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Associations of Parent-Child Psychosocial Informant Discrepancy
in Young Adults on the Autism Spectrum

A thesis submitted in partial satisfaction
of the requirements for the degree of Master of Arts
in Education

by

Steven Kenneth Kapp

2013

ABSTRACT OF THE THESIS

Associations of Parent-Child Psychosocial Informant Discrepancy
in Young Adults on the Autism Spectrum

by

Steven Kenneth Kapp

Master of Arts in Education

University of California, Los Angeles, 2013

Professor Jeffrey J. Wood, Chair

People on the autism spectrum tend to report higher psychosocial competence than their parents attribute to them, but previous research has not uncovered the reasons for these discrepancies. In this study autistic young adults and their parents both completed questionnaires rating the young adults' psychosocial functioning, including autistic traits, empathy, and social skills. Parent-child informant discrepancy on these measures was tested using paired sample *t*-tests; Pearson's correlations of significant differences were performed to test for the differences' associations with other variables. Young adults reported greater skills on all common measures, predicted by self-reported self-presentational skills and parent-reported externalizing behaviors and low social

awareness for the autistic traits and empathy discrepancies, and self-reported self-control for the social skills discrepancy. Parent-child differences may result from the young adults' low self-awareness and less adaptive behavior in family contexts, and parents' stress, suggesting need for respective growth in developmental and parenting skills.

The thesis of Steven Kenneth Kapp is approved.

Sandra H. Graham

Connie L. Kasari

Jeffrey J. Wood, Committee Chair

University of California, Los Angeles

2013

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Associations of Parent-Child Psychosocial Informant Discrepancy in Young Adults on the Autism Spectrum

Previous research has shown that children, adolescents, and co-residing young adults on the autism spectrum rate their psychosocial functioning more positively than do their parents. The only autism study to examine associations of this informant discrepancy recently reported low self-reported attribution of hostile intent to peers and low reported parental self-efficacy as predictors (Lerner, Calhoun, Mikami, & De Los Reyes, 2012). These findings are consistent with the Attribution Bias Context Model, a theoretical framework focused on the cognitive biases and social factors that influence the ratings of different groups of reporters in questionnaire research about young people with disabilities' functioning (De Los Reyes & Kazdin, 2005). Yet researchers have tended to attribute autistic (see Kapp, Gillespie-Lynch, Sherman, & Hutman, 2013) people's unique perspective on their own lives to their view of deficits inherent to autism – poor self- and social understanding or lack of self-control for challenging behavior (e.g., Barnhill et al., 2000; Johnson, Filliter, & Murphy, 2009). The present research examined differences between autistic young adults and their parents regarding the young adults' psychosocial functioning and variables correlated with those differences. Understanding those associations may improve understanding of the parent-child relationship and accuracy of raters' reports in questionnaire research.

Social Awareness and Context

One source of the parent-child differences appears to be the young adult child's low self-awareness of his or her social communication differences (Barnhill et al., 2000; Cederlund, Hagberg, & Gillberg, 2010; Foley Nicpon, Doobay, & Assouline, 2010; Green et al., 2000; Johnson et al., 2009; Knott, Dunlop, & Mackay, 2006; Koning & Magill-Evans, 2001). Even into

adolescence, many autistic individuals self-report typical social abilities (Koning & Magill-Evans, 2001; Lerner et al., 2012) and their parents report that they have no awareness of having a disability (Green et al., 2000). Many do not become aware of autism until their parents disclose it to them, which sometimes does not happen until at least adolescence because parents fear the knowledge would distress their child (Camarena & Sarigiani, 2010; Huws & Jones, 2008).

Lack of self-awareness appears positively related to challenges with theory of mind, or the ability to attribute mental and emotional states to the self and others (Barnhill et al., 2000; Green et al., 2000; Johnson et al., 2009). This ability tends to remain impaired in autistic adults and may stem from reflexive thinking abilities, shedding light on the importance of introspective difficulties autistic people may experience (Lombardo & Baron-Cohen, 2011). Baron-Cohen conceptualizes empathy as depending on theory of mind: “the drive or ability to attribute mental states to another person/animal, and [it] entails an appropriate affective response to the other person’s mental state” (p. 168). Not surprisingly then, autistic children and adolescents, unlike neurotypical youth, rated themselves as more empathetic and as having fewer autistic traits than their parents did (Johnson et al., 2009). It was therefore hypothesized that young adults would report higher empathy and lower autistic traits than their parents reported them to have.

Indeed, parent-child discrepancies may in part stem from the latter’s difficulties in recognizing and interpreting their own feelings, a problem experienced by most autistic people (Hill, Berthoz, & Frith, 2004; Silani et al., 2008). These significant challenges with emotional awareness relate to both empathy and social and broader autistic traits within the autistic and general population (Bird, Press, & Richardson, 2011; Bird et al., 2010; Grynberg, Luminet, Corneille, Grèzes, & Berthoz, 2010; Liss, Mailloux, & Erchull, 2008), and may thus contribute to parent-child informant discrepancy on empathy and autistic traits.

Furthermore, the explicit attempts of autistic young adults to compensate for their challenges with self-presentation may contribute to their overestimation of their competence in typical social settings. Beginning in infancy neurotypical people develop spontaneous, automatic social cognition that guides their behavior (Frith & Frith 2011, 2012). Autistic people tend to have markedly impaired intuitive social abilities but often gradually gain explicit social cognitive skills through conscious effort (Frith & Frith, 2011). By late adolescence and adulthood those without intellectual disability tend to pass many advanced theory of mind tasks (Kapp, Gantman, & Laugeson, 2011; Vivanti et al., 2011; Zaki & Oschner, 2011), but often fail to perform their abilities in real-life settings because of subtle, quick, and simultaneous social cues (Kapp et al., 2011; Zaki & Oschner, 2011). Autistic adolescents and adults thus often try to inhibit unusual behaviors or “pass” for neurotypical to fit in with peers, but social differences limit their success (Carrington, Templeton, & Papinczak, 2003; Davidson & Henderson, 2010; Foley Nicpon et al., 2010; Humphrey & Lewis, 2008; Jones & Meldal, 2001; Portway & Johnson, 2005). Since they usually have basic social cognitive abilities and their social awareness and skills tend to grow throughout development (Hamilton, 2009; Pellicano, 2010; Zaki & Oschner, 2011; Schwenck et al., 2012), autistic young adults may overestimate their self-presentational skills.

Emotional Dysregulation and Parenting Stress

Externalizing problems reflecting emotion dysregulation, such as aggressive, impulsive, hyperactive, and other disruptive behaviors, by their children may reduce parent-child rater agreement. Autistic children, adolescents, and young adults often exercise little self-control around their parents (Baker, Smith, Greenberg, Seltzer, & Lounds, 2011; Barnhill et al., 2000; Kanne & Mazurek, 2011; Kanne et al., 2009). These behavioral challenges often lower parent-child relationship quality and raise parental stress (Abbeduto et al., 2004; Lounds, Seltzer,

Greenberg, & Shattuck, 2007). The parenting stress resulting from the problems tend to reduce a sense of parental self-efficacy (Hastings & Brown, 2002; Rezendes & Scarpas, 2011), which in turn predicts parent-child social informant discrepancy (Lerner et al., 2012). This may occur because given the parenting stress they cause, parents tend to self-protectively attribute the behaviors to internal child causes like low skills and therefore somewhat beyond parental control (De Los Reyes & Kazdin, 2005).

Poor emotion regulation abilities of the young adults may also directly contribute to parent-child informant disagreement. Depression approached significance as a predictor, and decreased social anxiety following a social intervention predicted discrepancies between autistic youth and their parents in the study by Lerner et al. (2012). The youths' report of social competence may partially result from positive self-illusions to protect identity and self-esteem (Lerner et al., 2012). Indeed, by adolescence many autistic young people feel self-critical of their differences, viewing them as an obstacle to fitting in, even sometimes disliking support services for apparently harming their reputation (Camarena & Sarigiani, 2010; Hedley & Young, 2006; Humphrey & Lewis, 2008; Huws & Jones, 2008). Yet this hypothesis had mixed support and requires further testing (Lerner et al., 2012). Indeed, autistic adolescent boys and their parents had similar ratings on the social skills of self-control and assertiveness but parents rated cooperation much lower, in contrast to the lack of differences reported by neurotypical boys and their parents (Koning & Magill-Evans, 2001).

Aims of the Study

The present study proposed to advance understanding of informant discrepancies between autistic young adults and their parents regarding the young adults' psychosocial functioning, through testing hypothesized associated variables. It aimed to 1) replicate the findings by

Johnson et al. (2009) that autistic children and adolescents rated themselves as having higher empathy and lower autistic traits than their parents did, and by Koning and Magill-Evans (2001) that autistic adolescents boys reported more social skills and particularly cooperative behavior than did their parents. Young adults and parents completed the same questionnaires, which followed those used by the aforementioned studies (Johnson et al., 2009; Koning & Magill-Evans, 2001; see Measures). It then 2) analyzed expected associations between these discrepancies with questionnaire ratings by the parent or young adult of constructs in the two main categories: a) poor insight and social insight and social understanding, measured by reports of social awareness, emotional awareness, and self-presentational skills, and b) problematic behaviors and lack of emotional self-control, measured by reports of externalizing behaviors, lack of emotional control, and lack of impulse control. More specifically (all measures referring to the young adults), I hypothesize that parent-reported low social awareness, self-reported lack of problems in emotional awareness, self-reported self-presentational presentational skills, parent-reported externalizing behaviors, and self-reported emotional control and impulse control would positively relate to parent-child informant discrepancies.

Method

Participants

Data were drawn from the battery of assessments completed at baseline by autistic young adults and their parents, who were recruited for participation in the PEERS for Young Adults study (Gantman, Kapp, Orenski, & Laugeson, 2012). Thirty-six young adults (ages 18 to 24) and one of their parents participated in this study. All young adults had a previous diagnosis of an autism spectrum disorder by a qualified professional; their IQ ranged from 62 to 143. As part of participation in PEERS, all young adults a) had social problems as reported by a caregiver; (b)

were motivated to participate in the intervention; (c) were fluent in English; (d) had a family member who was fluent in English and willing to participate in the study; and (e) had no history of major mental illness (e.g., bipolar disorder, schizophrenia, or psychosis). The analysis of this study excluded two young adults, one whose sister rated her and another who had scores all in the typical range. Twenty-four of the young adults identified themselves as Caucasian, eight as Asian, and four as Hispanic/Latino. Twenty-five of the young adults were male and 11 were female. Thirty-four of the young adults were living with their parents. In all cases, parents initiated inquiry into participation.

Procedures

Following directions from a trained postdoctoral fellow in clinical psychology, young adults and their parents filled out questionnaires about the young adults' psychosocial functioning in separate sessions that lasted approximately two hours each. Both groups signed informed consent forms to participate in the study.

Two young adults did not complete IQ testing and one did not complete the SSRS because one moved and the other had a scheduling conflict that prevented participation in the intervention, but both had a clinical presentation of IQ in the normal range.

Measures Completed by Young Adults

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). DERS is a 36-item self-report measure of emotion dysregulation along six dimensions, including two six-item subscales included in this study: emotional awareness (e.g., "When I'm upset, I acknowledge my emotions") and impulse control difficulties (e.g., "When I'm upset, I have difficulty controlling my behaviors"). Respondents record how frequently statements apply to them (1 = almost never (0-10%), 2 = sometimes (11-35%), 3 = about half the time (36-65%), 4 = most of the time (66-

90%), and 5 = almost always (91-100%)). Young adults reported respective alphas of .76 and .87.

Kaufman Brief Intelligence Test - Second Edition (KBIT-2; Kaufman & Kaufman, 2005). Included as a covariate and administered to the young adults over approximately 25 minutes, the KBIT-2 is a brief screening tool used to assess cognitive functioning. Higher scores represented better intellectual functioning, while lower scores represented poorer intellectual functioning.

Social Skills Inventory (SSI; Riggio, 1986). The SSI is a 90-item self-report measure scored using a 5-point Likert-type scale (1 = *not at all like me* to 5 = *exactly like me*) and yields a total score as well as scores on six 15-item subscales. This study employed the Emotional Control subscale (the ability to regulate emotional communications and nonverbal displays), Social Control subscale (role-playing ability, regulation of verbal behavior, and self-presentational skill), and Emotional Sensitivity subscale (ability to decode others' emotions, beliefs, attitudes, and nonverbal cues). Young adults reported respective alphas of .66, .77, and .79.

Measures Completed by Parents

Social Responsiveness Scale (SRS; Constantino, 2005). The SRS is a 65-item rating scale (1 = *not true*, 2 = *sometimes true*, 3 = *often true*, and 4 = *almost always true*) that measures the degree of ASD symptoms as they occur in natural social settings, and takes approximately 15 minutes to complete. It provides a clinical representation of an individual's social impairments through five subscales; this study only assessed the eight-item Social Awareness (the recognition of and ability to read social cues) subscale (e.g., "Is aware of what others are thinking and feeling"). Parents reported an alpha of .62.

Vineland Adaptive Behavior Scales - Second Edition, Survey Form (Vineland-II; Sparrow, Balla, & Cicchetti, 2005). Included as a covariate, the Vineland II measures adaptive

behavior skills needed for everyday living and provides assessment of functioning within the domains of Communication, Daily Living Skills, and Socialization. The Vineland-II took approximately 30 minutes to complete. Parents rated the degree to which their child exhibited the behavior described by rating the item as either “Never,” “Sometimes or Partially,” or “Usually.” Domain and Adaptive Behavior Composite scores are presented as standard scores with a mean of 100 and a standard deviation of 15. Higher scores represent better adaptive functioning, while lower scores represent poorer adaptive functioning. Parents reported an alpha of .87.

Measures Completed by Both Raters

Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001). The AQ is a 50-item scale that measures characteristics of autism in the general population. Respondents recorded whether they agree or disagree with a statement. It contains five subscales of 10 items each that represent domains of autistic behavior: Social Skills (e.g., “I find it hard to make new friends”), Attention Switching (e.g., “I frequently get so strongly absorbed in one thing that I lose sight of other things”), Attention to Detail (e.g., “I tend to notice details that others do not”), Communication (e.g., “I frequently find that I don’t know how to keep a conversation going”), and Imagination (e.g., “I don’t particularly enjoy reading fiction”). Young adults and parents respectively reported alphas of .70 and .66, and respective alphas for subscales as ordered above of .73, .54, .42, .54, and .44, and .66, .79, .48, .48, and .60.

Empathy Quotient (EQ; Baron-Cohen & Wheelright, 2004). The EQ is a measure of empathy established through comparison between autistic adults and higher-scoring neurotypical controls. Respondents recorded whether they agree or disagree with a statement. This study employs a 22-item version with 11 items of Cognitive Empathy (e.g., “I can tune into how someone feels rapidly and intuitively”) and 11 items of Emotional Reactivity (e.g., “I tend to get

emotionally involved with a friend's problems"), which has shown a stronger fit to the data than the original 40-item unifactorial design (Muncer & Ling, 2006; Shaw, Baker, Baron-Cohen, & David, 2004).

Social Skills Rating System (SSRS; Gresham & Elliott, 1990). The SSRS is a 52- and 39-item, respectively, parent and adolescent questionnaire. Derived by factor analysis, the SSRS provides standard scores along the dimensions of social skills and problem behaviors with a mean of 100 and a standard deviation of 15. The Social Skills Scale on the adolescent and parent versions include three subscales in common, investigated in this study: Cooperation, Assertion, and Self-control. They tap into social competence through inquiry about interactions with peers, performance on household and classroom tasks, use of free time, and academic competence. Young adults and parents reported respective alphas of .75, .70, and .73, and .71, .76, and .82 on these subscales. The 12-item Problem Behaviors Scale, completed by the parents, includes a six-item Externalizing Behaviors subscale used in this study (alpha of .75). Higher scores on the Social Skills Scale reflect better social functioning, whereas lower scores on the Problem Behaviors Scale suggest better behavioral functioning. Parents and young adults rated items as either "Never," "Sometimes," or "Very Often."

Results

Due to the high number of analyses, only significant results are statistically reported.

Aim 1: Determining Parent-Child Informant Discrepancies

First was tested the hypothesis that young adults would report higher empathy (on the Empathy Quotient), lower autistic traits (on the Autism Spectrum Quotient), and higher cooperation (on the Social Skills Rating System) than their parents reported of them.

Parent and self-report of the total scores and subscales of the measures completed by both raters

(EQ, AQ, and SSRS) were directly compared to test for differences using paired sample *t*-tests. When a parent-child informant discrepancy on the total score or a subscale of one of these measures reached significance of $p < .05$, a difference score was created. Significant results are reported below.

The hypothesis was supported. Results revealed that in comparison to parent report, young adults reported better overall social skills on the SSRS ($p < .01$), significant for the Cooperation subscale ($p < .001$); higher empathy overall and on both subscales of the EQ ($p < .001$); and lower autistic traits on the AQ ($p < .001$), significant for all subscales except Attention to Detail (see Table 1). Thus 10 out of 14 possible parent-child report pairs (total scores and subscales) had significant mean differences; see the Discussion regarding lack of significant differences on most general (adaptive rather than symptomatic of ASD) social skills and on strength-based attention to detail. Indeed, discrepancies all related to the pattern that the young adults reported more competence than their parents reported of them.

Aim 2: Correlations of Parent-Child Discrepancies

Next was analyzed whether and how significant parent-child discrepancies correlated with hypothesized variables organized into the two categories below: ASD-related low self- and young adults' behavioral problems and lack of emotional self-control. Each of the 10 difference scores was tested for whether it correlated with the hypothesized variables (see below). Pearson's correlations (with the difference score as the dependent variable and hypothesized correlates as the independent variable) were performed to test for significant correlations, and their direction and strength.

When a correlate had a significant relationship with the difference scores of both the total score and multiple subscales of a measure, that will be noted but only the correlation with the

difference score of the total score will be reported. The difference scores of the Attention Shifting, Communication, and Social Skills subscales of the Autism Spectrum Quotient all shared the same significant correlations with one another and the difference score of the AQ's total score. The Imagination subscale, while an area of parent-child discrepancy, had no significant relationships with hypothesized correlates.

Furthermore, to try to better understand the origin of significant correlations, parent report and young adult report of dependent measures (AQ, EQ, and SSRS) were analyzed for whether one, the other, both, or neither had a significant relationship with their correlates. Statistics are only reported where the reporter of a correlate differed from the reporter of the dependent measure, as might be expected of correlations between reports on such measures by the same rater.

The hypothesis was tested that parent-reported low social awareness, self-reported lack of emotional awareness problems, and self-reported self-presentational skills correlated with the informant discrepancies (difference scores). Results are in Table 2. Parent-reported low social awareness correlated with parent-child discrepancy on autistic traits (AQ; $p < .001$), and discrepancy on empathy (EQ; $p < .002$) but only EQ – Emotional Reactivity on the subscale level ($p < .001$). Young adult low emotional awareness of own emotions (Difficulties in Emotion Regulation Scale – Awareness) correlated only with EQ – Emotional Reactivity ($p < .005$). Self-reported self-presentational skills (Social Skills Inventory – Social Control) correlated with discrepancy on autistic traits (AQ; $p < .016$) and on empathy ($p < .003$), but only Cognitive Empathy on the subscale level ($p < .004$). Overall, 13 of 30 – 10 discrepancies with three hypothesized correlates each – tested correlations were significant, including the seven listed above and AQ – Communication, AQ – Attention Shifting, and AQ – Social Skills with

social awareness and self-presentational skills.

Correlations of the preceding measures for young adult and parent reports rather than difference scores remained significant, and only significant, when the raters of the correlation and dependent measure matched. Thus all 13 of the significant correlations reported in the previous paragraph were also significant when the both sets of measures were completed by the same group (e.g., young adult-reported empathy and self-presentational skills), but none were significant when the raters differed.

Taken together, results provide further support that autistic individuals' low self-awareness contributes to informant discrepancies. Parent and young adults disagreed on the young adults' autistic traits and empathy, with parents reporting more deficits (higher autistic traits and less empathy), consistent with the hypothesis. Conversely, results on the Empathy Quotient subscales had more limited associations than expected that may qualify the breadth or depth of self-awareness deficits. Within empathy measurement self-reported self-presentation skills correlated only with reports (parent-child discrepancy and self-report) of social cognition (Cognitive Empathy), while parent-reported low social awareness and young adults' self-reported emotional awareness correlated only with reports of the young adults' quality of socio-emotional responsiveness (Emotional Reactivity).

Next, the hypothesis was tested that parent-reported externalizing behaviors and self-reported lack of emotional and impulse control problems correlated with psychosocial informant discrepancies. Results are presented in Table 2. Parent-reported externalizing problems followed the same pattern of parent-reported social awareness problems, correlating with parent-child discrepancy on autistic traits (AQ; $p < .003$), and discrepancy on empathy (EQ; $p < .046$), but only EQ – Emotional Reactivity on the subscale level ($p < .007$). The Social Skills Rating Scale finally

revealed significant correlates, with young adults' report of lack of Impulse Control problems on the Difficulties in Emotion Regulation Scale ($p < .003$) and of Emotional Control on the Social Skills Inventory ($p < .011$) positively relating to parent-child discrepancy on the SSRS total score (for the standard score but not raw score). Parent-child discrepancy on the SSRS – Cooperation subscale, however, had no significant correlates. The SSRS thus had only unique correlates as compared with those of the AQ and EQ in this study, and those correlates both related to young adults' report of self-control skills. Overall only eight of the tested 30 correlations – again, calculated by 10 discrepancies with three hypothesized correlates each – were significant: the five listed here and the association of externalizing behaviors with always-paired (in this study) AQ subscales of Communication, Attention Shifting, and Social Skills deficits.

Correlations of the preceding independent variables with young adult and parent reports of dependent variables (AQ, EQ, and SSRS for respective relationships) had mixed patterns of results. The parent-reported Externalizing Behaviors subscale of the Social Skills Rating System correlated unsurprisingly with and inversely with only parent reports of overall empathy and emotional reactivity, but also only with young adults' report of the Autism Spectrum Quotient ($r = -.405$, $p < .018$) and the three related subscales subserving it. It is thus especially notable that when young adults reported greater autistic traits, parents reported lower externalizing behaviors of them, suggesting the importance of self-awareness in managing behavior. Thus SSRS – Externalizing Behavior correlated with both of its parent, but neither of its young adult-reported empathy associations, and it correlated with all four of its autistic traits associations for self- but not parent-report.

Given that young adult and parent report of previous dependent measures related to correlates only when the raters matched and because parent-reported SSRS Externalizing

Behaviors and low Social Awareness on the Social Responsiveness Scale had significant interactions with only the same difference scores (of the AQ, EQ, and EQ Emotional Reactivity), I explored and found support for the hypothesis that young adults' low self-awareness and high externalizing behavior positively relate. While parent-reported externalizing behaviors negatively correlated with self-reported autistic traits on the AQ, they positively correlated with parents' report of low social awareness on another measure of ASD symptoms, the SRS ($r = .524, p < .001$). No other correlates significantly related to one another. Therefore, of the 15 possible unique combinations of correlates, only one significantly related, the hypothesized (low) social awareness-(high) externalizing behaviors association.

Furthermore, self- and parent report of the SSRS had somewhat more predictable relationships with correlates, although they suggested less discrepancy than on the AQ or EQ. Self-reports of emotional and impulse control correlated positively with only self-reported overall social skills on the SSRS, rather than parent-reported social skills or self- or parent-reported cooperation on the SSRS. Given the lack of correlations with SSRS – Cooperation despite parent-child discrepancy on only this subscale of the SSRS and the similarity of self control to the emotional and impulse control correlates of the SSRS total score, I explored correlations between self- and parent report of SSRS – Self-control and the SSRS total score to test which raters' reports related more significantly to discrepancy on the SSRS. Both self-reported SSRS – Self-control ($r = .498, p < .003$) and parent-reported SSRS – Self-control ($r = -.494, p < .003$) correlated significantly with parent-child discrepancy on the SSRS. As the SSRS measures adaptive behaviors and was designed for children and youth with a variety of problems, while the AQ and EQ intentionally measure behaviors associated with autism symptoms, autistic young adults may have more awareness of their general adaptive and

maladaptive behaviors except where they relate to interactions with parents (such as their performance of parent-ordered duties and otherwise getting along with parents, as assessed within the Cooperation subscale), than their deficits in social communication. In summary, the two self-control-related (emotional and impulse control) correlations remained significant with the discrepancy on social skills only for self-report, but both self- and parent-reported self-control corresponded with the discrepancy in social skills.

Overall, results provide partial support for the hypothesis that young adults' externalizing behaviors and lack of self-control would relate to parent-child discrepancy on their autistic traits, empathy, and social skills. Analyses revealed some hypothesized associations but correlations were specific to dependent variables, grouped by ASD social deficits and more general adaptive deficits. Young adults may have overreported social communicative skills and behavior, especially responsive behavior, related to poor awareness of their externalizing behavior. Moreover, young adults may have overreported cooperative behavior because of poor insight into self-regulation during such activities. At the same time, these externalizing and uncooperative behaviors may especially occur around and be salient to parents, who may underreport young adults' skills because of the stress these difficult behaviors present to them (see Discussion).

Final checks included analysis to verify that major developmental factors in this age group of young adults were not associated with parent-child discrepancies. Parent-reported adaptive behaviors on the Vineland Adaptive Behavior Scale were tested for correlation with any parent-child discrepancies. They did not correlate, neither on the total score nor the Communication, Social Skills, or Daily Living Skills subscales. Moreover, young adults' IQ scores were analyzed for correlation with any discrepancies. Full-scale and verbal IQ were not

associated with any discrepancies, and only AQ – Communication discrepancy associated (positively) with nonverbal IQ ($r = .402, p < .015$). These results suggest IQ scores and general adaptive behaviors hardly factor into parent-child informant discrepancies for young adults with at least normal range or near-normal range IQ. The lone finding on IQ may reflect higher parental social expectations of more intellectually able young adults, if not a result by chance. Indeed, of the seventy correlation tests performed (four adaptive behavior scales and three IQ scales with 10 discrepancies), only an IQ subscale correlated (modestly) with one subscale discrepancy.

Owing to greater correlations within empathy discrepancies specific to emotional reactivity despite growing evidence on cognitive rather than emotional empathy as an inherent problem in autism (see Discussion), the construction of the Empathy Quotient as dependent on theory of mind skills was tested. Correlations were performed of the EQ subscale discrepancies and parent and self-report of EQ subscales with self-reported ability to read mental and emotional states and nonverbal cues on the Social Skills Inventory (SSI – Emotional Sensitivity). SSI – ES had a moderately positive correlation with informant discrepancies on Cognitive Empathy ($r = .459, p < .006$) and Emotional Reactivity ($r = .444, p < .008$) on the EQ, and stronger positive correlations with self-reported Cognitive Empathy ($r = .638, p < .000$) and Emotional Reactivity ($r = .690, p < .000$), but no relationships to parent-reported EQ scores in either subscale. These analyses confirm the critical importance of theory of mind abilities to EQ-measured emotional reactivity, one comparable with more direct EQ-measured cognitive empathy.

Finally, to better characterize the implications of parent-child informant discrepancies, I conducted a preliminary analysis of intervention effects for part of the sample. The nine

parent-young adult families in the treatment group of the first clinical trial of PEERS for Young Adults at baseline had the same overall discrepancies as in this study from the broader sample, regarding overall AQ, EQ, and SSRS scores, but these discrepancies disappeared following intervention. This suggests young adults' improved self-awareness and better parent-child understanding and relationship (see Discussion).

Discussion

This study provided support for and extended research finding that autistic youth reported higher empathy and social skills and lower autistic traits than their parents reported of them (Johnson et al., 2009; Koning & Magill-Evans, 2001) by investigating empathy and autistic trait subscales (unlike Johnson et al., 2009) and building on a recent predictor study (Lerner et al., 2012) to demonstrate that problems of insight and externalization (likely in both thought and behavior) converge. Informant discrepancy mainly centered on social cognitive and interactive skills associated with autism, which may reflect the young adults' genuine caring and interests in social engagements alongside poor awareness of social cues and norms, more atypical behavior around parents than in other contexts, and disruptive behavior around parents that increases parenting stress and reduces parents' assessment of their child's competencies. Indeed, discrepancy on the specific social skills involved in cooperation reflect that autistic young adults may exercise less control over their behavior in familial surroundings, as young adults try to fit into more salient but stressful, exhausting environments around peers or the public. Discrepancies neither arose from ratings of other general adaptive behaviors nor of the young adults' strengths (such as attention to detail), suggesting particular challenges with the parent-child relationship that may affect informant discrepancies and psychosocial functioning.

That the results suggest certain competencies in the young adults' self-reflection, particularly on areas of strength – in fact, mean young adult and parent report of attention to detail only varied by 0.02 – may indicate an exaggeration of common self-protection biases toward protecting self-esteem (Lerner et al., 2012). Discrepancy on the Autism Spectrum Quotient converged on subscales of deficits. Parent and self-report of the AQ showed no differences on Attention to Detail, a trait known to be a strength in ASD and its broader phenotype (Austin, 2005; Baron-Cohen, Ashwin, Ashwin, Tavassoli, & Chakrabarti, 2009; Del Giudice, Angeleri, Brizio, & Elena, 2010; Happé & Vital, 2009; Wakabayashi, Baron-Cohen, & Wheelwright, 2006). They also had discrepancies on but no correlations with the Imagination subscale, an area characterized as a deficit in some social contexts related to theory of mind (Baron-Cohen & Wheelwright, 2004; Wheelwright et al., 2006), but also strengths in nonsocial contexts such as creativity in areas of interest (Baron-Cohen, 2008; Craig & Baron-Cohen, 1999; Liu, Shih, & Ma, 2011). Yet parents reported higher degrees of Communication, Attention Shifting, and Social Skills problems, which measure core social communication deficits in autism related to social cognition and executive functioning challenges (Austin, 2005; Wakabayashi et al., 2006), and this parent-child discrepancy had consistent associations with social awareness and self-presentational correlates. Johnson et al. (2009) similarly reported that autistic youth reported fewer social deficits than their parents did of them while equally recognizing strength in the broad ability of systemizing, which relates to skills in patterns-based information processing.

Moreover, parents of autistic youth may often emphasize their deficits, while their children focus on the environment as the source of problems or area to address. In the study by Camarena and Sarigiani (2009), parents of autistic adolescents directed their concerns about their child's higher education opportunities mainly to their child's social and independence deficits, while the

youth were most concerned about coursework and campus disability awareness. More direct evidence of this study's young adults' insecurities and awareness of their problems, if still limited in the accuracy of their perception, includes their high report of loneliness, social and dating anxiety, and emotion dysregulation (Kapp, Gantman, & Laugeson, 2012). Nevertheless, low insight contributes to autistic individuals' externalizing attributive tendencies, including into adulthood (Didehbani et al., 2012).

Furthermore, that the parent-child discrepancy on cognitive empathy (theory of mind) correlated only with self-reported self-presentational and role-playing skills suggests the dynamics of social interaction play a much more significant role in views of the young adults' abilities and interests than young adults' social cognition. Indeed, autistic people's social cognitive challenges often have less pervasive effects than hypothesized in the literature (Zaki & Ochsner, 2011), such as in this study and others (e.g., Liss et al., 2008). Consistent with past studies (Bird et al., 2010; Hirvela & Helkama, 2011; Rogers, Dziobek, Hassenstab, Wolf, & Convit, 2007; Poustka et al., 2010), young adults reported theory of mind deficits, although parents assigned them a mean score much lower than their own. Young adults' reliance on more conscious strategies to fit in or display normative behavior, compared with the relatively intuitive ease of most people for basic social skills, may give them a false illusion about their abilities. The possibility remains that young adults demonstrate better skills in more salient but stressful, exhausting social environments (such as around peers) that parents may not see. Yet even when they demonstrate social understanding autistic adults and youth often fail to adapt their behavior to the social context because of inflexible thinking like moralistic rule-following (e.g., honesty even at the expense of their reputation or relationship opportunities: Frith & Frith, 2011; Scheeren, Begeer, Banerjee, Terwogt, & Koot, 2010). Therefore, even if parents significantly

under-reported (and under-recognize) young adults' cognitive empathy – which is far from clear – the practical effect seems negligible.

Conversely, the several associations with discrepancy on young adults' emotional reactivity appear to represent complex, consequential processes emerging from the distinction between cognitive and emotional empathy. Cognitive empathy denotes understanding others' emotions (and often intentions, beliefs, perceptions, and thoughts as well, as measured here); emotional empathy denotes caring, sympathy, and affection (sometimes as expressed to and understood by others, as measured within emotional reactivity here; Jones, Happe', Gilbert, Burnett, & Viding, 2010; Shamay-Tsoory, 2011). As evidence has accumulated (Bird et al., 2010; Blair, 2008, 2005; Dziobek et al., 2008; Hirvela & Helkama, 2011; Jones et al., 2010; Poustka et al., 2010; Rogers et al., 2007; Schwenk et al., 2012; Shamay-Tsoory, 2011), autism has often become the paradigm of a low cognitive empathy, intact emotional empathy disorder (opposite antisocial personality disorder; Bird et al., 2010; Blair, 2008, 2005; Jones et al., 2010). While cognitive and emotional empathy may operate independently, most empathy in practice uses both types (Shamay-Tsoory, 2011), meaning autistic people often appear uncaring or unsympathetic but when they understand they do not feel less emotional empathy.

Several explanations may help account for the association of reports of the young adults' low emotional and social awareness, and externalizing behaviors, with discrepancies in their emotional reactivity. Autistic people report higher personal distress for other people's problems (Bird et al., 2010; Dziobek et al., 2008; Rogers et al., 2007), because of at least a typical amount of sympathy (see Markram & Markram, 2010; Smith, 2009), often coupled with deficits in self-other distinction related to their deficits in emotional self-awareness. Thus, if a friend or relative shares their problems with the young adults to have them offer advice or simply listen, the young

adults may misperceive their loved one as blaming them and possibly engage in challenging behavior, or may otherwise feel stressed by their interest in the others' well-being but not knowing how to help support them. Indeed, many people with conduct problems or who impulsively engage in difficult behavior have core deficits in cognitive empathy but not in direct emotional empathy (Cox et al., 2012; Schwenck et al., 2012). Similarly, the young adults' poor emotional and social awareness may lead to externalizing behavior that stresses parents and make them appear less affectively empathetic. Whether and how this occurs is unclear from the data, as the parent-child discrepancy in emotional sensitivity is smaller than that in cognitive empathy but still quite substantial, and the empathy questionnaire used conceptualizes emotional reactivity as dependent on cognitive empathy rather than as "pure" emotional empathy (Baron-Cohen & Wheelwright, 2004; Lawrence et al., 2004).

Regardless of how parents make sense of their child's problematic behavior, abundant evidence suggests that autistic people especially engage in it around their parents. Autistic children and adolescents tend to demonstrate more externalizing behavior around their parents than teachers or other adults (Barnhill et al., 2000; Kanne, Abbacchi, & Constantino, 2009; Kanne & Mazurek, 2011), which may be one reason that teachers tend to rate their social skills more favorably than parents in informant research (Kanne et al., 2009; Murray, Ruble, Willis, & Molloy, 2009; Szatmari, Archer, Fisman, & Streiner, 1994). Autistic adolescents may rate teachers as more socially supportive of them than their parents (Humphrey & Sympes, 2010; Lasgaard, Nielsen, Eriksen, & Goossens, 2010) but their relationship with parents and adults is a relative strength compared with peer relationships (Cottenceau et al., 2012; Knott, Dunlop, & Mackay, 2006). Autistic adolescents and adults have explained that they must exercise their best or most normative behavior around peers, strangers, and in public, while their parents are more

accepting and the autistics may otherwise have expended their self-regulatory abilities (Baines, 2012; Davidson & Henderson, 2010). This phenomenon may help to explain why poor self-control may underlie uncooperative behavior perceivers see and reported here. Ultimately, parents' and young adults' distress appears to have snowballing, bidirectional effects, raising young adults' challenging behavior and parental criticism of their child (Greenberg, Seltzer, Hong, & Orsmond, 2006). This dynamic appears to increase post-high school as autistic individuals have hallmark challenges with transitions and their services tend to drop at a time of less structure and often fewer daytime activities outside the home, yet greater need for personal responsibility (Baker, Smith, Greenberg, Seltzer, & Taylor, 2011; Kapp et al., 2011).

This study has implications for intervention. Young adults need education or therapy that improves their self-awareness and social skills, which should in turn assist with their behavioral self-management, while parents need help transitioning from an overprotective or directive to supportive role (Kapp et al., 2011; Portway & Johnson, 2005). Such intervention can narrow discrepancies and more importantly improve young adults' psychosocial functioning and relationship with their parents, yet is a delicate issue for the young adults psychologically.

Rises in self-awareness may objectively or according to parent report be associated with improvements in their functioning, but paradoxically youth may perceive more problems (Verhoeven et al., 2012). Conversely, Lerner et al. (2012) reported that autistic youth with greater discrepancy from their parents' report had less anxiety following a strength-based socio-dramatic intervention. Similarly, as reported in this study, young adults' apparent gains in self-awareness positively related to the disappearance of parent-child discrepancies following the first trial of PEERS for Young Adults, at which point their parent-reported social and self-reported psychological functioning – including a decrease in family loneliness – improved (Gantman et

al., 2012). Interventions that offer effective direct instruction such as PEERS help to build the young adults' explicit social cognitive skills (Gantman et al., 2012), which are more advanced than their implicit counterpart (Frith & Frith, 2012), and as such young adults may learn to compensate with adaptive functioning led by knowledge of why people behave as they do.

This study included several limitations. Due to the number of analyses some results may be false positives, and due to the small sample there is little power to detect low but robust correlations so there may be false negatives, while the lack of report of non-significant results omits a clearer representation of the patterns of associations. Several measures had only acceptable alphas at best, especially on subscales, and a larger sample might enable an elucidating item-by-item analysis (see Hirvela & Helkama, 2011). Indeed, few validated and normed measures assess the psychosocial functioning of autistic young adults, and this lack of age-appropriate comparable standardized assessment tools led to the use of certain measures designed for the ASD adolescent or neurotypical adult populations (Gantman et al., 2012).

Future studies should address the notable limitations of this study. It lacks any form of independent rater; as noted by Gantman et al. (2012), independent raters were sought but not enough families could identify one. Independent raters could add more direct evidence to investigate the discussion of how young adults' behavior may vary by context. Like Lerner et al. (2012), who used parent reports of the Social Responsiveness Scale, this study similarly lacked gold-standard independent assessment to corroborate ASD diagnoses (see Warren et al., 2012). More direct measurement, such as of parenting stress, of constructs of interest is needed. This includes the need for an empathy questionnaire with more valid distinction between cognitive and emotional empathy, as the Empathy Quotient's counterpart that claims to do so, the Interpersonal Reactivity Index (IRI; Davis, 1980), has some items on its Empathic Concern

subscale that require theory of mind abilities and others that are more direct. This issue with the IRI has caused problems for measurement with autistic adults and emotional awareness deficits (Grynberg et al., 2010; Hirvela & Helkama, 2011), who among others need better characterization of how they understand, feel, and communicate about others' emotional and mental states. Other helpful additions could include further measurements assessing the parents, such as their own autistic traits, and qualitative data that may suggest reasons for parent-child differences (e.g., the child's identity, including in relation to their autism if known to them). Furthermore, a more thorough analysis of whether and how PEERS may narrow parent-child discrepancies may help to inform knowledge about treatment response and improving young adults', and parents' skills in supporting their, self-advocacy or independence skills.

Table 1.
Mean differences between parent-child reports

| Variable | Rater | | <i>p</i> |
|------------------------------------|--------------|--------------|----------|
| | Young adult | Parent | |
| AQ ¹ | 25.64 (7.2) | 33.42 (6.9) | <.001 |
| AQ – Attention Shifting | 6.14 (2.0) | 7.64 (1.7) | <.001 |
| AQ – Communication | 4.97 (2.1) | 7.42 (1.7) | <.001 |
| AQ – Imagination | 4.19 (2.1) | 5.69 (2.2) | <.001 |
| AQ – Social Skills | 6.15 (2.5) | 7.53 (2.0) | <.001 |
| EQ ² | 28.86 (11.6) | 17.47 (8.7) | <.001 |
| EQ – Cognitive Empathy | 7.78 (5.2) | 1.94 (2.5) | <.001 |
| EQ – Emotional Reactivity | 9.39 (5.0) | 5.69 (4.9) | <.001 |
| SSRS ² (Standard Score) | 95.71 (15.2) | 84.53 (11.6) | <.003 |
| SSRS – Cooperation | 14.80 (2.7) | 10.31 (3.8) | <.001 |

Note.

Higher scores indicate more deficits¹, higher scores indicate more skills²

Table 2.
Correlations of parent-child informant discrepancies

| Correlate of discrepancy | Discrepancy | Correlation (Pearson's <i>r</i>) |
|---|---------------------|-----------------------------------|
| DERS ¹ – Emotional Awareness | EQ – ER discrepancy | -.459** |
| DERS – Impulse Control | SSRS discrepancy | -.495** |
| SSI ² – Emotional Control | SSRS discrepancy | .426* |
| SSI – Social Control | AQ discrepancy | .399* |
| | EQ discrepancy | .482** |
| | EQ – CE discrepancy | .481** |
| SRS ¹ – Social Awareness | AQ discrepancy | .546*** |
| | EQ discrepancy | .502** |
| | EQ – ER discrepancy | .557*** |
| SSRS ¹ – Externalizing Behaviors | AQ discrepancy | .482** |
| | EQ discrepancy | .334* |
| | EQ – ER discrepancy | .453** |

Note. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Higher scores indicate more deficits¹, higher scores indicate more skills²

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