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IMPACT OF BIRTH ORDER ON AUTISM SPECTRUM DISORDER CHILDREN'S TYPICALLY-DEVELOPING SIBLINGS

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IMPACT OF BIRTH ORDER ON AUTISM
SPECTRUM DISORDER CHILDREN'S
TYPICALLY-DEVELOPING SIBLINGS

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Masters of Arts
In
Child Development

by
Teresa Orozco
December 2014

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ABSTRACT

Having a child with autism not only has devastating consequences for the individual child, but it also profoundly influences the entire family, including siblings. Researchers have explored the impact of having an ASD sibling on the typically-developing brother/sister; these studies have yielded inconsistent results, with some children benefitting from the experience while others encounter negative outcomes. The present study examined the role of birth order on ASD children's typically-developing siblings' outcome. It was predicted that typically-developing siblings born prior to their ASD sibling would have fewer behavioral difficulties and would do better academically compared to typically-developing siblings born after their ASD sibling. Typically-developing siblings born after their ASD sibling, by contrast, were expected to have more behavioral difficulties and do more poorly in school. Results demonstrated that none of the Strengths and Difficulties Questionnaire subscales approached statistical or practical significance in siblings who were younger vs. older than their ASD child. However, compared to a normative sample, typically-developing siblings of the ASD children were found to score significantly *higher* on all the SDQ measures including total difficulties. In addition, it was found that the more years separating the ASD sibling from the typically-developing sibling, the more conduct problems the typically-developing sibling displayed. These findings suggest that typically-developing siblings may benefit from some kind of intervention. For example, creating in-home interventions or services that target typically-developing siblings

which may include helping them find positive ways to interact with their ASD sibling, may provide some extra support for these children.

ACKNOWLEDGEMENTS

I would like to thank my committee members each and every one of you without their advice, guidance, and support this thesis would not have been possible. Especially, my mentor Dr. Kamptner her remarkable guidance and uplifting words helped me persevere through this journey.

I would also like to thank my family and siblings all of which one way or another helped me to complete this thesis.

DEDICATION

Es algo muy poderoso creer en ti mismo pero mas bello tener a una madre creer en ti. Gracias mama por creer en mi.

It is a powerful thing to believe in yourself but it is most beautiful to have a mother believe in you. Thank you mom for believing in me.

TABLE OF CONTENTS

ABSTRACT	iii
ACKNOWLEDGEMENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
CHAPTER ONE: INTRODUCTION	1
Impact of Autism on the Family	3
Parents of Children with Autism	3
Family Functioning	8
Siblings of Children with Autism	10
Studies Showing no Detrimental Effects on Siblings	11
Studies Showing Negative Effects on Siblings	11
Summary and Purpose of Study	18
CHAPTER TWO: METHOD	
Participants	22
Measures	24
Child Behavior Questionnaire	24
Parental Time	25
Demographic Information	25
Procedure	26
CHAPTER THREE: RESULTS	
Hypothesis One	28

Hypothesis Two	32
Hypothesis Three	33
Additional Analyses	34
CHAPTER FOUR: DISCUSSION	39
Additional Analyses	42
Limitations and Future Research	45
Conclusions	48
APPENDIX A: STRENGTHS AND DIFFICULTIES QUESTIONNAIRE	50
APPENDIX B: PARENTAL TIME	53
APPENDIX C: DEMOGRAPHIC INFORMATION	55
APPENDIX D: SCRIPT	60
APPENDIX E: RECRUITMENT LETTER	62
APPENDIX F: CONSENT FORM	64
APPENDIX G: INSTRUCTION FORM	66
APPENDIX H: FOLLOW UP LETTER	68
APPENDIX I: APPROVAL LETTER	70
APPENDIX J: INSTITUTIONAL REVIEW BOARD	72
REFERENCES	74

LIST OF TABLES

Table 1. Parent Demographic (N=32)	22
Table 2. ASD Child Characteristics (N=32)	24
Table 3. T-Tests Comparing Younger and Older Typically-Developing Siblings on the Strengths and Difficulties Questionnaire Scales	28
Table 4. Typically-Developing Sibling: Parental Time, Academic Competence, and Strengths and Difficulties Questionnaire Mean Scores (N=32)	29
Table 5. Multiple Regression Analyses of Typically-Developing Sibling's Total Behavior Measure.....	33
Table 6. Strengths and Difficulties Questionnaire Mean Scores of Typically- Developing Siblings Compared to Normative Sample	35
Table 7. Correlations Between Age and the Strengths and Difficulties Questionnaire Behavior Scale Measures (N=32).....	36
Table 8. Multiple Regression Analyses of Typically-Developing Sibling's Total Behavior Conduct Problems	38

LIST OF FIGURES

Figure 1. Proposed Moderated Model of Total Behavioral Difficulties	20
Figure 2. Proposed Model of Impact of Parental Time on the Strengths and Difficulties Questionnaire Total Difficulties Score	21
Figure 3. Standardized Regression Coefficients for the Relationship Between ASD Child Autism Severity and Total Difficulties as Mediated by Current Parental Time	34
Figure 4. Age Difference Between ASD Children and Typically-Developing Siblings: Conduct Problem	37

CHAPTER ONE

INTRODUCTION

Autism, also referred to Autism Spectrum Disorder (ASD), is a multifaceted disorder that includes various developmental deficiencies. In 1994, the American Psychological Association reported that autism occurred in only 1 in 1000 births; however, over the few last years the rates of autism have rapidly increased: the Autism and Developmental Disabilities Monitoring Network now reports that it is diagnosed in 1 out of 68 children, with boys four times more likely to be diagnosed than girls (Baio, 2014). Having autism not only has devastating consequences for the individual child, but it also has dramatic influences on the entire family, including siblings (Shuntermann, 2009). The purpose of the current study is, in general, to examine the impact of birth order of an ASD child on his or her typically-developing siblings.

Autism is a lifelong disorder with varying degrees of severity of symptoms: while some autistic children are diagnosed as being severely affected, others are considered high-functioning with very few symptoms (Lyons et al., 2010). Autism is characterized by the lack of skills in such areas as social relationships and communication, including having difficulties in maintaining eye contact or initiating social interactions with others such as in play (Ozonoff et al., 2005). Children on the autism spectrum also typically have difficulties with language, with their language skills mildly to severely impaired (Kauffman & Silverman,

2010). In addition, autism is often characterized by extreme aggressive and self-injurious behaviors, as well as impulsivity, hyperactivity, and destructiveness (Altiere & von Kluge, 2009). Baron-Cohen (2004) states that children with autism also tend to exhibit “repetitive stimulatory behaviors” and a strong desire to establish a repetitious daily routine. As outlined by the DSM-IV, the autism diagnosis is based on the following three criteria: inability to reciprocate social behaviors, poor language development, and repetitious stimulatory behaviors such as the flapping of hands and rocking in a chair. Any abrupt changes in an ASD child’s daily life may cause unwarranted behaviors to occur, e.g., violent outbursts and/or unmanageable tantrums.

Although the root cause of autism is still unknown, it has been speculated that exposure to environmental toxins, genetics, or the combinations of both factors may be the culprit of the high numbers of children currently being diagnosed (Kauffman & Silverman, 2010). It is also thought that a longer gestation period, an above-average birth weight, and atypical brain development with elevated white matter in the brain may also be implicated (Kauffman & Silverman 2010; Matson & Sipes, 2010). CNN recently reported that a team of researchers concluded that autism is prenatally predetermined, with ASD children having a 67% higher index of neurons in the prefrontal cortex. Having too many neurons in that region of the brain is related to the multi-faceted impairments that children with autism struggle (Falco, 2011). Of significance is the fact that no new neurons are produced in this region of the brain after birth.

Impact of Autism on the Family

A child with autism presents distinctive hardships for an entire family.

Parents, daily family functioning, and siblings are all impacted.

Parents of Children with Autism

Parents experience and manage several key issues when raising a child with a disability such as grief and depression, daily challenges, stress, and health issues.

First, grief and depression are common feelings among parents of children with autism. Grief is caused by the loss of an imagined healthy child, and parents of a child with a diagnosed disability often find themselves experiencing a very similar type of sorrow (Kenny & Corkin, 2011). Grieving can occur despite the severity of the diagnosed disability of the child. As parents first learn of their child's disability, feelings such as despair, gloom, or depression are often experienced (Kenny & Corkin, 2011). Feldman, McDonald, Serbin, Stack, Secco, and Yu (2007), for example, found that 40% of parents of children with a developmental delay indicated symptoms of depression ranging from mild to chronic. They concluded that some of the factors which contribute to parents' depression include low social support, dealing with a child with challenging behaviors, and/or parents feeling overwhelmed as a result of being unfamiliar or lacking information on the reasons for their child's developmental delay. Although mothers of children with an ASD may also experience a loving relationship with their child, their depressive symptoms over time have been reported to be at a

moderately elevated level (Carter, Martínez-Pedraza, & Gray, 2009).

Second, parents also face many specific challenges in raising a child with autism, including issues concerning social support, struggles in obtaining information and services, and the ongoing effort to involve their child in school and community events (Resch, Mireles, Benz, Grenwelge, Peterson, & Zhang, 2010). Social support is an important factor for the well-being of parents with ASD children (Ekas, Lickenbrock, & Whitman, 2010), including support from spouse, friends, and other immediate family members. Higher levels of social support are associated with lower depressive symptoms and lowered parental stress (Ekas, Lickenbrock, & Whitman, 2010). However, many families report having difficulty obtaining support, and state that caring for their ASD child means losing social contact with friends and other family members (Altiere & von Kluge, 2009). Another on-going challenge is the dire need for more services for parents and their ASD child such as respite care, family counseling services, and social interactions with other parents of children with disabilities (Dillenburger, Keenan, Doherty, Byrne, & Gallagher, 2010; Westling, 1997).

Obtaining information and services have also been described as a constant battle that is time-consuming and stressful. The lack of organization within agencies further complicates parents' abilities to acquire services for their child (Resch et al., 2010). A related challenge is that the types of services available for ASD children vary tremendously by parents' insurance company, the school district the family resides in, and the type/degree of interventions

offered by local, private, and public agencies. Funds and resources allocated to families of children with special needs are managed by the Department of Developmental Services, which are then funded through Regional Centers and most recently private insurance companies. Local Regional Centers then decide which local, private, or public agency will provide the funds to service each family. This ultimately dictates the type/degree of services each individual family receives; therefore, what may be offered in one school district or region may not be offered in other regions (Ruiz, 2012, personal communication).

Parents have also reported their struggles of integrating their ASD child into community and school settings. While efforts have been made in recent years to include children with disabilities in schools, negative perceptions of what a child with a disability is able to accomplish impose difficulties for children in assimilating and fully participating in activities (Gilmore, Campbell, & Cuskelly, 2003). Studies of teachers' attitudes about children with disabilities in the mainstream classroom, for example, show that teachers often think it may not be the most supportive environment for the ASD child (Gilmore, Campbell, & Cuskelly, 2003). In spite of these barriers, parents continue to hope that schools can provide an effective method of socialization for their special needs child (Resch et al., 2010).

Stress is a third challenge faced by parents with a child on the autism spectrum. Research suggests that parents of ASD children are prone to higher stress levels than parents of typically-developing children (Baker-Ericzcn,

Brookman-Frazcc, & Stahmer, 2005), with fathers reporting lower stress levels than mothers (Johnson, Frenn, Feetham, & Simpson, 2011). This may result from the fact that mothers do most of the childrearing (Gau et al., 2012). Mothers who report the highest levels of stress are those with ASD children who exhibit such behaviors as non-compliance, hyperactivity, irritability, and socially-withdrawn behaviors, and who lack self-help skills (Tomanik, Harris, & Hawins, 2004). The social skills level of the child seems to be especially predictive of maternal child-related stress in mothers of children with ASD (Baker-Ericzcn, Brookman-Frazcc & Stahmer, 2005). These factors then add strain on the marital relationship (Rao & Beidel, 2009).

While all marital relationships are apt to encounter stress, strain, and difficulties, having a child with special needs can have a negative effect on the marriage (Lundeby & Tossebro, 2008). Marital relationships in families of children with special needs are particularly prone to high levels of conflict and low levels of marital satisfaction since a child with special needs is an added stressor for daily living among parents (Parker, Mandleco, Roper, Freeborn, & Dyches, 2011). The presence of a child with disabilities in the home can ultimately increase the risk of marital dissolution and contribute to a parent's decision to divorce (Hirst, 1991). Parents of children with special needs have been found to report that their diagnosed child was a contributing factor that led to the divorce (St. John, Pai, Belfer, & Mulliken, 2003). However, the likelihood of divorce decreases when a special-needs child (e.g., a child diagnosed with Down

Syndrome) is born later in the birth order meaning that the diagnosed child has typically-developing older brothers and sisters (Ubano & Hodcapp, 2007).

Nevertheless, researchers have concluded that families with a special needs child, including autism, are at an 80% risk for divorce compared to families with all typically-developing children who have slightly less than 50% risk of divorce (Sobsey, 2004). Also, families with an ASD child are more likely to be divorced than families with children who have any other special needs prognosis (Hartley et al., 2010). The child's manifestations of unwarranted behaviors such as non-compliance, hyperactivity, irritability, and lack of self-help skills are thought to play an important role in divorce rates: hence, the higher the level of severity of autism, the greater the likelihood that his/her parents will be divorced (Tomanik, Harris, & Hawins, 2004).

Finally, parents of children on the autism spectrum have reported many health issues of their own. Research suggests that the overall physical well-being of parents of children with ASD is more negatively affected compared to parents of typically-developing children (Allik, Larsson, & Smedje, 2006; Benjak, Mavrincac, & Simetin, 2009). Parents have reported the excessive physical demands (including the strain on their bodies) when caring for a child with a disability, and these physical demands become more challenging as parents and the child become older (Davis et al., 2009). Researchers suggest that the stress and the physical demands of caring for an ASD child predict the mother's physical well-being (Johnson, Frenn, Feetham, & Simpson, 2011).

Family Functioning

The entire family unit, including siblings, must accommodate to a child's special needs. Key issues that families of an ASD child encounter that impact family functioning include limited leisure activities, economic hardships, and challenges in managing the child's behaviors.

First, the quality and amount of leisure time can be greatly impacted. Many researchers investigating family functioning have come to conclude that family leisure is a key component in building and maintaining strong relationships among its family members (Dodd, Zabriskie, Widmer, & Eggett, 2009). Families are often faced with the challenge of providing adequate leisure for everyone in the family, and this often becomes especially difficult for those families who have a child with a disability (Dodd, Zabriskie, Widmer, & Eggett, 2009). It has been found that about 66% of parents of children with ASD report the inability to spontaneously do things, with family vacations often being nonexistent (Rao & Beidel, 2009).

It has also been found that parents often do not allow friends or play dates in their home with their disabled child due to the high level of supervision required (Solish, Perry, & Mines, 2010). In addition, researchers have determined that a high number of children with a disability are often friendless, and it is very unusual for them to engage in recreational activities within their own neighborhood. Solish, Perry, and Mines (2010), for example, found that children with autism and other intellectual disabilities differ greatly in the amount of time

that they engage in leisure-like activity compared to typically-developing children. Thus, families with disabled children may encounter many challenges and struggle to provide the leisure activities for the entire family.

Second, financial struggles are common among families of children with a disability (including a child with ASD). Factors that contribute to financial hardships include significantly higher costs in traveling, medical care, and health costs (Xiong et al., 2011). In fact, the expenses and financial burden is greater for families with autistic children compared to families of children with other types of physical or mental disabilities because these families are more likely to experience a greater burden with medical expenses (Xiong et al., 2010). Studies have also found that many parents do not want their child to be labeled as “autistic,” resulting in parents being unable to obtain economic assistance (Xiong et al., 2010). Another key factor that increases financial difficulty is the fact that mothers are less likely to provide a source of income due to the high demands of full-time care needed by the child (Bachman & Comeau, 2010).

Third, families are negatively impacted by the child’s excessive violent and unpredictable behaviors (Gary, 2002). For instance, parents of autistic children have reported that their main struggles are dealing with uncomfortable public displays of behaviors, improper sexual gestures, and managing violent outbursts. One parent’s testimony described how a child’s increasingly aggressive behaviors in the home directly impacted and diminished the quality of life for all members in the family (Gary, 2002):

Her behavior has gotten worse. Her anger has certainly gotten worse ... It really is horrid living with someone who you're never sure when she is going to turn on you and attack you. You can't even enjoy a cuddle without being aware that at any second, for no reason at all, that cuddle might turn into a bite, a pinch or a scratch. (Gary, 2002, pg. 218)

Not surprisingly, families of ASD children with the most aggressive behaviors indicate greater detrimental effects on the family, such as high levels of stress, anxiety, and depression (Rao & Biedel, 2009).

Although research studies collectively support that a child with autism imposes significant challenges for the entire family, it is worth noting that researchers have also found that some families are able to adequately and successfully accommodate to the stressful demands that are required with raising such a child. Stainton and Besser (1998), for example, examined the positive impact that a child with a disability (specifically an intellectual disability) has on the family, and found that parents identified happiness, establishment of new relationships, parental growth, and increased awareness of tolerance as themes throughout their interviews. In addition, many parents felt that their special-needs child "brought out the best" in them and promoted personal growth (Stainton & Besser, 1998).

Siblings of Children with Autism

Studies have explored many aspects of the impact of having an ASD

sibling on children; these studies have yielded inconsistent results, with some children benefitting from the experience while others encounter negative outcomes.

Studies Showing no Detrimental Effects on Siblings

Some studies of ASD children have reported positive or no detrimental effects on the behavioral adjustment, social skill adjustment, and/or self-concept of their siblings. Mascba and Boucher (2006), for example, found that siblings report positive experiences of playing with their ASD brother or sister such as watching television together. Similarly, Mates (1990) found that siblings of ASD children do not report a negative self-concept when compared to children who have typically-developing siblings. In addition, Verte, Roeyers, and Buysse (2003) found that adolescent female siblings of high functioning ASD children tend to report a more positive self-concept compared to adolescent females with typically-developing siblings. Finally, Hastings (2007) found that siblings of children with ASD did not show any indication of behavioral maladjustment, and that assessments of their social skills demonstrated that they were better functioning compared to a group of children with typically-developing siblings. Overall, these researchers concluded that siblings of children with autism were well-adjusted, considering the many stresses they face.

Studies Showing Negative Effects on Siblings

Other studies, however, have found that siblings of ASD children are negatively impacted in a number of domains including their behavioral

adjustment, challenges with their own development, and deprivation of parental time and affection.

First, studies of typically-developing siblings of special needs children have found that they are more likely to be at-risk for behavior difficulties when compared to children in families where all children are typically-developing. For example, Shur-Fen et al. (2010) found that siblings of children with ASD are more likely to have minor behavior difficulties such as an increased likelihood of delinquent behaviors and internalizing issues. Similarly, in a meta-analytic review of families with children who had disabilities, typically-developing siblings were found to have a modest increase of behavioral adjustment difficulties including anxiety and depression, which tended to disappear in later childhood (Shuntermann, 2007). Other behavioral problems found among typically-developing siblings include a higher probability of engaging in delinquent behaviors if they have a sibling who is severely autistic compared to siblings of children who have a milder form of autism (Shur-Fen et al., 2010). Siblings of ASD children may be at risk for psychological problems including poor self-esteem and symptoms of depression that increase with the severity of the sibling's autism (Shur-Fen et al., 2010).

Second, research findings suggest that siblings of children with autism may have challenges in their own development. For example, siblings of ASD children have been found to score lower on language skills (including the use of syntax), emotional functioning, communication, and aspects of play such as the

use of symbolic objects (compared to children in families without an ASD child). In addition, they tend to demonstrate poorer skills in gesturing, pointing, and requesting behavior compared to typically-developing children (Toth, Dawson, Meltzoff, Greenson, & Frein, 2007).

Third, deprivation of parental time and attention (i.e., parental involvement) has also been found to be a common experience among typically-developing children who have an ASD sibling (Mulroy, Robertson, Aiberti, Leonard, & Bower, 2008). Out of necessity, parents tend to allocate most of their attention to the child with special needs because of the extra time needed for the child's daily care, such as with personal care (Gevir, Goldstand, Weintraub, & Parush, 2006; Pilowsky et al., 2003). While siblings of children with ASD acknowledge the fact that most of their parents' time is allocated to the child with ASD, many still expect equal treatment (Moyson & Roeyers, 2011). One 9 year old participant, for example, stated that "it would be easier for me if my parents gave me some more attention, because now they are always busy with Thomas" (Moyson & Roeyers, 2011, pg 49). Approximately 30% of siblings of children with ASD, in fact, report feeling neglected by their parents (Dillenburger, Keenan, Doherty, Byrne &, Gallagher, 2010). Parental and professional reports on the impact of an ASD sibling on typically-developing children agree that typically-developing siblings may feel neglected and treated unfairly (Dillenburger, Keenan, Doherty, Byrne &, Gallagher, 2010). From an early age, children are aware of the discrepancies in parental affection, attention, and the use of

disciplinary actions among all siblings (Dillenburger, Keenan, Doherty, Byrne &, Gallagher, 2010). Feelings of frustration and irritation may also surface in the typically-developing sibling due to the fact that their families have limited time to spend in social or extra-curricular activities (Cunningham, Bennes, & Siegel, 1988). Other troublesome feelings that siblings may experience include the sense of responsibility they may feel to care for their disabled sibling and to make sure to not create additional difficulties for their parents (Kaminsky & Dewey, 2001).

Studies to date have identified at least two factors that may impact the outcome of a typically-developing child in a family with an ASD child: the severity of autism of the afflicted child and birth order.

First, the severity of autism has been found to be an important contributing factor to the degree to which the typically-developing child is impacted. The more an ASD child manifests such behaviors as aggression, self-stimulatory behaviors, and self-injurious behaviors, the greater the likelihood that the typically-developing sibling will manifest difficulties in behavioral adjustment (Hastings 2003 b; Meyer, Ingersoll, & Hambrick, 2011). In fact, Tomeny, Barry, and Bader (2012) found that an ASD child's internalizing problems (e.g., depression, anxiety, and somatic issues) and externalizing problems (aggression and conformity issues) are partially related to their typically developing sibling's behaviors. More specifically, ASD children with high levels of internalizing and externalizing behaviors were more likely to have their typically-developing sibling

identified with internalizing and/or social problems because siblings often mimic one another (Tomeny, Barry, & Bader, 2012). Also, as discussed above, the extent to which an ASD child manifests behavioral issues (e.g., non-compliance, hyperactivity, irritability, and socially-withdrawn behaviors) impacts parental stress levels, with higher levels of behavioral challenges resulting in the highest maternal stress levels (Baker-Ericzcn, Brookman-Frazcc & Stahmer, 2005).

Second, the birth order of the typically-developing sibling (relative to the ASD sibling) may also impact the extent to which a typically-developing sibling is affected since parental time and attention available to the typically-developing child will likely vary markedly depending on whether he/she is born before or after the ASD child.

Research findings show that even in families where all children are typically-developing, the oldest sibling tends to spend roughly 20 minutes more of quality time with the father and 25 minutes more of quality time with the mother on a daily basis than the younger sibling at the same age (Price, 2008). Similar findings have been reported by Keller and Zach (2002): mothers spend less alone time with their later-born children than their first-born children. Thus, parents tend to provide slightly less quality time with their later-born children (Begue & Roche, 2005). First-born children also tend to be provided with more time to talk with parents, a higher number of feeding intervals as infants, more one-on-one play with parents, and they receive more stimulation from parents (Keller & Zach, 2002). First-borns are described in studies as having such

positive characteristics as a greater likelihood of being achievement-oriented, extraverted, organized, responsible, and to be able to cope well with stress (Badger & Reddy, 2009), and they tend to report feeling closer to their parents than later-born siblings (Rohde et al., 2003). The more quality time the first-born child receives, the better their developmental trajectory (Keller & Zach, 2002), which is believed to be a direct result of being exposed to a more intellectually-stimulating environment.

These findings are consistent with other studies that show that first-born children tend to develop stronger intellectual abilities than their younger siblings (Badger & Reddy, 2009), and are more likely to attain higher education levels than later-born siblings (Gugl & Welling, 2010; Price, 2008). In fact, educational resources tend to decrease with birth order, with younger siblings being more likely to be identified in the lower levels of educational attainment when compared to first-born children (Booth & Hiau Joo, 2009).

These findings are consistent with the research on the benefits for children of parental time and attention (i.e., “parental involvement”), because first-borns tend to get more of it. Studies find that higher levels parental involvement in children’s schooling (e.g., parents talking to teachers or volunteering in a classroom, providing help with homework, or talking to their children on school matters in children’s schooling) is related to children remaining in school for longer periods of time and obtaining high levels of scholastic achievement (Berthelsen & Walker, 2008). Higher levels of parental involvement in their

children's schooling have also been found to predict higher levels of literacy, mathematical thinking, and language skills in children compared to children whose parents had low levels of parental involvement (Berthelsen & Walker, 2008). For instance, within the Latino population, Durnand (2011) reports that parental involvement is positively associated with children's literacy skills even after variables such as income, maternal education, age, and acculturation are taken into account. In addition, parental involvement has also been positively associated with children's attendance in school and having fewer behavioral problems in school settings (McBride, Dyer, Liu, Brown, & Hong, 2009). Overall, as parents communicate with their children's teachers and assist their children in their academic endeavors, children gain an appropriate model that schooling and learning are an essential part of their futures (Durnand, 2011).

Parental time and attention has also been found to impact children's social-emotional development (El Nokali, Bachman, & Votruba-Drzal, 2010). For example, McWayne, Hampton, Fantuzzo, Cohen, and Sekino (2004) found that higher levels of parental involvement with kindergarten children resulted in these children being more cooperative, having good social skills, and being more self-controlled. High levels of parental involvement have also been associated with lower levels of children's conduct problems (Fantuzzo, Davis, & Ginsburg, 1995). Research focusing on other age groups such as adolescence has also found that parental involvement during the adolescent years is especially crucial for individual's self-esteem (Cripps & Zyromski, 2009). Hence, high levels of parental

involvement support the development of social and emotional competencies (Lagacé-Séguin, & Case, 2010).

In summary, research has found that parental time and involvement has a significant impact on a child's developmental outcome (Gugl & Welling, 2010). In families with an ASD child, a disproportionate amount of parental time, attention, and resources are directed towards the ASD child (Schuntermann, 2007), which invokes the question of how much parental time and involvement is directed to the typically-developing siblings in the household. Ultimately, whether the typically-developing child is born before or after the ASD child will likely have a significant impact on how much parental time, attention, and resources he or she receives (and, consequently, the extent to which his/her development may be impacted). Although Hastings (2003 b) found that being older than an ASD sibling increased the likelihood that the typically-developing sibling would have significantly more prosocial behaviors, the effect size was small and the sample mainly consisted of primarily high SES families. Hastings (2003 b) could therefore not conclude whether typically-developing siblings are better adjusted if they are older as opposed to being younger than the ASD sibling.

Summary and Purpose of Study

Overall, research findings show that families of children with ASD experience disrupted functioning; parents and siblings must accommodate and adapt to the ASD child's needs. Typically-developing siblings of ASD children

have been found to have many struggles of their own, including challenges with their own development, behavioral issues, and competing for parental time and attention, although not all research findings are consistent.

Very little research has focused on how birth order may affect the impact of having an ASD sibling on a typically-developing child. This study attempted to examine this issue. It was hypothesized that typically-developing siblings born prior to their ASD sibling would have fewer behavioral difficulties and would do better academically than typically-developing siblings born after their ASD sibling, because they would generally have had more parental time and attention compared to their younger siblings. Typically-developing siblings born after their ASD siblings were expected to show more behavioral difficulties and do more poorly in school. Second, it was expected that the severity of the ASD child would moderate the relationship between the typically-developing sibling's birth order and total behavioral difficulties, since ASD children with more severe forms of autism would have a greater overall impact on typically-developing sibling's behaviors due to its impact on family functioning (Figure 1).

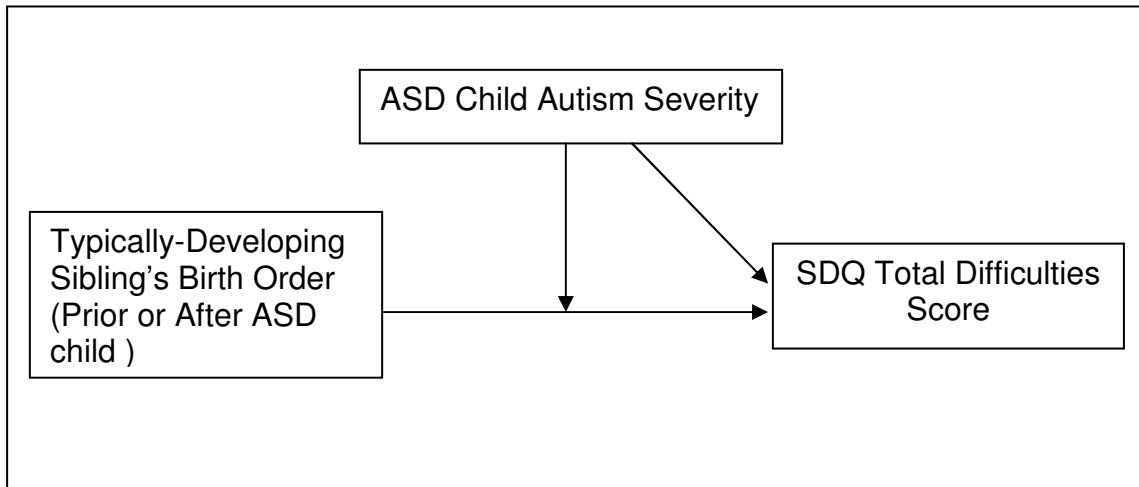


Figure 1. Proposed Moderated Model of Total Behavioral Difficulties

Finally, it was expected that current parental time would mediate the relationship between the ASD child's severity of autism and the typically-developing sibling's total difficulties score regardless of birth order, with children having the more severe ASD behaviors requiring more parental time which would result in a greater likelihood of the typically-developing sibling being more at risk for demonstrating behavioral difficulties (Figure 2).

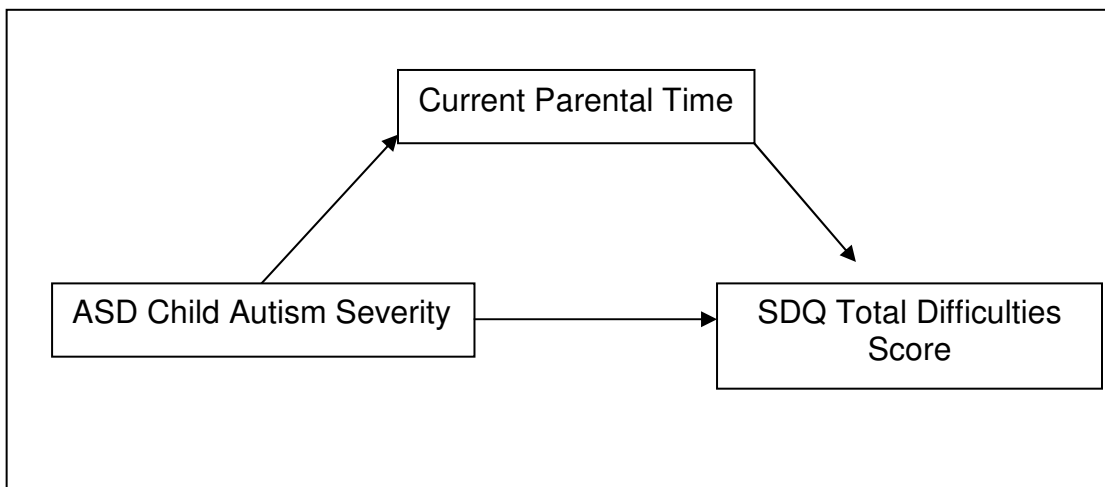


Figure 2. Proposed Model of Impact of Parental Time on the Strengths and Difficulties Questionnaire Total Difficulties Score

CHAPTER TWO

METHOD

Participants

Thirty-two families with a diagnosed child on the autism spectrum (and who are active within an ABA [Applied Behavior Analysis] intervention program with California Psychcare Inc.) participated in the current study. All families also had a typically-developing child between 5 and 16 years old, and all children were living together in the same household. As shown below, the majority of parents who participated were female, married, and Hispanic. Almost half had a high school diploma or less, and most did not work outside the home (Table 1).

Table 1. Parent Demographics (N=32)

Gender	
male	6.3% (n=2)
female	93.8% (n=30)
Mean Age	38 yrs. (range: 25 to 65 yrs)
Marital Status	
married	75.0% (n=24)
divorced	12.5% (n=4)
never married	6.3% (n=2)
widowed	3.1% (n=1)
separated	3.1% (n=1)
Ethnicity	
Hispanic	56.3% (n=18)
Caucasian	21.9% (n=7)

Asian	6.3% (n=2)
African American	9.4% (n=3)
Other	3.1% (n=1)
Multi	3.1% (n=1)

Parental Education:

did not complete high school	25.0% (n=8)
high school diploma/GED	18.8% (n=6)
some college	31.3% (n=10)
associate degree	3.1% (n=1)
Bachelor's Degree	12.5% (n=4)
Master's Degree	6.3% (n=2)
Professional/Doctorate Degree	3.1% (n=1)

Employment Status

homemaker	56.3% (n=18)
employed for wages	21.9% (n=7)
self-employed	9.4% (n=3)
out of work and looking	3.1% (n=1)
retired	3.1% (n=1)
government support	3.1% (n=1)
missing	3.1% (n=1)

Parental Time (M hrs per week) spent with:

spouse	28.4 hrs.
ASD child	45.4 hrs.
Typically-developing child	21.3 hrs.

As shown below, the ASD children were between the ages of 3 – 18 years and were mostly male. The majority of children were classified as severely autistic and had been receiving services for 3 to 5 years (including speech, occupational, or ABA [Applied Behavior Analysis] therapies).

Table 2. ASD Child Characteristics (N=32)

Age	3-18 yrs.
Gender	
male	84.4% (n=27)
female	12.5% (n=4)
missing	3.1% (n=1)
Diagnosis	
Autism only	50% (n=16)
multiple diagnoses	50% (n=16)
Severity of Autism	
mild	6.3% (n=2)
moderate	34.4% (n=11)
severe	59.4% (n=19)
Years Receiving Services	
0-6 months	6.3% (n=2)
7-11 months	9.4% (n=3)
1 year – 2 years	21.9% (n=7)
3 – 5 years	46.9% (n=15)
6 or more years	15.6% (n=5)

Measures

Child Behavior Questionnaire

The 25-item Strengths and Difficulties Questionnaire (SDQ) (Stone, Ottens, Engels, Vermulst, & Janssens, 2010) was utilized to assess the typically-developing siblings' competencies/strengths and difficulties/negative aspects of behavior. The SDQ is widely used as a screening tool for child psychopathology problems and for clinical assessments due to its brevity. Each question is rated on a three point Likert scale (1 = Not True, 2 = Somewhat True, 3 = Certainly True). The 25 items comprise 5 scales consisting of 5 items each: emotional symptoms scale, conduct problems scale, hyperactivity scale, peer problems

scale, and the prosocial scale. In addition, a total difficulties score reflecting the likelihood of psychosocial problems can be calculated by adding all the scale scores with the exception of the prosocial scale. As reported by Stone, Ottens, Engels, Vermulst, and Janssens (2010), the internal consistency for the SDQ ranges below .70 for prosocial, emotional symptoms, conduct problems, and peer problems scales. The hyperactivity and total difficulties scales range above .70. Reliability scores over a 12-month period ranged between $r = .61-.65$ for the prosocial, conduct, and peer problems scales, while the emotional scale had a reliability of $r = .71$. The reliability for the hyperactivity and total difficulties scales was .77 (Stone, Ottens, Engels, Vermulst, & Janssens, 2010) (APPENDIX A).

Parental Time

Parental time was assessed by asking the primary parent/caregiver to estimate the average amount of one-on-one time spent in hours and/or minutes per day (and per week) with each family member (i.e., spouse/partner, the ASD child, and the typically-developing sibling) (APPENDIX B).

Demographic Information

The primary parent/caregiver was asked to provide information on his/her own age, ethnicity, marital status, education level, the number hours worked outside the home per week, and who provides child care for the diagnosed child throughout the day. The primary parent/caregiver also provided information on all of the children's ages, their gender(s), the severity of the ASD child's autism, the length of time that intervention had been provided for the ASD child, and the

typically-developing sibling's academic performance (i.e., math, language arts/reading, and social studies) (APPENDIX C).

Procedure

One-hundred forty families with an ASD child who receive ABA services through California Psychcare¹ were informed of the study. The clinical supervisors who were assigned to each family were asked by the individual who oversees the quality assurance department at California Psychcare to provide a list of all the families they serve with the ASD child's age and his/her siblings' ages. A code number was then assigned to each family by the individual who oversees quality assurance to match the recruitment letter information with the surveys.

One hundred thirty-five families who met the criteria for this study were informed of the study via phone (APPENDIX D) by the individual who oversees the quality assurance department at California Psychcare indicating that they had been chosen to voluntarily participate in the study. Afterwards, a recruitment letter (APPENDIX E), consent form (APPENDIX F), instruction form (APPENDIX G), the demographic form (APPENDIX C), and the Strength and Difficulty Questionnaire (APPENDIX A) were then mailed in a packet to the families. The primary parent/caregiver was instructed to complete all information. Families who decided to participate in the study mailed the consent form with the questionnaire back to California Psychcare through postage-paid and addressed envelope.

Only twenty-three families responded by the end of two months, so a follow up letter was mailed to all the families' homes requesting that parents return completed questionnaires if they had not already done so (APPENDIX H). In addition, supervisors were provided with copies of the consent form and questionnaires. As they personally see the families on a weekly basis, they were asked to have families who met the criteria for participating in the study complete the questionnaire while their ASD child was in his/her therapy session. The parent/caregiver then gave the completed questionnaire to the supervisor and the supervisor left the completed survey in the researcher's mailbox at California Psychcare office. This resulted in an additional eight recruited families, bringing the total number of families participating in this study to thirty-two after eight months' effort of recruitment.

CHAPTER THREE

RESULTS¹

Hypothesis One

The first hypothesis stated that typically-developing siblings born prior to their ASD sibling would score lower on the SDQ measures and would do better academically than typically-developing siblings born after their ASD sibling (assuming they would have had more parental time and attention compared to siblings born after the ASD child). Typically-developing siblings born after their ASD siblings were expected to show more behavioral difficulties and do more poorly in school. Although the sample size was small, the hypothesized difference was examined quantitatively using t-tests. As shown in Table 3, the t-tests comparing younger and older typically-developing siblings demonstrated that none of the SDQ sub-scales approached statistical or practical significance.

Table 3. T-Tests Comparing Younger and Older Typically-Developing Siblings on the Strengths and Difficulties Questionnaire Scales.

	Sibs Born Before ASD Child (n=7) \bar{X}	Sibs Born After ASD Child (n=25) \bar{X}	t value	Degrees Of Freedom	1 – Tailed Probability	Effect Size r
SDQ						
Emotional Symptoms	4.29	4.52	-.21	30	.418	.04

¹ The resulting sample size of 32 families is quite small, limiting the interpretation of these results.

Conduct Problems	2.86	3.00	-.15	30	.411	.03
Hyperactivity	5.86	5.32	.43	30	.335	.08
Peer Problems	4.14	4.04	.10	30	.462	.02
Prosocial Behavior	5.71	6.60	-.66	30	.257	.12
Total Difficulty	17.14	16.88	.10	30	.464	.02

Table 4 shows parental time per week, academic performance, and child behavior scores of the typically-developing siblings born *before* vs. *after* their ASD sibling. As shown below, parents reported (currently) spending on average more time per week with siblings born *before* the ASD than they did with siblings born *after* the ASD child (27.0 vs. 19.8 hrs). Thus, the expectation that parents spent more time with the typically-developing sibling born *before* their ASD sibling than *after* their ASD sibling was supported². A t-test was then computed to compare the average weekly hours with birth order; results showed that there was no statistically significant difference in parent time between younger or older typically-developing siblings with a small effect size.

Table 4. Typically-Developing Siblings: Parental Time, Academic Competence, and Strengths and Difficulties Mean Scores (N=32)

	Sibs Born Before ASD Child (n=7)	Sibs Born After ASD Child (n=25)
Gender		
male	57.1% (n=4)	52.0% (n=13)
female	28.6% (n=2)	48.0% (n=12)
missing data	14.3% (n=1)	

² Parents were asked to report the average amount of one-on-one time in hours currently spent with each family member on a daily and weekly basis. Only the weekly average was used for this analysis. Retrospective data on the amount of time spent with each child was, unfortunately, beyond the scope of this study.

Parental Time (M hrs per week)	27.0 hrs.	19.8 hrs.
Math Academic Performance		
Above Grade level	14.3% (n=1)	40.0% (n=10)
At Grade Level	57.1% (n=4)	44.0% (n=11)
Below Grade Level	14.3% (n=1)	16.0% (n=4)
missing data	14.3% (n=1)	
Language Art Academic Performance		
Above Grade Level	28.6% (n=2)	48.0% (n=12)
At Grade Level	28.6% (n=2)	24.0% (n=6)
Below Grade Level	28.6% (n=2)	28.0% (n=7)
missing data	14.3% (n=1)	
Overall Academic Performance		
Above Grade Level	14.3% (n=1)	44.0% (n=11)
At Grade Level	42.9% (n=3)	32.6% (n=8)
Below Grade Level	28.6% (n=2)	24.8% (n=6)
missing data	14.3% (n=1)	
SDQ (mean score)		
Emotional Symptoms		
Normal 0-3	4 (borderline)	5 (abnormal)
Borderline 4		
Abnormal 5-10		
Conduct Problems		
Normal 0-2		
Borderline 3	3 (borderline)	3 (borderline)
Abnormal 4-10		
Hyperactivity		
Normal 0-5		
Borderline 6	6 (borderline)	5 (normal)
Abnormal 7-10		
Peer Problems		
Normal 0-2		
Borderline 3	4 (abnormal)	4 (abnormal)
Abnormal 4-10		
Prosocial Behavior		
Normal 6-10	6 (normal)	7 (normal)
Borderline 5		
Abnormal 0-4		
Total Difficulty		
Normal 0-13	17 (abnormal)	17 (abnormal)
Borderline 14-16		
Abnormal 17-40		

Regarding academic performance, two-thirds of the siblings born *before* the ASD child were reported to be at grade level for math, and they were equally distributed among “above” “at”, and “below” grade level for language arts (Table 4). Over half were reported at grade level for overall academic performance. Siblings born *after* the ASD child were mostly at grade level for math, above grade level for language arts, and almost half were above grade level in overall academic performance. Thus, the expectation that typically-developing siblings born *after* their ASD siblings would do more poorly in school was generally not supported.

As Table 4 shows, for the child behavior measure (SDQ), siblings born *before* the ASD child were identified as being in the normal range only for the prosocial scale, borderline for emotional symptoms, conduct problems, and the hyperactivity scales, and abnormal for total difficulty. Siblings born *after* the ASD child scored within the normal range for prosocial and hyperactivity scales, borderline for conduct problems, and abnormal for emotional symptoms, peer problems, and total difficulty.

In sum, typically-developing siblings born *before* the ASD child reportedly spent slightly but not significantly more time with the parent compared to children born *after* their ASD sibling. Academically, both groups were identified as doing well in math, language arts, and overall performance. Scores on the child behavior measures suggested that there were no major differences between both groups for conduct problems, peer problems, and total difficulties since both

groups scored within the borderline or abnormal mean scores (and both groups scored within normal range for the prosocial subscale).

Hypothesis Two

The second hypothesis stated that the severity of the ASD child's autism would moderate the relationship between the typically-developing sibling's birth order and SDQ total difficulty score (since ASD children with more severe forms of autism were hypothesized to have a greater overall impact on typically-developing sibling due to the heightened impact on family functioning). Due to the sensitivity of the study it was determined that the typically-developing child and the ASD child age difference was best suited for this analysis. Before this analysis was performed, the independent variables were examined for collinearity. Results of the variance inflation factor (all less than 2.0) and collinearity tolerance (all greater than .97) suggested that the estimated β s were well established in the following regression model. Parametric screening for assumptions of normality indicated a normal distribution, and using a standard z score of ± 3.5 no outliers were present in the screening for all continuous variables. Neither the assumptions of homoscedasticity nor linearity assumptions were violated. To test the hypothesis, a multiple regression was computed and the overall model was not significant, $R^2 = .03$, $F(3, 28) = .27$, $p = .85$ $\beta = -.005$ (Table 6). Overall, this analysis demonstrated that the effect of the ASD child's and typically-developing sibling's age difference on the SDQ total difficulty score

was not moderated by the ASD child's severity of autism.

Table 5. Multiple Regression Analyses of Typically-Developing Sibling's Total Behavior Measure.

Predictor variables	SDQ total score						
	R ²	adjR ²	R ² change	b	β	t-value	p
Model 1							
age difference	.024	-.009	.024	-.248	-.154	-.853	.40
Model 2							
age difference				-.249	-.154	-.841	.40
ASD severity o autism	.028	-.039	.004	-.669	-.064	-.348	.73
Model 3							
age difference				-.245	-.152	-.736	.47
ASD severity of autism				-.668	-.064	-.342	.74
age difference X ASD severity of autism	.028	-.076	.000	-.035	-.005	-.022	.98

*p ≤ .05
 **p ≤ .01
 ***p ≤ .001

Hypothesis Three

The third hypothesis stated that (current) parental time would mediate the relationship between the ASD child's severity of autism and the typically-developing sibling's behaviors measured by the SDQ regardless of birth order, with ASD children having the more severe behaviors requiring more parental time which would result in a greater likelihood of the typically-developing sibling being more at risk for demonstrating behavioral difficulties. To test this hypothesis, Preacher and Haye's (2008) indirect script file was used and the

results showed that the relationship between severity of autism and SDQ total difficulties score was not mediated by parental time. As Figure 3 illustrates, the standardized regression coefficient between severity of autism and the SDQ total difficulties score did not decrease when controlling for parental time. Using exploratory analysis, it was also found that current parental time did not mediate the relationship between the ASD children's severity of autism and any of the SDQ subscales measures.

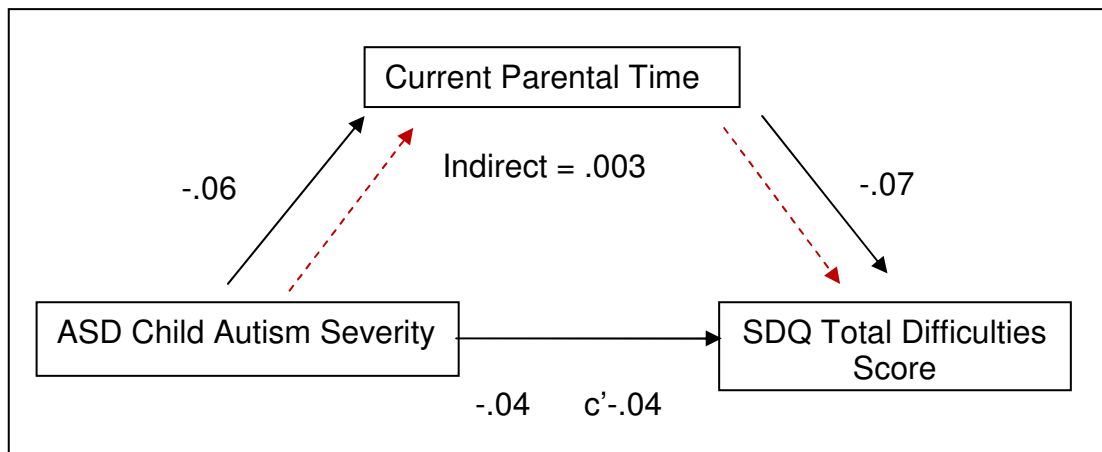


Figure 3. Standardized Regression Coefficients for the Relationship Between ASD Child Autism Severity and Total Difficulties Score as Mediated by Current Parental Time.

Additional Analyses

The mean scores for the SDQ subscales were then compared to a normative sample derived from a sample of 10,298 British children utilizing

exploratory analysis (Hastings, 2003 a). One sample t tests were used to compare the mean scores from the present sample with the normative sample. As shown in Table 7, typically-developing siblings of the ASD children in the present study were found to score significantly *higher* on all the SDQ measures including total difficulties compared to the normative sample. For the prosocial behavior subscale, the present sample scored *lower* than the normative sample. In sum, this analysis indicates that when the current sample was compared to a normative sample of all typically-developing children, typically-developing siblings of children with ASD in the present study are at an increased risk for being identified with many difficulties as measured by the SDQ subscales.

Table 6. Strengths and Difficulties Questionnaire Mean Scores of Typically-Developing Siblings Compared to Normative Sample.

SDQ score	Present sample		Normative sample		t value	Effect Size r
	Mean	SD	Mean	SD		
Emotional Problems	4.46	2.57	1.90	2.00	5.66***	.49
Conduct Problems	2.97	2.19	1.60	1.70	3.53***	.33
Hyperactivity	5.44	2.88	3.50	2.60	3.80***	.33
Peer Problems	4.06	2.46	1.50	1.70	5.89***	.52
Prosocial Behavior	6.41	3.09	8.60	1.60	-4.01***	-.41
Total Difficulties Score	16.94	6.52	8.40	5.80	7.41***	.57

*p ≤ .05
 **p ≤ .01
 ***p ≤ .001

Next, a Pearson correlation was computed on the age differences between the ASD children and the typically-developing siblings with the SDQ subscales (Table 8). Results showed that there was a significant U-shaped relationship between age difference and conduct problems: i.e., the more years separating the ASD sibling from the typically-developing sibling, the more conduct problems for the typically-developing sibling (see Figure 4).

Table 7. Correlations Between Age and the Strengths and Difficulties Questionnaire Behavior Scale Measures (N=32)

SDQ scales	Age
Emotional Symptoms	.06
Conduct Problems	-.36*
Hyperactivity	.03
Peer Problems	-.19
Prosocial Behavior	.23
Total Difficulty	-.15

* $p \leq .05$
 ** $p \leq .01$
 *** $p \leq .001$

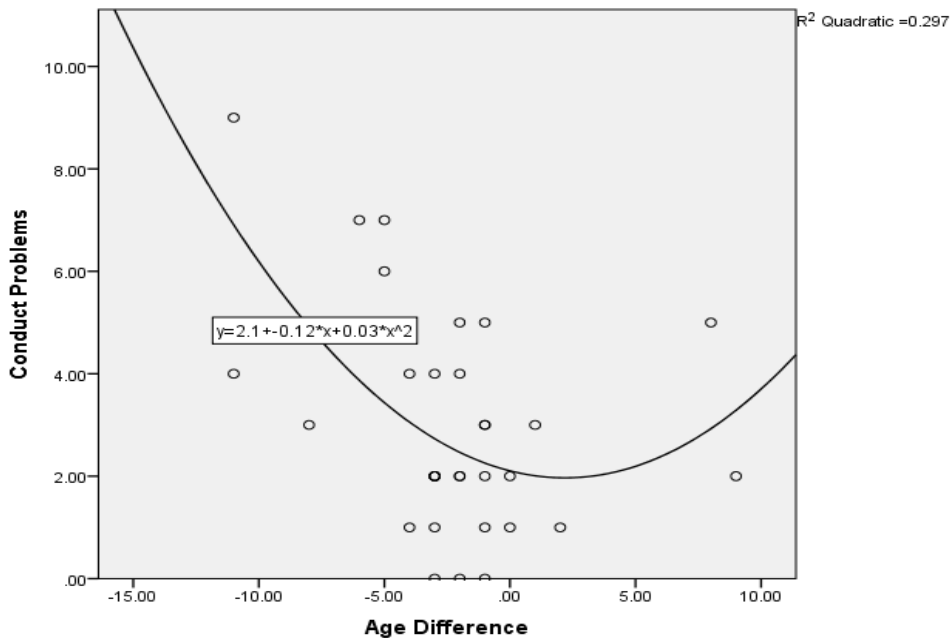


Figure 4. Age Difference Between ASD Children and Typically-Developing Siblings: Conduct Problem

Finally, based on the correlation results, a second multiple regression was computed to test whether the severity of autism would moderate the relationship between age difference and conduct problems. The overall model was not significant, $R^2 = .21$, $F(3,28) = 2.42$, $p = .09$ (Table 9). Overall, this analysis revealed that the effect of the typically-developing sibling's age difference on the SDQ conduct problems score was not moderated by the ASD child's severity of autism nor was any other SDQ subscale.

Table 8. Multiple Regression Analyses of Typically-Developing Sibling's Total

Behavior Conduct Problems

Predictor variables	SDQ Conduct Problems						
	R ²	adjR ²	R ² change	<i>b</i>	β	t-value	p
Model 1							
age difference	.131	.102	.131	-.196	-.362	-2.13	.04
Model 2							
age difference				-.197	-.362	-.22	.04
ASD severity of autism	.205	.150	.074	-.963	-.273	-1.65	.11
Model 3							
age difference				-.195	-.138	-.21	.42
ASD severity of autism				.973	-.285	-1.63	.12
age difference X ASD severity of autism	.206	.121	.001	-.061	-.449	-.15	.89

CHAPTER FOUR

DISCUSSION

The present study attempted to examine how birth order may impact the effect of having an ASD sibling on a typically-developing child.

The first hypothesis was that siblings born prior to their ASD sibling would have fewer internalizing and/or externalizing behaviors and would do better academically than typically-developing siblings born after their ASD sibling. This hypothesis was based on the assumption that parents would generally have provided more parental time and attention to this child compared to those children born after the ASD sibling (Price, 2008). The results of this study, however, showed no significant group differences on the behavioral and academic measures between those born before vs. after the ASD child. However, when comparing the SDQ mean scores of younger vs. older typically-developing siblings, it was found that for this particular group, most children fell within the borderline and abnormal scale scores. This resonates with Shur-Fen et al. (2010) who found that siblings of children with ASD are more likely to have minor behavior difficulties such as an increased likelihood of delinquent behaviors and internalizing issues. Other studies, however, have found that siblings of children with an ASD did not show any indication of behavioral maladjustment and that siblings generally report positive experiences of playing with their ASD brother or sister such as watching television together (e.g.,

Hastings, 2007; Mascba & Boucher, 2006). In fact, Macks and Reeve (2007) found that typically-developing siblings of ASD children tend to have a high regard of themselves, including their intelligence, behavior, and their scholastic performance as compared to children with typically-developing siblings. However, other studies have found that typically-developing siblings who are younger than an ASD sib are prone to having fewer prosocial behaviors, while siblings older than an ASD sib have been reported to have a higher tendency of internalizing and externalizing behavioral maladjustments (Hastings, 2007; Macks & Reeve, 2007). In sum, studies have found mixed results regarding older vs. younger typically-developing siblings. A possible reason as to why the current study did not find any significant group differences was the small sample size, especially for the younger sibling group, which had only 7 children. Also, the current study measured the amount of time the parent *currently* spends with each sibling, not during the first three of life which is arguably the most influential in a child's development (Zeanah, Gunnar, McCall, Krener & Fox, 2011). Parents' estimate of the current time may also not have been accurate. Finally, having parents report on their typically-developing child's behavioral difficulties may have been another factor: Dempsey, Llorens, Brewton, Mulchandani and Goin-Kochel (2012), for example, report that parents may have an inaccurate perception of their typically-developing child's behavior due to the comparisons made with their ASD child's behaviors, leading the parent to over or underestimate their typically-developing child's behavior.

The second hypothesis examined whether the severity of autism would moderate the relationship between the typically-developing siblings' birth order and SDQ total difficulties scale. For this analysis, the age difference between the ASD child and the typically-developing sibling was computed (instead of the typically-developing sibling's birth order). The results of the multiple regression analysis indicated that severity of autism did not moderate this relationship, which is inconsistent with previous research which has found that the severity of autism tends to predict the behavioral adjustment of typically-developing children (Hastings 2003 b; Meyer, Ingersoll, & Hambrick, 2011): more severe ASDs tend to be related to more severe behavioral problems in typically-developing children. Similarly, typically-developing siblings of children with mild/moderate ASDs tend to show fewer conduct problems, especially when parents report a high level of social support (Hastings, 2003 a). In sum, while studies have generally identified severity of autism as an influence on typically-developing children's behaviors, the current study did not demonstrate this. Possible reasons for these results are again the small sample size, and also the fact that most of the ASD children in the current study were identified as being severely autistic, leaving little range of variability in autism severity.

The third hypothesis attempted to examine whether current parental time would mediate the relationship between the ASD child's severity of autism and the typically-developing siblings' behaviors as measured by the SDQ (regardless of birth order). With the use of Preacher and Haye's (2008) indirect script file, it

was found that the relationship between severity of autism and the SDQ total difficulties score was not mediated by parental time. Two possible reasons as to why this hypothesis was not supported were that parents were asked to estimate the amount of one-on-one spent time with each family member (which may not have been very accurate), and the small sample size which consisted of 32 families with only 7 of these typically-developing siblings born before the ASD child. A more objective measure on the average amount of quality time spent with the parent might have resulted in a different outcome.

Additional Analyses

While the initial hypotheses were not supported, additional analyses were conducted which yielded interesting findings.

First, the mean scores of the SDQ subscales were compared to a normative sample of 10,298 British children with typically-developing siblings. Results indicated that the typically-developing siblings of ASD children in the current study scored higher (indicating more problems) on the emotional, conduct, hyperactivity, and total difficulties scales, and lower on the measure of prosocial behaviors compared to the normative sample. In other words, when compared to a normative sample, children in the current study showed more behavioral adjustment difficulties regardless of being younger or older than the ASD child. Other researchers have reported similar findings. For example, Hastings (2003 a) found that typically-developing siblings had more peer

problems, more overall adjustment problems, and lower levels of prosocial behaviors. In addition, Ross and Cuskelly (2006) found that typically-developing siblings of an ASD sibling were 40% more at risk to be identified with internalizing and/or externalizing difficulties (which was greater than the normative sample percentage of only 6%). In the current study, the typically-developing siblings' SDQ mean scores indicated that they, as a total group, were identified as being borderline for the conduct and hyperactivity scales, and abnormal for the peer problems and total difficulties scales. A possible reason for this finding may be the child's temperament. A child who is slow to warm will be most likely identified with having more behavioral difficulties than a child with an easy temperament (Wong, 2014, personal communication). Another possible reason may be that the overall demeanor of the parent and the parent's approach to parenting a child with an ASD vs. a typically-developing child are different, i.e., a parent may discipline the typically-developing child for misbehaving at the grocery store but not the ASD child; therefore, siblings of ASD children are aware of these discrepancies. From an early age, children are aware of the discrepancies in parental affection, attention, and the use of disciplinary actions among all siblings (Dillenburger, Keenan, Doherty, Byrne &, Gallagher, 2010).

Next, a Pearson correlation was computed on the age differences between the ASD child and their typically-developing sibling on all the SDQ scales. It was found that the sibling age *difference* was correlated with conduct problems. That is, the greater the age difference between the ASD child and the

typically-developing sibling, the more conduct problems the typically-developing sibling had. (Most of the current research on typically-developing siblings of autistic children has focused on older vs. younger sibs and has not taken into account the age disparity between these two groups). A possible reason for this finding in the current study may be that the typically-developing child and the ASD child are in different developmental stages, and that greater age differences might hinder the possibility of establishing any type of close interaction or relationship due to their different interests. Newman (1996) reports that frequent interactions among siblings promote closer relationships. Having a sibling that is closer in age with shared interests may, perhaps, buffer the effect of the typically-developing child demonstrating conduct problems. It may be that typically-developing siblings who are farther apart in age and who don't share a quality relationship with their ASD sibling may demonstrate more conduct problems. Therefore, typically-developing siblings who do share a close relationship with their ASD sibling will be least likely to demonstrate conduct problems. Future research can further explore this hypothesis.

Finally, since greater age difference between the typically-developing child and their ASD sibs' ages correlated with conduct problems, a second multiple regression analysis was computed to test whether the severity of autism would moderate the relationship between typically-developing siblings' age differences and conduct problems. The result of this analysis revealed that the severity of autism did not moderate this relationship. A recent study by Pollard, Barry,

Freedman, and Kotchick (2013) found that the quality of the relationship between the ASD child and the typically-developing sibling was a moderator between the ASD siblings' diagnosis and the anxiety level of the typically-developing sibling. That is, when the typically-developing sibling perceived that their relationship quality with the ASD child was poor, the typically developing sibling reported higher levels of anxiety (Pollard, Barry, Freedman, & Kotchick, 2013).

Researchers have also found that families are negatively impacted by the ASD child's excessive violent and unpredictable behaviors; therefore, aggression has been found to be one of the most common stressors between these siblings' relationships (Gray, 2002; Ross & Cuskelly, 2006). Another possible reason as to why this hypothesis was not supported might be because there was a lack of a "range" of autistic severity of the ASD children: almost all of the ASD children in the current study were rated by their parents as severely autistic.

Limitations and Future Research

There were several limitations to this study including methodology difficulties resulting in a small sample size, parent estimate of time, and parent report on the typically-developing child behaviors.

First, methodological challenges were apparent in this study. Many researchers have reported that when implementing a study consisting of ASD children and their families, most sample sizes are relatively small (Meadan, Stoner, & Angell, 2010). For this current study, the younger group of typically-

developing siblings consisted of only seven participants with the majority of typically-developing siblings being older than their ASD sibling. There was an enormous challenge with recruiting families of children with autism who met the criteria of this study and who were willing to participate. Although California Psychcare provides services for over one hundred families in the Riverside County alone, the response of the families was relatively low in spite of multiple attempts to recruit families. In addition, almost half of the parents in the current study weren't highly educated so they may not have fully appreciated the value of the study and their participation in it. Also, these parents may have felt that they were too busy with managing the daily stressors of having multiple children and the ASD child. Perhaps the use of other resources such as social media and support groups such as Autism Society found on Facebook may be sought out in future studies to gain a greater number of participants.

Secondly, parents were asked to estimate the amount of quality time spent one-on-one with each child individually on a daily and weekly basis and report on their typically-developing child's behavior. Results showed that there were discrepancies between the averages reported by the parent for the daily vs. weekly estimates, suggesting that parents may not have accurately have estimated the time spent one-on-one spent with each child. These discrepancies may be due to parents not wanting to lead researchers to the idea that their typically-developing child may be receiving less parental time. A more precise estimate would have been to have an objective measure, and ideally one that

assessed parental time throughout the early years of each child's life. In addition, parents may have an imprecise perception of their typically-developing child's behavior due to the comparisons made with their ASD child behaviors, leading the parent to over or underestimate their typically-developing sibling's behavior (Dempsey, Llorens, Brewton, Mulchandani & Goin-Kochel, 2012). Therefore, a third party who knows the child relatively well such as an uncle/aunt, neighbor, or teacher may have rated the child's behavior differently than that of the parent.

Researchers have established that parenting is the most important and influential aspect in a child's development. Parental interactions, quality of parenting, and the timing of these interactions are all supportive in children sustaining a positive trajectory throughout adolescence and adulthood (Landry, Smith, & Swank, 2003). A longitudinal study following typically-developing siblings of ASD children during the first several years of life may help clarify the impact of parent time and birth order on children with an ASD sibling. Another possible future research can explore the temperament of typically-developing siblings of ASD children and its influence on their behavioral adjustments. It would be expected that children with a slow to warm temperament will be more likely to be identified with behavioral difficulties than children with a warm temperament.

Conclusions

Though no significant group differences were found between younger and older typically-developing siblings of ASD children as measured by the SDQ scales, the current sample of typically-developing siblings did show a significantly higher risk for maladjustment difficulties on all SDQ measures. It was also found that typically-developing siblings' age differences were significantly correlated with conduct problems: i.e., the more years separating the ASD sibling from the typically-developing sibling, the more conduct problems the typically-developing sibling showed. These findings suggest that typically-developing siblings may benefit from some kind of intervention. Many interventions focus mainly on the ASD child and improving many skill deficits, i.e., communication and self help. Creating in-home interventions or services that target typically-developing siblings including perhaps helping them to find positive ways to interact with or assist their ASD sibling, may lead typically-developing siblings with better outcomes.

Findings from this research may be of benefit to professionals and clinicians as it may help them to better understand the impact of an ASD child on the family system. In addition, this research will help inform support programs and professionals of the needs of each specific family member, particularly typically-developing siblings, i.e., incorporating the typically developing sibling within therapy sessions or within a classroom setting to serve as the model student for the ASD children. Finally, this study helps to shed light on the existing

research literature of the impact of an ASD child on his/her siblings.

APPENDIX A
STRENGTHS AND DIFFICULTIES QUESTIONNAIRE

Code # _____

Child Behavior Checklist

Child's gender: _____

Child's age: _____

Instructions: Please read each phrase on the following page and mark the response that best describes how your _____ year old child has behaved in the last several months or this school year.

Circle **N** if the behavior **Not True**.

Circle **S** if the behavior **Somewhat True**.

Circle **C** if the behavior **Certainly True**.

Please mark every item: If you don't know or are unsure of your response to an item, give your best guess

How to Mark Your Responses

Be certain to circle the letter you choose, like this:

N S C

If you wish to change a response, mark an X through it, and circle your new choice, like this:

N S C

Code # _____

	Not True	Somewhat True	Certainly True
	N	S	C
Considerate of other people's feelings	N	S	C
Restless, overactive, cannot stay still for long	N	S	C
Often complains of headaches, stomach-aches or sickness	N	S	C
Shares readily with other children, for example toys, treats, pencils	N	S	C
Often loses temper	N	S	C
Rather solitary, prefers to play alone	N	S	C
Generally well behaved, usually does what adults request	N	S	C
Many worries or often seems worried	N	S	C
Helpful if someone is hurt, upset, or feeling ill	N	S	C
Constantly fidgeting or squirming	N	S	C
Has at least one good friend	N	S	C
Often fights with other children or bullies them	N	S	C
Often unhappy, depressed or tearful	N	S	C
Generally liked by other children	N	S	C
Easily distracted, concentration wanders	N	S	C
Nervous or clingy in new situations, easily loses confidence	N	S	C
Kind to younger children	N	S	C
Often lies or cheats	N	S	C
Picked on or bullied by other children	N	S	C
Often offers to help others (parents, teachers, other children)	N	S	C
Thinks things out before acting	N	S	C
Steals from home, school, or elsewhere	N	S	C
Gets along better with adults than with other children	N	S	C
Many fears, easily scared	N	S	C
Good attention span, sees work through to the end	N	S	C

APPENDIX B
PARENTAL TIME

“One-on-One” refers to undivided attention given to another single person. For example, listening/ talking with spouse/partner, doing an activity with spouse/partner, etc.

9) Please indicate how much time you spend ONE-ON-ONE with this person per day:

- on a typical day: _____ hours _____ minutes

- during an average week: _____ hours _____ minutes

APPENDIX C
DEMOGRAPHIC INFORMATION

Code # _____

Family Background Form

Instructions: Please respond to each of the following questions:

About you:

- 1) Gender: male _____ female _____
- 2) Age: _____
- 3) What is your relationship to the children: _____ mother _____ father _____ other: _____
- 4) Who provides the majority of the care for the child and spends the most time with the children in the household?
_____ mother _____ father _____ respite care
_____ grandparents _____ other relatives _____ other
- 5) What is the total number of children living in the household (including the ASD child)? _____
- 6) What is your current marital status?
_____ married _____ widowed
_____ divorced _____ separated
_____ never married
- 7) Your ethnicity:
_____ African American _____ Caucasian
_____ Hispanic _____ Asian
_____ Native American _____ Other: _____
- 8) What is the highest degree or level of school you have completed?
_____ did not complete high school
_____ high school graduate – high school diploma or the equivalent (for example: GED)
_____ some college
_____ Associate degree
_____ Bachelor's degree
_____ Master's degree
_____ professional/ doctorate degree
- 9) Are you currently...?
_____ employed for wages
_____ self-employed
_____ out of work and looking for work
_____ a homemaker
_____ a student
_____ other: _____
- 10) How many of hours of work do you completed outside the home per week?
_____ 15 or less _____ 20 -25 _____ 25-30 _____ 35-40 _____ 40 or more

Code # _____

About your spouse/partner:

1) Is there a second adult living in the home? Yes: ____ No: ____

If yes:

2) What is this person's relationship to the children? _____

3) This adult's age: _____

4) This adult's gender: male ____ female ____

5) This adult's ethnicity:

____ African American ____ Caucasian
____ Hispanic ____ Asian
____ Native American ____ Other: _____

6) The highest degree or level of school this person completed?

____ did not complete high school
____ high school graduate – high school diploma or the equivalent (for example: GED)
____ some college
____ Associate degree
____ Bachelor's degree
____ Master's degree
____ professional/ doctorate degree

7) Is this person currently...?

____ employed for wages
____ self-employed
____ out of work and looking for work
____ a homemaker
____ a student
____ other: _____

8) How many of hours of work does this person complete outside the home per week?

____ 15 or less ____ 20 -25 ____ 25-30 ____ 35-40 ____ 40 or more

“One-on-One” refers to undivided attention given to another single person. For example, listening/ talking with spouse/partner, doing an activity with spouse/partner, etc.

9) Please indicate how much time you spend ONE-ON-ONE with this person per day:

- on a typical day: ____ hours ____ minutes

- during an average week: ____ hours ____ minutes

Code # _____

About your child with ASD:

1) ASD child's age: _____ gender: _____ grade in school: _____

2) Is your child diagnosed with any other challenges or disabilities in addition to autism?

3) Please check one that best describes this child to indicate his/her severity of autism:

- a) My child lives a relatively normal life, is able to interact with peers (may show some signs of difficulty), is able to engage in normal day-to-day activities without the need of too much help, and has no significant delays in language and motor skills.
- b) My child needs minor assistance with daily routine, is not be able to interact easily with others, needs reminders to pay attention to a parent or teacher and to attend to things such as hygiene, language development is significantly delayed (may not speak much but is able to understand what is being said to him/her) and may have poor motor skills.
- iii. My child requires extensive physical care, unable to interact with peers, is unable to use spoken language, engages in stereotypical movements (i.e. rocking in chair, hand flapping), often injures him/her self (biting, hair pulling, scratching, head banging), and is highly sensitive to light, touch, certain tastes, loud sounds, and are large crowds often overwhelming.

4) How long has the child been receiving services? (i.e. behavioral, speech, occupational)

- 0 - 6 months
- 7 - 11 months
- 1 year - 2 years
- 3 years - 5 years
- More than 6 years

“One-on-One” refers to undivided attention given to another single person. For example, helping a child with homework, listening/ talking with child, doing an activity with a child, reading with child, and/or playtime with child, etc.

5) Please indicate how much time you spend ONE-ON-ONE with this person per day:

- on a typical day: _____ hours _____ minutes
- during an average week: _____ hours _____ minutes

Code # _____

About the brother/sister of the ASD child:

Child's age: ____

Child's gender: ____

Child's grade in school: ____

Please indicate this child's current school performance (based on his/her last report card) by marking an X on the appropriate line to indicate this child's overall performance in each of the following 3 areas:

Math:	Language Arts/Reading:	Overall:
___ above grade level	___ above grade level	___ above grade level
___ at grade level	___ at grade level	___ at grade level
___ below grade level	___ below grade level	___ below grade level

“One-on-One” refers to undivided attention given to another single person. For example, helping a child with homework, listening/ talking with child, doing an activity with a child, reading with child, and/or playtime with child, etc.

Please indicate how much time you spend ONE-ON-ONE with this person per day:

- on a typical day: ____ hours ____ minutes

- during an average week: ____ hours ____ minutes

APPENDIX D

SCRIPT

Script:

Hi, I am Belen Van Campen, the Quality Assurance Coordinator for California Psychcare. I am calling you today on Teresa Orozco's behalf; she is an employee with California Psychcare in the Riverside region. She has been with the company for approximately three years and is a graduate student in the M.A. program in Child Development at California State University, San Bernardino. You and your family are being contacted about participating in a study about the day-to-day stressors of families coping with a child diagnosed with autism, especially how his or her siblings may be impacted.

Participation simply involves completing a questionnaire about your family, including one of your autistic child's siblings, which will take approximately 15 minutes. Please be assured that your responses will remain absolutely confidential. No names will be recorded on the questionnaire; your responses will be pooled with other participants.

By participating in this project, you will be assisting professionals in becoming more aware of ASD families' needs. This information will ultimately be useful for coordinating services to better fit families.

With your permission, we will mail additional information about this study to your home. If at that time you agree to participate, simply sign the consent form, complete the questionnaire, and mail it back in the enclosed postage-paid and addressed envelope.

APPENDIX E
RECRUITMENT LETTER



Dear Parent/Caregiver,

My name is Teresa Orozco and I am currently employed with California Psychcare in the Riverside region. I have been with the company for approximately three years. I am also a graduate student in the M.A. program in Child Development at California State University, San Bernardino. I would like to invite you to participate in my study about the day-to-day stressors of families coping with a child diagnosed with autism, especially how his or her siblings may be impacted.

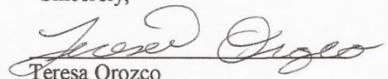
Participation simply involves completing a questionnaire about your family, including one of your autistic child's siblings, which will take approximately 15 minutes. You will also be asked to jot down the approximate amount of time spent with individual family members per week.

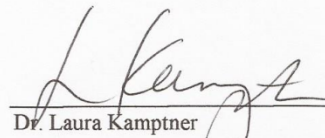
Your responses will remain absolutely confidential. Code numbers only will be used to identify participants' questionnaires. At no point during the survey will you be asked to write your name, your children's names, or any other identifying information.

By participating in this project, you will be assisting professionals in becoming more aware of ASD families' needs. This information will ultimately be useful for coordinating services to better fit families.

If you would be willing to participate, please mark the attached consent form and mail it with the completed questionnaire back to us through the enclosed postage-paid and addressed envelope. We greatly appreciate your participation!

Sincerely,


Teresa Orozco
M.A. Candidate in Child Development


Dr. Laura Kamptner
Professor, Human Development
Dept. of Psychology

APPENDIX F
CONSENT FORM

Dear Parent/Caregiver,

We invite you to participate in a study about the day-to-day stressors of families coping with a child diagnosed with autism, especially how his or her siblings may be impacted. This study is being carried out by Teresa Orozco, a graduate student in the M.A. program in Child Development at California State University, San Bernardino working under the supervision of Prof. Laura Kamptner. Participation simply involves filling out a questionnaire about your family and **one** of your autistic child's siblings, which will take approximately 15 minutes.

Please be aware that your responses will remain absolutely confidential. At no point during the survey will you be asked to write your name, your children's names, or any other identifying information. Your responses will not be analyzed individually; all responses will be pooled and analyzed as a group.

Your participation is completely voluntary and you are free to discontinue at any time, or to leave any items blank if you don't want to answer them. If you choose not to participate in the study, it will not affect your current services provided through California Psychcare. Though there are no direct risks or benefits to you and your family for your participation, the information you provide will assist professionals in becoming more aware of the needs of families with autistic children. The goal of this information is to coordinate services to better fit families of children with autism.

This project has been reviewed and approved by the Institutional Review Board at California State University, San Bernardino. and a copy of the official Psychology IRB stamp of approval should appear on this consent form.

If you have any questions about the project, or wish to receive a copy of the results when they become available, please feel free to contact Dr. Laura Kamptner at (909) 537-5582.

Thank you!

I acknowledge that I have been informed of, and understand the true nature and purpose of this study, and I freely consent to participate. I acknowledge that I am at least 18 years of age. Please indicate your desire to participate by placing and "X" on the line below.

Participant's X _____

Date: _____

CALIFORNIA STATE UNIVERSITY PSYCHOLOGY INSTITUTIONAL REVIEW BOARD SUB-COMMITTEE			
APPROVED	6/4/13	VOID AFTER	6/4/14
IRB #	II-135D-17	CHAIR	<i>John B. Clay</i>

APPENDIX G
INSTRUCTION FORM



Thank you for participating in this study!

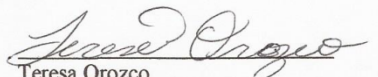
Instructions: The primary parent/caregiver (i.e., the adult who spends the most time with the Children) should fill out the attached questionnaire.

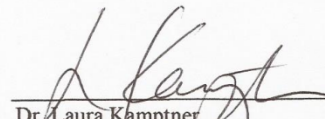
Included are:

- 1) Family background form
- 2) Child Checklist: Please read each phrase and mark the response that best describes how your ____ year old child has behaved in the last several months

When you have completed these forms, please mail them back to us in the enclosed postage-paid, addressed envelope.

Sincerely,


Teresa Orozco
M.A. Candidate in Child Development


Dr. Laura Kamptner
Professor, Human Development
Dept. of Psychology

APPENDIX H
FOLLOW UP LETTER



Dear Parent/Caregiver,

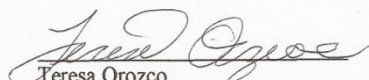
A questionnaire about the day-to-day stressors of families coping with a child diagnosed with autism was sent to your home several weeks ago. We would greatly appreciate it if you could please mail back the questionnaire as soon as possible. If you have already mailed it back to us, I'd like to take a moment to say thank you!!

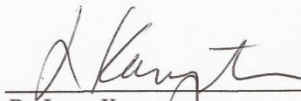
If you have misplaced the questionnaire, please contact the Riverside office at (951) 346-4860 and I will be happy to mail you another.

By participating in this project, you are assisting professionals in becoming more aware of ASD families' needs. This information will ultimately be useful for coordinating services to better fit families.

Your participation is greatly appreciated!

Sincerely,


Teresa Orozco
M.A. Candidate in Child Development


Dr. Laura Kamptner
Professor, Human Development
Dept. of Psychology

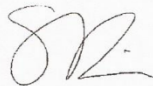
APPENDIX I
APPROVAL LETTER

January 18, 2013

To whom it may concern:

This letter is being provided to indicate that California Psychcare, Inc. will support Teresa Orozco's research. Our Quality assurance team will contact all families to identify interest to participate in the study. California Psychcare also takes all measures to ensure the confidentiality of all the participants. If you have any question please contact us at 951 346-4860.

Be Blessed



Stephanie Richardson, MA, BCBA

Certified Autism Specialist

Director of Clinical Services

California Psychcare

Riverside (951) 346-4860

Srichardson@calpsychcare.com

APPENDIX J
INSTITUTIONAL REVIEW BOARD

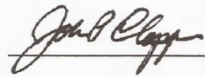
**Human Subjects Review Board
Department of Psychology
California State University,
San Bernardino**

PI: Orozco, Teresa and Kamptner, Laura
From: John P. Clapper
Project Title: Impact of birth order on ASD children's typically-developing siblings
Project ID: H-13SP-17
Date: 6/4/13

Disposition: Administrative Review

Your IRB proposal is approved. This approval is valid until 6/4/2014.

Good luck with your research!



John P. Clapper, Co-Chair
Psychology IRB Sub-Committee

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