Mostly False</th>
<th>3-Sometimes False</th>
<th>5-Mostly True</th>
<th>6-true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My child is good at throwing a ball.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. My child is interested in all school subjects.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. My child likes all school subjects.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. My child gets along with other kids easily.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Most other kids like my child.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. My child and I have a lot of fun together.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. My child likes me.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. My child enjoys sports and games.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. My child learns things quickly in all school subjects.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. My child is dumb in all school subjects.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. My child hates all school subjects.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. My child and I spend a lot of time together.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. My child is good at aiming at targets.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. If my child has children of their own my child would want to bring them up like I raised him/her.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. I like my child.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. My child has lots of friends.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. My child finds me easy to talk to.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. My child is easy to like.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. My child is popular with kids of his/her own age.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
20. Work in all school subjects is easy for my child. 1 2 3 4 5 6
21. My child is good at all school subjects. 1 2 3 4 5 6
22. I understand my child. 1 2 3 4 5 6
23. My child likes to run and play hard. 1 2 3 4 5 6
24. My child enjoys doing work for all school subjects. 1 2 3 4 5 6
25. My child can run fast. 1 2 3 4 5 6
26. My child is a good athlete. 1 2 3 4 5 6
27. Other kids want my child to be their friend. 1 2 3 4 5 6
28. Most kids have more friends than my child does. 1 2 3 4 5 6
29. My child is good at sports. 1 2 3 4 5 6
30. My child makes friends easily. 1 2 3 4 5 6
31. My child looks forward to all school subjects. 1 2 3 4 5 6
32. My child gets along well with me. 1 2 3 4 5 6
33. My child gets good marks in all school subjects. 1 2 3 4 5 6
34. My child’s body is strong and powerful. 1 2 3 4 5 6

Reverse Scoring: 10, 11, 28

Constructs

Relationships with Peers
1. My child makes friends easily
2. My child gets along with other kids easily
3. My child has lots of friends
4. Other kids want my child to be their friend
5. Most other kids like my child
6. My child is popular with kids of his/her own age
7. My child is easy to like
8. Most kids have more friends than my child does
Relationship with Parents
1. I get along well with my child
2. My child and I have a lot of fun together
3. My child finds me easy to talk to
4. I like my child
5. My child and I spend a lot of time together
6. If my child has children of their own my child would want to bring them up like I raised him/her
7. I understand my child
8. My child likes me

School Subjects
1. My child likes all school subjects
2. My child looks forward to all school subjects
3. My child is interested in all school subjects
4. My child enjoys doing work for all school subjects
5. *My child hates all school subjects
6. My child learns things quickly in all school subjects
7. My child gets good marks in all school subjects
8. Work in all school subjects is easy for my child
9. My child is good at all school subjects
10. My child is dumb in all school subjects

Physical Abilities
1. My child is good at sports
2. My child is a good athlete
3. My child likes to run and play hard
4. My child enjoys sports and games
5. My child can run fast
6. My child is good at throwing a ball
7. My child is good at aiming at targets
8. My child’s body is strong and powerful
References


Losh, M., Childress, D., Lam, K., & Piven, J. (2008). Defining key features of the broad autism


