EFFECTS OF BIRTH-ORDER COMPOSITION

ON THE INITIAL, SAME-SEX

INTERACTIONS OF

YOUNG ADULTS

by

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ABSTRACT

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Using both individual- and dyad-level analyses, this study investigated the effects of birth order on the initial, same-sex interactions of young adults. One hundred eighteen students (59 dyads) participated in initial, unstructured dyadic interactions while being unobtrusively audio- and videotaped. Following their interaction, the dyad members independently completed three self-report questionnaires about their interactions with their dyadic partner and about their familial and social relationships growing up. Three theories informed my predictions about birth order influences in these initial interactions: the Family Constellation Theory, the Observational Learning Theory, and the Trait Theory. In contrast to a previous study of mixed-sex interactions (Ickes and Turner, 1984), Family Constellation Theory received at least a modicum of support in the present study of same-sex interactions but only for a composite measure of interactional involvement and not for any measures of specific interaction behaviors.

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CHAPTER 1

INTRODUCTION

<u>1.1 Uniqueness of Siblings</u>

Of all the relationships people have in life—with parents, grandparents, brothers, sisters, friends, neighbors, colleagues, coworkers, and acquaintances—the longest lasting relationships are often with their siblings (Stocker, Lanthier, & Furman, 1997). Researchers continue to find many connections between children's relationships with siblings and their development of roles, behavior, sexuality, socialization, and personality (McCoy, Brody, & Stoneman, 2002; Salmon, 2003; Spitze & Logan, 1991).

Interestingly, although siblings share the same home environment, their personalities are often quite dissimilar from one another. For example, three children who were born to the same parents, grew up in the same household, attended the same schools, and were exposed to the same family experiences can develop three quite distinct personalities. Whereas the first-born child might be conscientious, logical, and well organized, the second-born child might be diplomatic, compromising, and independent, and yet the last-born child might be charming, precocious, and manipulative. Because genetic factors account for only 50% of the shared characteristics among siblings, environmental influences and other non-shared factors must also offer answers about siblings' personality differences (Dunn & Plomin, 1991).

Some researchers have argued that children's ordinal positions in their family (i.e., their birth order) can account for differences in the patterns of behavior displayed by siblings (Harris, 1998; Herrera, Zajonc, Wieczorkowska, & Cichomski, 2003; Sulloway, 1995, 1996). Other researchers, espousing a more complex model, have argued that sibling configuration, which includes birth order, age spacing, sex composition, and the number of children, can constrain and shape children's personality development. In particular, sibling configuration can affect (1) children's ways of relating to others socially (Tucker, McHale, & Crouter, 2001; Lockwood,

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Kitzmann, & Cohen, 2001; Salmon, 2003; Steelman, Powell, Werum, & Carter, 2002), (2) their performance in school (Steelman, 1985; Cicirelli, 1978), and (3) the levels of intelligence they achieve (Guo & Van Wey, 1999; Zajonc, 2001).

1.1.1 Birth Order and Social Development

1.1.1.1 Toman's (1959, 1976) Family Constellation Theory.

Another theory posits that siblings are available interaction partners who bring to their interactions with co-siblings their own unique perspectives and experiences. Siblings can, therefore, serve as role models to each other and influence each other's social, emotional, and intellectual development (Salmon, 2003; Steelman et al., 2002; Zajonc, 2001). With regard to children's social development, Walter Toman proposed a Family Constellation Theory which argued that people's sibling relationships affect their future compatibility with adult romantic partners and adult friendships. According to this theory, relationships are more satisfying and more enduring to the extent that they replicate the childhood sibling relationships of both adult partners.

Toman explained that lasting and satisfying friendships are those which have complementary matches, i.e., one person is used to playing a senior role to other same-sex siblings at home, and another person is used to playing a junior role to same-sex siblings at home. For example, if an older sister of sisters befriends another woman who was herself the younger sister of sisters (a complementary match), both should experience a successful and enduring friendship, other areas being equal. Similarly, an older brother of brothers should enjoy a compatible friendship with a younger brother of brothers (another complementary match). However, because of what Toman called "rank conflict," an oldest sister of sisters should be less compatible as friends with an oldest sister of sisters, just as an oldest brother of brothers should be less compatible as friends with an oldest brother of brothers. Toman further argued that "sex conflict" should be relevant as well, such that an oldest sister of younger brothers would be less compatible as friends with a younger sister of older sisters than a younger sister

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of older brothers would be. This "sex conflict" is based on the premise that same-sex siblings share more experiences than opposite-sex siblings share due to being more similar to one another (Ruble & Martin, 1998).

Although few researchers have been able to replicate Toman's results apart from himself and his associates (Birtchnell & Mayhew, 1977; Levinger & Sonnheim, 1965; Vockell & Felker, 1971), Scheidt and Smith (1974) found some support for the Family Constellation Theory. These investigators assessed the level of conflict between college roommates. Comparing dyads that had compatible birth rank and gender, (older sisters of sisters with younger sisters of sisters and older brothers of brothers with younger brothers of brothers) with dyads that had conflict in rank and gender (older sisters of sisters with older sisters of brothers and older brothers of sisters with older brothers of brothers), they found that the dyads with compatible birth rank and gender reported the least interpersonal conflict, consistent with Toman's theory.

1.1.1.2 Trait-based Theory

Based on his review of the available research findings, Sulloway (1995, 1996) asserted a different theory, positing that first borns are organized, anxious, conforming, extraverted, traditional and fearful. He explained that first borns enjoy a sense of privileged access to their parents' resources, exert control over their younger siblings, and are more traditional in their views because the status quo often serves their best interests. In contrast, last-born children are often more "others oriented," having not only parents but also siblings as their socialization models. Because they are frequently doted upon and have more to gain by trying to change the existing social order, last borns tend to capitalize on their ability to charm and to be indulged by others. Accordingly, as Sulloway has noted, last-born children are relatively popular, unconventional, cooperative, open to experience, rebellious, and easygoing. They are likely to demonstrate competitiveness, creativity, free-thinking, and risky behavior.

Researchers who have tested Sulloway's Trait-based theory have reported mixed results. Whereas some investigations have supported Sulloway's theories (Rohde, Atzwanger, & Butovskaya, 2003; Zweigenhaft & Von Ammon, 2000), a few studies have found partial support (Michalski & Shackelford, 2002; Zweigenhaft, 2002), but several report mixed or even contradictory results (Freese, Powell, & Steelman, 1999; Jefferson, Herbst, & McCrae, 1998; Saroglou & Fiasse, 2003).

<u>1.2 Birth Order Effects on Socialization</u>

During their developmental years, last borns use their first-born siblings as their social role models. Observational learning theory, with its emphasis on "vicarious conditioning," provides the theoretical basis for this occurrence (Bandura, 1977). Social learning theorists assume that operant conditioning can occur when an individual simply watches another person behave in a certain manner and reap the benefits or consequences of that behavior. For example, younger siblings can observe their older siblings interacting with their peers and learn social skills from their older brothers and sisters (Brody & Murry, 2001; Mischel, 1966; Stormshak, Bellanti, & Bierman, 1996; Tucker, Updegraff, McHale, & Crouter, 1999; Wade & Tavris, 1996; Zukow-Goldring, 1995).

Research evidence supports this younger-modeling-older pattern and also suggests that the opposite pattern of older-modeling-younger is less likely to occur (Azmitia & Hesser, 1993; Brody, Stoneman, MacKinnon, & MacKinnon, 1985; Bryant, 1982; Cicirelli, 1975; Tucker et al., 1999). In a study of third, sixth, ninth and twelfth-grade girls and boys, Buhrmester and Furman (1990) administered the Sibling Relationships Questionnaire (SRQ; Furman & Buhrmester, 1985), which measures feelings of status, conflict, and closeness. When these researchers gave the SRQ to 363 children, they found that younger siblings looked up to their older siblings and felt closer to them, whereas the older youth were less likely to report the same sentiments with regard to their younger brothers and sisters. The experimenters offered a possible explanation for this one-way admiration: Older youth try to separate themselves from

their parents and siblings in order to become independent and adult-like, whereas younger siblings yearn to be grown up by mimicking their older brothers' and sisters' behaviors. Other researchers' findings have adduced further support for the position that younger siblings often try to replicate their older siblings' behaviors during social interactions (Cotte & Wood, 2004; Gozali-Lee, 1995; Kitzmann, Cohen, & Lockwood, 2002).

Sibling relationships also provide a network of affiliations in which children can practice their developing social skills (Dunn, 1993; Lockwood et al., 2001). Focusing on second-borns, Ruble and Martin (1998) found that this specific ordinal position would be more apt to learn relationship skills and behaviors through interacting with their older siblings or by observing their older siblings' friendships. More generally, however, most researchers believe that last borns are more socially adept than first borns because they not only have their parents as socialization agents but also are socialized by older siblings who can model more advanced social skills in relationships with peers (Sulloway, 1995, 1996). Reinforcing their influence as models, older brothers and sisters often provide social support for their younger relatives, thereby setting up a dependent relationship of younger children on older siblings, often a stronger dependence than what these youngsters feel toward their parents (Bryant, 1992; Cotte & Wood, 2004).

Gender is another factor that can affect the extent to which younger children learn social skills from their older brothers and sisters. Studying gender-related modeling influences in adolescents, Ruble and Martin (1998) concluded that teens are more apt to model the social skills of same-sex siblings than of opposite-sex siblings. Because same-sex siblings experience more similar events growing up than opposite-sex siblings share, older same-sex siblings often become role models for their younger, same-sex siblings and can also be sources of social support to their younger relatives (Buhrmester, 1992; Cotte & Wood, 2004; Sutton-Smith & Rosenberg, 1970; Tucker, Barber, & Eccles, 1997; Whiteman, McHale, & Crouter, 2007).

1.3 Methodological Considerations

Studying human social behavior can be challenging because the participants often develop hypotheses about what the experimenters are studying and adjust their responses accordingly. Exacerbating this problem, researchers too frequently rely on unimaginative and relatively "transparent" methodologies, such as surveys and self-report questionnaires (Stroup & Hunter, 1965). These data-gathering methods often fail to capture behaviors not apparent to the participants themselves and can compromise accuracy (as in the case of participants' self-reports, which may be inaccurate due to self-presentation bias, experimenter bias, or demand characteristics that might alter the participants' responses) (Ickes, Bissonnette, Garcia, & Stinson, 1990; Snyder & Ickes, 1985).

To counter these biases, some researchers ask participants to perform unrelated tasks in an effort to observe the participants' natural behaviors. However, because these tasks often introduce demand characteristics that can minimize the very individual differences in perception and behavior that are of greatest interest to the researcher, the use of such tasks can actually create more serious problems than the ones they were intended to solve (Snyder & Ickes, 1985).

To address these methodological weaknesses, the present study uses the dyadic interaction paradigm (Ickes, 1982; Ickes et al., 1990; Ickes, Robertson, & Tooke, 1986; Ickes & Turner, 1983). This paradigm enables researchers to record the spontaneous, naturally occurring behaviors that participants display in an unstructured social interaction. In addition, it permits the data to be analyzed at both the individual and dyadic levels. Moreover, because the participants are free to interact as little or as much as they choose without any imposed task requirement, the effects of individual differences on behavior are typically greater than those observed in experimental studies with explicit task constraints (Ickes, 1982; Ickes et al., 1990; Ickes et al., 1986; Ickes & Turner, 1983).

Using the unstructured dyadic interaction paradigm, Ickes and Turner (1983) unobtrusively recorded the initial interactions of 40 pairs of opposite-sex, college-age strangers to determine if having an older sibling affected their opposite-sex, younger siblings' social skills. The experimenters matched first-born participants with opposite-sex, last-born strangers and observed the dyads interacting for six minutes without the subjects realizing they were being recorded. After receiving permission from participants to use the videotape of their interaction for research purposes, the experimenters administered questions about participants' thoughts and feelings during the interaction and later coded their interaction behaviors from the videotapes. The results revealed that last-born participants (all of whom had at least one older, opposite-sex sibling) were better liked and treated more positively by their partners than were the first-born participants (all of whom had at least one younger, opposite-sex sibling). This outcome applied to participants of both genders, but it was most strongly evident for the last-born males. The authors interpreted their findings as evidence that younger siblings who have older, opposite-sex siblings have more and better opportunities to learn how to relate effectively to an opposite-sex peer.

<u>1.4 Behavioral Measures</u>

In the Ickes and Turner (1983) study, three different categories of the participants' social behaviors were recorded: (1) static behaviors, (2) dynamic behaviors, and (3) structural behaviors. Static behaviors include actions that occur only once (e.g., who talks first) or that remain somewhat stable during social interactions (e.g., body posture, body orientation, and interpersonal distance). Dynamic behaviors include the frequency and duration of each dyad member's verbalizations, directed gazes, expressions of positive affect, and expressive gestures. Structural behaviors include the number of conversation sequences, speaking turns, questions, and verbal reinforcements.

The present study addresses an important question that was suggested by, but left unanswered in, the study by Ickes and Turner (1983). Specifically, if people's history of interaction with their older, opposite-sex sibling(s) can enhance their ability to relate effectively to an opposite-sex peer, does their history of interaction with their older, same-sex sibling(s) enhance their ability to relate effectively to a same-sex peer? From the social learning perspective, the answer to this question should be yes. Just as children who have learned to relate to older, opposite-sex siblings can apply the resulting social skills to relate effectively to an opposite-sex stranger (Ickes & Turner, 1983), so should children who have learned how to relate to older, same-sex siblings be able to apply the resulting social skills to relate effectively to a same-sex stranger.

Accordingly, similar to the Ickes and Turner (1983) study, the present study used the unstructured dyadic interaction paradigm to "capture" the participants' spontaneous interaction behaviors. And, like the earlier study, the present study focused solely on first borns and last borns (excluding middle borns) and assessed a very similar set of behavioral measures, comparable to the Ickes and Turner (1983) investigation. Finally, following the unobtrusive videotaping of each of the unstructured interactions, one questionnaire was administered to assess participants' perceptions about their interaction, a second measure that asked the participants to report on various aspects of their relationships with their siblings growing up, and a third measure that asked them to report on their friendships throughout their lives.

1.6 Hypotheses

The present study tested the following four hypotheses.

1.6.1 Hypothesis 1

Based on the Observational Learning Theory of vicarious conditioning, Hypothesis 1 predicts that last-born participants who had opportunities to observe same-sex, older siblings successfully interact with their peers should generally feel more comfortable and relaxed during

the dyadic interaction with same-sex partners than first-born participants. The Observational Learning Theory further predicts that this effect should be greatest for those last-born participants who report having had the most opportunity to observe their sibling interacting with same-sex peers.

Hypothesis 1 also follows from the Trait-based Theory but is based on different reasoning: According to this theory, last-born participants will be more comfortable and relaxed in social settings because, as youngest borns, they learned to use "low-power, low conflict" interpersonal strategies (e.g., charm, cooperation, compromise) to get along with others. Finally, the Family Constellation Theory would predict that FB-LB dyads would be compatible in their interaction more so than the other two dyad compositions. In this case the FB-LB dyad would experience the complementary match of both rank and sex as opposed to the other two dyad compositions (FB-FB and LB-LB).

1.6.2 Hypothesis 2

The Observational Learning Theory predicts that, compared to the first-born participants, the last-born participants should generally display higher levels of the behaviors that are likely to facilitate initial same-sex interactions. Specifically, last borns should be more likely than first borns to speak first, display a more open body orientation, initiate more conversation sequences, ask more questions, and provide more verbal reinforcements. Because the trait-based theory would make similar predictions, a theory-specific interpretation of these effects may be difficult to achieve.

1.6.3 Hypothesis 3

Based on the predictions of the Trait Theory, Hypothesis 3 states that last-born participants who have same-sex older siblings will be better liked by their interaction partners than first-born participants who have same-sex younger siblings. According to the Trait Theory, the last-born participants should have developed more congenial, charming, and nonconfrontive personalities than the first-born participants.

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A similar effect can also be predicted by the Observational Learning Theory. In this case, however, it should be qualified so that it applies primarily to those last-born participants who report having had the most opportunity to observe their older siblings interacting with same-sex peers.

1.6.4 Hypothesis 4

Counter-based to Toman's Constellation Theory, the last hypothesis states that participants who have same-sex complementary-matched friendships will *not* report those relationships as more satisfying and enduring than same-sex friendships with rank and/or sex conflict. The Friendship Matrix (see Appendix D) will be used to test this hypothesis.

CHAPTER 2

METHOD

<u>2.1.Participants</u>

Previous birth order studies have been criticized for not controlling variables such as a family's socioeconomic status (SES), stillbirths and miscarriages, family size, and blended families, and for not providing a clear, operational definition of birth order (Ernst & Angst, 1983; Freese et al., 1999; Sulloway, 1995, 1996). Accordingly, the present study controls for these variables in the following ways: (1) SES was determined by the participants' responses to a post-experiment question about total household income and the amount of education each of their parents received; (2) stillbirths and miscarriages were excluded when listing siblings; (3) family size was set at a maximum of four children; (4) participants who were part of a blended family were excluded if they did not grow up in the same household as their step-siblings; and (5) birth order was operationally defined as the ordinal position of living siblings who reside in the same household during the participants' formative years.

With regard to the selection of participants, we included only those who met the following criteria:

(1) Participants must be eighteen years or older and must be able to sign their own consent form.

(2) Participants must be either first born or last born in a family.

(3) Participants must be in a family with only one to three other siblings. If a participant is last born with three older siblings, the sibling "adjacent" to the participant must be the same sex as the participant.

(4) Participants must have an age gap of no less than two years or no more than five years between themselves and their "adjacent" sibling(s).

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(5) First borns must share their gender with their last-born sibling, and last borns must

      share their gender with their first-born sibling.

(6) Participants must not be adopted and must not be a twin or one of multiple births.

The pretest (see Appendix A) was administered to participants prior to the experiment in pencil and paper format for spring and fall 2005 but in virtual format (on-line) for spring and summer 2006. This test asked information regarding birth order, number of siblings, adjacent siblings, being a twin or adopted, and demographic information such as age, ethnicity, level of family income, and siblings' gender and ages. Based on the aforementioned criteria and participants' responses to the pretest, we chose 64 females and 56 males to populate six dyad conditions (three conditions within each gender): (1) 11 female-female and 9 male-male dyads of a first born paired with a same-sex, first born; (2) 10 female-female and 9 male-male dyads of a first born paired with a same-sex, last born; and (3) 10 female-female and 10 male-male dyads of a last born paired with another same-sex, last born. Within the constraints imposed by the design, participants were randomly assigned to their interaction partners.

2.2 Setting & Materials

The study was conducted in the UTA Social Interaction Lab which consists of an observation room, a control room with adjacent cubicles, and a storage room directly across the hall from the observation room (see Figure 1 for a schematic diagram of the laboratory setting). The observation room contains a couch which hides a transmitting microphone, a coffee table, and a bookcase. In the control room are the video and audio equipment, and adjacent to the control room are two private cubicles. Finally, the storage room, which is across the hall from the observation room, contains a hidden video camera positioned to record the interaction of participants when they are seated on the couch in the observation room. Following each videotaped interaction, the experimenter escorted each of the dyad members to separate cubicles where she or he completed a set of post-interaction measures.
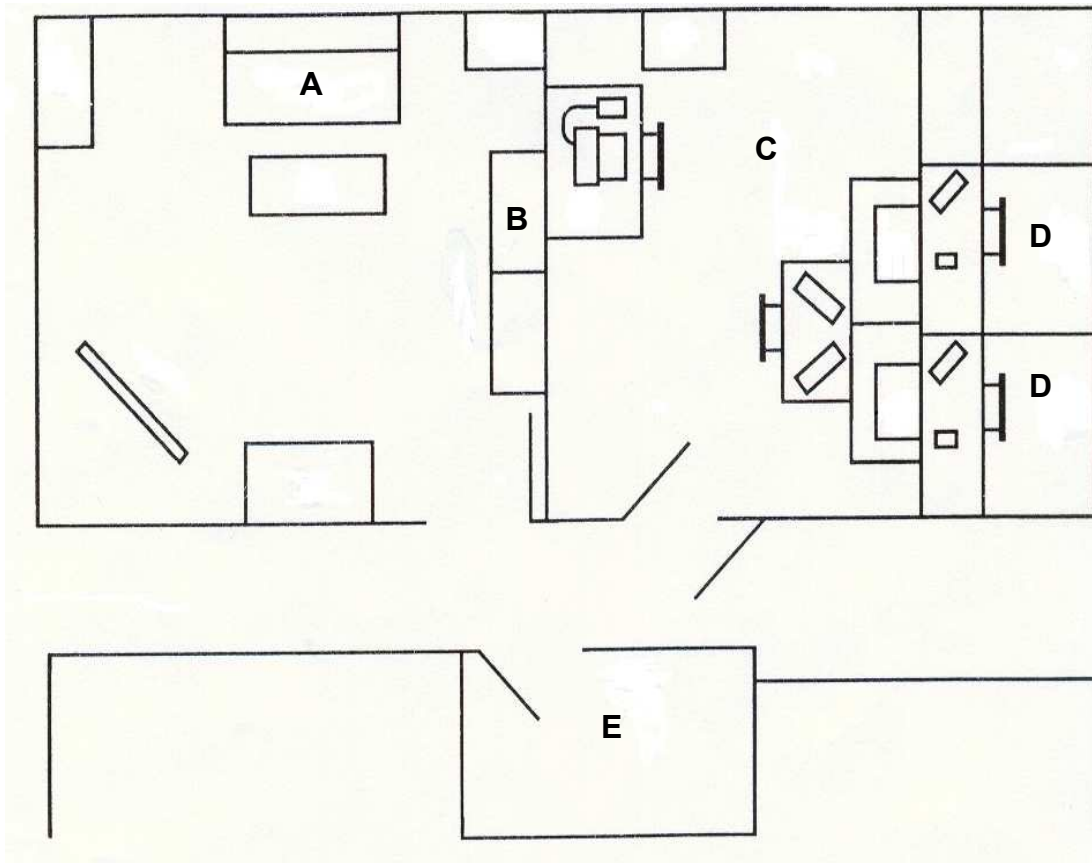
Figure 2.1 Schematic Diagram of the Social Interaction Laboratory: A - Couch with hidden transmitting microphone, B - Bookcase with consent forms, C - Control room with video and audio equipment, D - Private cubicles for post-experiment questionnaires, and E - Storage room with hidden video camera

2.3 Questionnaires

The post-experiment measures included the Perceptions of Interaction measure (see Appendix B) and the Other Interaction Questionnaire (see Appendix C). All items in these surveys used a Likert scale of 1 (*Not at all*) to 7 (*Very much*). Consistent with the goals of the present study, the Perceptions of Interaction measure asked participants about their views of their interaction during the interaction with their partners. Next, the Other Interaction Questionnaire asked participants about their current social contacts and asked participants to characterize their relationship growing up with their first-born or last-born, same-sex sibling.

2.4 Friendship Matrix

Toman's format for measuring compatible relationships is replicated in the Friendship Matrix which asked participants to list their closest friends throughout their lifetimes. Participants were also asked to give the friend's gender and friend's birth order as well as the number of years that they were friends and how enjoyable they felt the friendship was from 1 (*Not enjoy*able) to 7 (V*ery enjoyable*).

2.5 Procedures

To populate the previously described six dyad conditions, a research assistant contacted participants who met the experiment's criteria to solicit their involvement in the present project. When contacting the potential members of each dyad in the study, the research assistant directed the two participants in each session to separate waiting rooms. The intent of this procedure was to ensure that the dyad members would not meet and interact with each other until the experimenter brought them together in the observation room. Prior to meeting the participants in their separate rooms, the experimenter turned on the recording equipment to unobtrusively record the participants' interaction.

Once both participants arrived in their respective waiting rooms, the experimenter met them separately and then escorted each of them to the observation room and asked each to sit on the couch. When retrieving consent forms from a shelf on the bookcase, the experimenter "discovered" that she had only one copy of the consent form left. At that point she told the participants that she needed to make copies of the form and that she would return in a few minutes.

After exactly six minutes had elapsed, the experimenter re-entered the observation room. Then, the experimenter partially debriefed the participants by telling them they had been videotaped and had already taken part in the first phase of the experiment. She then probed the participants to determine if they suspected that their behavior was being recorded during the six minutes they were left alone together. If one or both participants suspected that their behavior

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was being recorded, the experimenter erased that specific dyadic interaction portion of the tape in the presence of the suspecting participant(s).

If the participants appeared to be unaware they were being videotaped, the experimenter informed them that no one had viewed the videotape of their interaction and, if they did not agree to allow their interaction to be used for research purposes, the portion of their interaction on the videotape would be erased immediately. However, if both participants gave permission for their videotape to be used for research purposes, the experimenter provided videotaping consent forms for them to sign. By signing the different parts of this form, each participant gave her or his consent (1) to allow the videotape to be used as a source of data and (2) to participate in the next two phases of the study (described both on the consent form and in oral instructions provided by the experimenter). Once the experimenter obtained the signed consent of both participants, she then escorted them from the observation room and asked them to sit in separate, private cubicles.

Next, the experimenter gave participants two questionnaires: The Perceptions of Interaction measure and The Other Perceptions questionnaire. She assured them that their interaction partner would never see any of their responses to the questionnaire items. The experimenter then went in the control room and turned off the videotape recording. After both participants completed the questionnaires, the experimenter debriefed them regarding the purposes of the study and asked them not to share any information about the experiment with anyone to ensure that future participants would not be biased by a prior knowledge of the study's procedures and purposes.

<u>2.6 Data Coding</u>

2.6.1 Static Behaviors

Two undergraduate judges who were blind to the participants' birth order independently rated static behaviors. The raters' scores were averaged on the individual, not dyadic, level. Also, differences in static behaviors between the first and last 30 sec were calculated to capture individual changes during the six-minute interaction.

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2.6.1.1 Who Spoke First

By independently viewing the video recordings of participants interacting with one another, judges rated who spoke first. Inter-rater reliability indicated high levels of agreement between judges (α = .95).

2.6.1.2 Body Posture

Body posture was defined using one of three descriptors: (1) "closed" referred to arms and/or legs crossed or close to body and received a value of 0, (2) "intermediate" referred to neither open or closed and received a value of 1, or (3) "open" defined as arms and/or legs extended and was given a value of 2. Inter-rater reliability yielded an alpha of 0.61.

2.6.1.3 Body Orientation

Body orientation estimated the degree of participants' facing directly toward or away from their dyadic partners. If participants turned toward their partners, judges rated the degree of this behavior from +4 (directly facing the other) to +1 (slightly turning toward the other). By contrast, if participants turned away from their partners, judges rated the degree of this behavior from -4 (turned completely away) to -1 (slightly turned away. However, if participants faced forward, raters recorded a score of "0." Inter-rater reliability resulted in an alpha of 0.66.

2.6.1.4 Interpersonal Distance

Using a ruler with centimeters and the same TV, two blind independent raters measured literal interpersonal distance defined as the distance between the dyad participants' proximal shoulders during the first and last 30 sec of the interaction. Inter-rater reliability indicated a high reliability value of α = .97.

2.6.2 Dynamic Behaviors

Dynamic behaviors include the frequency and duration of each dyad member's verbalizations, directed gazes, expressions of positive affect, and expressive gestures. Two blind independent undergraduate students rated these behaviors using a behavioral coding box. Raters pressed a button when participants initiated a given behavior (e.g., directing a gaze at their partners) and released the same button when participants ceased that specific behavior

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(e.g., looking away from their partners). These behaviors resulted in the following alpha values: Frequency of head nods (.87), frequency of positive affect (e.g., smiles and laughs) (.91), frequency of directed gazes (.98), duration of directed gazes (.98), frequency of mutual gazes (.95), duration of mutual gazes (.94), mutual gazes initiated defined as looking at their partners in response to their partners' looking at them first (.88), and mutual gazes terminated defined as looking away from their partners' mutual gazes first (.95).

2.6.3 Structural Behaviors

Structural behaviors include the frequency of conversation sequences, speaking turns, questions, and verbal reinforcements. As with the other data coding, two blind independent raters coded these behaviors on the videotapes. Ratings indicated the following alphas: Frequency of speaking turns (.93), duration of speaking turns (.98), frequency of questions (.93), frequency of verbal reinforcements defined as back channel responses, such as "right," "uh huh," "yeah," and others (.83), and frequency of conversation sequences initiated by participants following at least 10 seconds of silence separating the previous conversation (.75).

CHAPTER 3

RESULTS

3.1 APIM Analysis

In dyadic relationships each partner's behavior has the potential to influence the other partner's subsequent behavior. However, some researchers fail to deal appropriately in their data analyses with the resulting interdependence that typically develops during a dyadic exchange. Instead, they attempt to analyze their data using statistical models that assume that the responses of each dyadic partner can be treated as being statistically independent of the responses of the other dyadic partner. As Kenny (1996) and his colleagues have noted, this practice can create a host of problems that can result in inappropriate "findings" and flawed interpretations of them (Campbell & Kashy, 2002; Kashy & Kenny, 2000).

To analyze the data in a way that deals appropriately with dyadic interdependence, the present study used the Actor-Partner Interdependence Model (APIM; Kenny, 1996). This statistical model, a variant of a "mixed" or multi-level analysis-of-variance, estimates three sources of variation in criterion variables in studies of dyadic relationships: (1) the influence of the "actor," the person who initiates the criterion behavior, (2) the influence of the "partner," the person that the actor has interacted with, and (3) the actor X partner interaction, an estimate of residual variance reflecting the actor and partner's unique influence on each other (Campbell & Kashy, 2002).

In other words, the *actor effect* in APIM estimates the degree to which the actor's scores on a specific predictor variable can be used to predict the same actor's scores on the criterion variable (the actor effect). In contrast, the *partner effect* in APIM estimates the degree to which the actor's *partner's* scores on a specific predictor variable can be used to predict the actor's scores on the criterion variable (Campbell & Kashy, 2002). Put simply, "the actor effect captures self influence whereas the partner effect captures partner influence" (Margrett &

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Marsiske, 2002, p. 50). Finally, the *actor X partner interaction effect* estimates the degree to which the two dyad members uniquely influence each other's behavior in ways that are not accounted for by either the actor effect or the partner effect per se. (For more detailed discussions of the APIM analysis and its application to the studies of dyadic interaction, see Campbell & Kashy, 2002.)

3.2 Factor Analyses

As outcome measures in this study, 17 observed behaviors and the participants' answers to the 38 post-interaction survey questions were analyzed. In order to reduce these outcome measures to smaller and more manageable sets, factor analyses with varimax rotation were performed on four different subsets of the data: individual-level behaviors, dyad-level behaviors, responses to the Perceptions of Interactions Questionnaire, and responses to the Other Interactions Questionnaire.

For the individual-level behaviors, two factors were abstracted: *nonverbal involvement* (α = .89) and *verbal involvement* (α = .58). The dyad-level behaviors yielded a *mutual gaze* factor with an alpha of 0.75. From the Perceptions of Interactions Questionnaire, two factors were abstracted: *perceived interaction quality* (α = .63) and *liking for partner* (α = .63).Finally, four factors were abstracted from the Other Interactions Questionnaire: *perceived closeness to sibling* (α = .89), *comfort level in social settings* (α =.89), *degree of reported exposure to sibling's friends* (α = .77), and *degree of reported exposure to sibling's friends outside the home* (α = .84).

The *nonverbal involvement* factor was composed of the following five behaviors with their corresponding alphas noted in parentheses: number of head nods (.75), number of smiles (.74), number of gazes initiated (.88), number of gazes terminated (.87), and number of directed gazes (.88). The *verbal involvement* factor was composed of three variables: duration of gazes (.82) number of speaking turns (.63), and duration of speaking turns (.88) The *mutual gaze* factor included two items: the number of mutual gazes (.96) and the duration of mutual gazes

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(.96). The perceived interaction quality factor included six items on the Perceptions of Interaction Questionnaire, such as "How easy was it to find things that you could talk about with the other person?" and "How comfortable did you feel during the interaction?" See Appendix A. The *liking-for-partner* factor was composed of six items on this same questionnaire, such as, "How much do you like the other person?" and "If you met this person in a social setting, would you choose to spend time with this individual?"

The next four factors were extracted from the Other Interactions Questionnaire. The factor *perceived closeness to sibling* included four items such as, "How much did you share your inner feelings or secrets with your older, same-sex sibling?" and "How would you rate the closeness of your relationship with your older, same-sex sibling?" Four items defined the next factor, *comfort level in social settings*. Examples for this factor are as follows: "How easy was it for you, when you were growing up, to talk with people of your same age in social situations?" and "To what extent, when you were growing up, were you able to form relationships with new people easily?" The *degree of reported exposure to sibling's friends* factor was composed of four items, such as, "Did your older, same-sex sibling have friends who visited your home when you were present?" and "To what degree did you observe your older, same-sex sibling interact with his/her friends?" Finally, the *degree of reported exposure to sibling's friends outside the home* factor included two items: "How often did you socialize outside your home with your older, same-sex sibling and her/his friends?" and "Did your older, same-sex sibling introduce you to her/his friends in social settings outside the home?" See Appendix B.

3.3 Tests of the Research Hypotheses

To test the four research hypotheses appropriately, some tests were conducted at the dyad level only or at the individual level only, whereas others were conducted at both the dyad and individual level by using a multilevel statistical model. Specifically, Hypotheses 1 and 2 were tested at both dyad and individual levels of analysis, first with a between-dyads ANOVA and then with the multi-level Actor-Partner Interdependence Model (APIM). Hypothesis 3, however, was tested only at the individual level using the multi-level APIM model. Finally,

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Hypothesis 4 was analyzed at the individual level using a multiple regression analysis. The results reported below are organized by the hypotheses.

3.3.1 Hypothesis 1

Hypothesis 1 predicted that LB participants who had opportunities to observe same-sex, older siblings successfully interact with their peers should generally feel more comfortable and relaxed during the dyadic interaction with same-sex partners than FB participants. First, to investigate if significant differences existed among the three birth-order compositions (FB-FB, FB-LB, and LB-LB), a between-dyads general linear model was used. The dependent measures were the following three composites: *perceived interaction quality, degree of reported exposure to sibling's friends*, and *degree of reported exposure to sibling's friends outside the home.*

The first dependent (criterion) variable, *perceived interaction quality*, is pertinent to testing Hypothesis 1 because this aggregate measure is composed of items that ask participants how comfortable and relaxed they felt during the interaction, how close they felt to their interaction partner during the interaction, and whether they felt their interaction partner was easy to talk to. This measure can, therefore, be used to test whether the dyad members' birth order and/or their birth-order composition affects perceived interaction quality. The second and third dependent variables, *degree of reported exposure to sibling's friends and degree of reported exposure to sibling's friend outside the home,* are relevant to testing Hypothesis 1 because they help us determine whether LB participants had more opportunities to observe their same-sex siblings successfully interact with their peers than FB participants did.

Results of the between-dyads GLM revealed no significant results for *perceived interaction quality*: birth-order composition, $F (2, 111) = 1.89$, $p < 0.16$, gender, $F (1, 111) = 1.81$, $p < 0.18$, and birth-order composition X gender, $F (2, 111) = 0.62$, $p < 0.54$. Similarly, *degree of reported exposure to sibling's friends* produced no significant effects: birth-order composition, $F (2, 111) = 0.28$, $p < 0.88$, gender, $F (1, 111) = 0.02$, $p < 0.88$, and birth-order composition X gender, $F (2, 111) = 1.74$, $p < 0.18$. Also, *degree of reported exposure to sibling's friends outside the home* did not yield any significant findings for birth-order composition, $F (2,$

111) = 0.80, *p* < 0.45, gender, *F* (1, 111) = 0.02, *p* < 0.89, or birth-order composition X gender, *F* (2, 111) = 0.00, *p* < 0.99.

Next, it was necessary to test this hypothesis at the individual level as well. A multilevel Actor-Partner Interdependence Model (APIM) was used to analyze the following independent variables: actor's birth order, partner's birth order, actor's birth order X partner's birth order, gender, actor's birth order X gender, partner's birth order X gender, and actor's birth order X partner's birth order X gender.

Contrary to Hypothesis 1, however, the results of the APIM analysis revealed no significant effects of *perceived interaction quality*: actor's birth order, *F* (1, 54.7) = 0.10, *p* < 0.75, partner's birth order, *F* (1, 54.7) = 0.10, *p* < 0.02, actor's birth order X partner's birth order, *F* (1, 52.9) = 0.26, *p* < 0.61, gender, *F* (1, 53.7) = 0.00, *p* < 0.98, actor's birth order X gender, *F* (1, 55.6) = 0.08, *p* < 0.78, partner's birth order X gender, *F* (1, 55.3) = 0.05, *p* < 0.78, or actor's birth order X partner's birth order X gender, *F* (1, 53.7) = 0.04, *p* < 0.85. Thus, Hypothesis 1 was not supported at either the individual or dyad level.

3.3.2 Hypothesis 2

Hypothesis 2 predicted that LB participants would generally display higher levels of the behaviors likely to facilitate initial same-sex interactions than FB participants would. A between-dyads general linear model was initially used to test Hypothesis 2 with an APIM analysis later conducted as a follow-up. In this case, the dependent measure was the composite measure of *interactional involvement*, which consists of behaviors such as head nods, smiles, and directed gazes. The results of the dyad-level ANOVA revealed a significant main effect of the birth-order composition of the dyads, *F* (2, 111) = 3.09*, p* < .05.

To identify the mean differences responsible for this effect, means were calculated for each of the three dyad-level birth order compositions: FB-FB (*M* = 234.06, *SD* = 124.64), FB-LB (*M* = 254.68, *SD* = 120.57), and LB-LB (*M* = 188.87, *SD* = 137.99). These results appear to indicate that, consistent with Toman's Constellation Theory, the FB-LB dyads displayed greater interactional involvement than the FB-FB dyads and LB-LB dyads. To see if this were true,

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planned contrasts were calculated to determine if the means of the three dyad types were significantly different from each other on interactional involvement. The results indicated that the FB-LB mean was significantly different from the combined means of the FB-FB and LB-LB dyad compositions, $F(1, 112) = 5.56$, $p < .02$. In other words, the FB-LB dyads displayed significantly more interactional involvement than did their other two dyad types, consistent with the prediction derived from Toman's Constellation Theory.

Because Hypothesis 2 further predicted that LB individuals would generally display more interactional involvement than FB individuals, regardless of dyad type, it was also necessary to test this prediction at the individual level. APIM was therefore used to test the effects on the various behavioral measures of the following independent variables: actor's birth order, $F(1, 53.9) = 1.16$, $p < 0.29$, partner's birth order, $F(1, 53.9) = 1.72$, $p < 0.19$, actor's birth order X partner's birth order, $F(1, 53) = 2.10$, $p < 0.15$, gender, $F(1, 53.4) = 0.01$, $p < 0.93$, actor's birth order X gender, $F(1, 54.4) = 0.16$, $p < 0.69$, partner's birth order X gender, $F(1, 54.3) = 0.05$, $p < 0.82$, and actor's birth order X partner's birth order X gender, $F(1, 53.4) = 0.05$, $p < 0.82$. The final variable, closeness to sibling, was analyzed as a predictor variable to determine if participants' relationships with their siblings would affect their comfort level and ease of interacting with a stranger. However, results were not significant, $F(1, 65.7) = 0.07$, $p < .79$. Thus, birth-order effects were evident for the composite measure of interactional involvement but not for any of the specific interaction behaviors.

3.3.3 Hypothesis 3

Based on the Trait Theory, the third hypothesis predicted that LB participants who have same-sex, older siblings would be better liked by their interaction partners than FB participants who have same-sex, younger siblings. Hypothesis 3 was tested using six post-experiment survey questions such as, "Do you like your partner?" and "Is this partner someone you would like to spend a lot of time hanging out with?" Results from the factorial analysis using varimax rotation revealed that the six questions loaded onto a single common factor: a liking-for-partner

composite. The data for the six items were therefore aggregated to create a liking-for-partner measure.

This liking-for-partner composite was then analyzed using APIM with the following predictor variables: actor's birth order, partner's birth order, actor's birth order X partner's birth order, gender, actor's birth order X gender, partner's birth order X gender, and actor's birth order X partner's birth order X gender. However, the results revealed no significant effects: actor's birth order, $F (1, 56.5) = 0.60$, $p < 0.44$, partner's birth order, $F (1, 56.5) = 0.27$, $p < .60$, actor's birth order X partner's birth order, $F (1, 53) = 0.90$, $p < 0.35$, gender, $F (1, 53) = 0.15$, $p < 0.70$, actor's birth order X gender, $F (1, 56.5) = 0.20$, $p < 0.66$, partner's birth order X gender, $F (1, 56.5) = 0.34$, $p < 0.56$, and actor's birth order X partner's birth order X gender, $F (1, 53) = 0.65$, $p < 0.42$. Thus, the third hypothesis was not supported.

3.3.4 Hypothesis 4

Contrary to the Family Constellation Theory, Hypothesis 4 states that participants who have same-sex, complementary-matched friendships will *not* report those relationships as more satisfying and enduring than same-sex friendships with rank and/or sex conflict, as demonstrated by responses on the Friendship Matrix (see Appendix D). The Friendship Matrix was used which collected data about participants' friendships outside the context of the laboratory by having subjects list their most enjoyable and longest-lasting friendships and the birth orders of their friends in these relationships.

To determine if a relationship existed between the enjoyableness of the friendships and the length of those same friendships, a bivariate regression was performed. The relationship was significant, $F (1, 1075) = 7.34$, $p < .01$. Thus, the more enjoyable the friendship was, the longer it lasted, $B = .082$, $p < .01$. This finding, although not predicted in any of this study's hypotheses, is not surprising due to the fact that one would not normally remain in a friendship if it were not enjoyable to some extent.

Hypothesis 4 was then tested using a weighted least squares regression analysis. With the reported enjoyableness of the friendship as the dependent variable and gender, friend's

gender, self's birth order, and friend's birth order as the independent variables, length of friendship was treated as the covariate. Results indicated that the friend's birth order significantly predicted how enjoyable the friendship was when using the enjoyableness of the friendships as the dependent variable while controlling for the length of the friendship, $F(4, 1053) = 2.89$, $p < .02$, (see Table 3.1).

Table 3.1 Between-subjects Effects of Birth Order on Enjoyableness of Friendship

Measure	Self B.O.	Friend B.O.	Gender	Friend's Gender	Means	*F* values
Birth order of self						.08
Birth order of friend						2.89*
Lasting friendship						9.61**
Gender						.01
Gender of friend						.02
Gender X Gender of friend						.23
Most enjoyable friendships	FB	Other	Female	Female	6.83	
	FB	Other	Female	Male	6.68	
	Middle	Middle	Male	Female	6.53	
	Middle	Other	Male	Male	6.64	

$p \leq .05^*$, $p < .01^{**}$

However, in order for Toman's theory to be supported by participants' responses on the Friendship Matrix, the most enjoyable friendships should be those in which the participant and the participant's friend had complementary matches in both rank and sex (e.g., if the participant was a FB female who had younger sisters and if the friend was a LB female who had older sisters).

To determine if participants' responses supported this prediction, planned contrasts were performed. Results, however, showed inconsistencies. The most enjoyable friendships for same-sex female friends occurred when the participant was FB female and her friend was "other" female (not first, middle, last, or only child but second of four, etc.) ($M = 6.83$, $SD = .63$). The most enjoyable friendships for opposite-sex friendships occurred when the participant was FB female and the friend was "other" male ($M = 6.68$, $SD = .45$). For same-sex male friendships, the most enjoyable friendships occurred when the participant was LB male and the male friend was "other" ($M = 6.64$, $SD = .54$). Finally, for opposite-sex friendships in which the

participant was male and his friend was female, the most enjoyable friendships occurred with participants who were LB males and female middle children as friends (M = 6.53, SD = .84) (see Table 2).

Next, a weighted least squares regression was used to examine length of friendship as the dependent variable and treated self's gender, friend's gender, self's birth order, friend's birth order, and self's gender X friend's gender as the independent variables while holding enjoyableness of the friendships constant. The effect of the covariate, enjoyableness of friendship, was significant, F (1, 1067) = 20.98, p < .001, and gender X friend's gender interaction was also significant, F (1, 1067) = 5.20, p < .02. As was the case with the analysis of the enjoyableness of the friendship, Toman's theory would have been fully supported had the responses on the Friendship Matrix indicated that the longest-lasting friendships were those in which the participant and the participant's friend had complementary rank and sex matches.

In regard to lasting friendships, inconsistent results failed to show any pattern as Toman predicted. Same-sex female friendships lasted the longest when the participant was FB and her friend was a middle child (M = 6.85, SD = 1.21). When the participant was FB female and the friend was FB male, these relationships lasted the longest (M = 5.77, SD = 1.15). However, same-sex male friendships lasted the longest when the participant was LB and the friend was a middle child (M = 6.52, SD = 1.19), similar to same-sex female friendships. Finally, when the participant was a LB male and his friend was also LB, this combination lasted the longest (M = 6.52, SD = 1.08) (see Table 3.2).

Table 3.2 Between-subjects Effects of Birth Order on Length of Friendship

Measure	Self B.O.	Friend B.O.	Gender	Friend's Gender	Means	*F* values
Birth order of self						.27
Birth order of friend						1.94
Lasting friendship						20.98***
Gender						.09
Gender of friend						.70
Gender X Gender of friend						5.18*

Table 3.2 - *Continued*

Measure	Self B.O.	Friend B.O.	Gender	Friend's Gender	Means	*F* values
Longest-lasting friendships	FB	Middle	Female	Female	6.85	
	FB	FB	Female	Male	5.77	
	Middle	LB	Male	Female	6.52	
	Middle	Middle	Male	Male	7.43	

p ≤ .05*, *p* < .01**, *p* < .001***

      In summary, these results of enjoyableness of friendship and length of friendship do not fit a regular pattern, nor do they consistently support Toman's theory which states that adults have the most satisfying and enjoyable relationships with those individuals who replicate their earlier sibling relationships in both sex and birth order. Thus, Hypothesis 4 was supported.

CHAPTER 4

OTHER RESULTS

4.1 Gender Effects

Although not specified in any of the hypotheses investigated in this study, gender effects were found to be significant in several areas. The aggregate composite *interactional involvement* revealed a significant effect of gender composition, $F (1, 112) = 40.57, p < 0.0001$. Follow-up *t*-tests indicated that females ($M = 287.92$, $SD = 106.53$) were significantly more involved in their interactions with same-sex partners than males were ($M = 156.15$, $SD = 118.49$). Of possible relevance for Toman's theory, the subject's gender and the friend's gender interacted to predict how long the friendship lasted, $F (1) = 5.20, p < .02$. However, as noted above, no clear gender patterns emerged that would confirm Toman's theory.

When the gender composition effect was examined by the specific behaviors that defined the overall significant *individual-level nonverbal involvement* factor, results indicated that the female dyads had higher means than the male dyads on all of the following behaviors: number of head nods, smiles, gazes initiated, gazes terminated, and directed gazes; however, none of these individual behaviors were significant (see Table 4.1).

Table 4.1. Effects of the Dyads' Gender on Individual- and Dyad-level Measures

Measure	Females	Males	*F* values
Number of head nods	13.58	5.80	1.15
Number of smiles	15.64	8.15	2.96
Number of gazes initiated	13.31	6.14	0.75
Number of gazes terminated	13.05	5.85	1.14
Number of directed gazes	31.11	20.07	1.11
Duration of gazes	134.22	54.06	48.62****
Number of speaking turns	33.81	25.19	0.85
Duration of speaking turns	119.64	76.67	0.81
Who spoke first	0.50	0.43	0.05
Number of conversation sequences	0.52	0.70	0.05
Number of verbal reinforcements	11.17	7.75	4.66*
Number of questions	6.21	5.70	0.90
Number of mutual gazes	28.67	13.54	36.53****

Table 4.1 – *Continued*

Measure	Females	Males	*F* values
Duration of mutual gazes	59.67	17.45	48.62****
Body posture	0.23	0.96	68.67****
Change in body posture	0.34	1.13	59.50****
Body orientation	0.05	0.11	2.19
Change in body orientation	0.10	0.23	2.67
Interpersonal distance	7.79	10.08	40.57****
Individual non-verbal involvement	87.15	46.32	34.61****
Dyad non-verbal involvement	88.61	31.18	48.57****
Interactional involvement	287.92	156.15	40.57****
Perceived interaction quality	28.50	27.02	1.74
Degree of reported exposure to sibling's friends	21.19	20.88	0.13
Degree of reported exposure to sibling's friends outside the home	8.98	8.57	0.45
Perceived closeness to sibling	18.56	17.13	1.43
Comfort level in social settings	19.13	19.46	0.10
Liking for partner	28.37	26.18	3.75*

$p \leq .05^*, p < .01^{**}, p < .001^{***}, p < .0001^{****}$

The gender composition effect for the *dyad-level nonverbal factor* was significant as a composite, $F (1, 112) = 48.57$, $p < .0001$, but not significant in regard to the specific behaviors comprising the composite (mutual gazes and duration of mutual gazes). These results are not unexpected in that previous research has shown that female dyads typically display greater nonverbal involvement, (e.g., more head nods, more smiling, more gazing) than males do (Matlin, 2000; Yee, Bailenson, & Urbanek, 2007; see also Ickes, Schermer, & Steeno, 1979).

Also not unanticipated is evidence that the males had more "open" body postures (*M* = 0.96, *SD* = 0.58) compared to the females (*M* = 0.23, *SD* = 0.47) and that the male partners maintained more interpersonal distance (*M* = 10.12, *SD* = 2.27) than the female partners did (*M* = 7.81, *SD* = 1.98). Again, these results replicate findings that previous research has already revealed: Males tend to take up more body space than females in social settings, e.g., spreading their arms across a couch or chair and/or widening their legs when they sit or stand (Crawford & Unger, 2000; Lips, 2001; Yoder, 2003). In addition, females tend to sit and stand closer to one another across social contexts than males do (Gifford, 1997; Yee et al., 2007).

Participants were asked demographic questions on the pretest and three components of the data were used to compile a socio-economic status (SES) composite. This SES composite was computed by adding the dummy variables corresponding to the following: (1) the participant's mother's educational level, (2) the father's educational level, and (3) the income level of the family. However, this SES composite measure was found to be uncorrelated with the independent variables of actor's birth-order, $B = -0.02$, $p < .84$, and actor's gender, $B = -0.12$, $p < .32$. Similarly, the SES composite measure was not significantly correlated with the composite dependent measures of *interactional involvement*, $B = -.25$, $p < .21$, *individual-level nonverbal behaviors*, $B = 0.04$, $p < .81$, *dyad-level nonverbal behaviors*, $B = 0.14$, $p < .48$, *perceived interaction quality*, $B = -0.04$, $p < .69$, *liking for partner*, $B = 0.09$, $p < .56$, *degree of reported exposure to sibling's friends*, $B = 0.09$, $p < .51$, *degree of reported exposure to sibling's friends outside the home*, $B = 0.07$, $p < .60$, *comfort level in social settings*, $B = 0.05$, $p < .68$, and *closeness to sibling*, $B = -0.14$, $p < .28$.

CHAPTER 5

DISCUSSION

5.1 Birth-order Effects

Using both individual- and dyad-level analyses, the present study investigated the effects of birth order on the initial, same-sex interactions of young adults. The first hypothesis, derived from the Observational Learning Theory, the Trait Theory, and the Family Constellation Theory, predicted that LB participants would feel more comfortable and relaxed during their initial interaction with a same-sex partner than would FB participants. This hypothesis was tested at the dyad and individual levels.

First, to investigate if significant differences existed among the three birth-order compositions (FB-FB, FB-LB, and LB-LB), a between-dyads general linear model was used. The dependent measures were three composites: *perceived interaction quality*, *degree of reported exposure to sibling's friends,* and *degree of reported exposure to sibling's friends outside the home.* However, the GLM yielded no significant results in support of the first hypothesis (see Table 5.1).

Table 5.1. Effects of Birth Order on Individual- and Dyad-level Measures

Measure	FB-FB Means	FB-LB Means	LB-LB Means	*F* values
Number of head nods	10.79	11.68	7.29	1.15
Number of smiles	10.95	14.83	10.61	2.96
Number of gazes initiated	11.40	11.32	7.09	0.75
Number of gazes terminated	10.39	10.95	7.63	1.14
Number of directed gazes	27.79	29.30	20.70	1.11
Duration of gazes	101.55	110.47	77.22	1.12
Number of speaking turns	27.53	32.64	29.14	0.85
Duration of speaking turns	104.75	111.34	82.25	0.81
Who spoke first	0.48	0.50	0.43	0.05
Number of conversation sequences	0.75	0.59	0.48	0.05
Number of verbal reinforcements	9.29	11.78	7.69	4.66*
Number of questions	5.38	6.76	5.80	0.90
Number of mutual gazes	22.89	25.24	16.53	3.89*
Duration of mutual gazes	39.66	48.22	31.46	2.14

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Table 5.1 – *Continued*

Measure	FB-FB Means	FB-LB Means	LB-LB Means	*F* values
Body posture	0.63	0.53	0.59	0.35
Change in body posture	0.73	0.70	0.71	0.35
Body orientation	0.04	0.07	0.13	0.11
Change in body orientation	0.16	0.16	0.16	0.03
Interpersonal distance	8.99	8.61	9.00	0.41
Individual non-verbal involvement	71.73	78.39	53.74	4.13*
Dyad non-verbal involvement	62.73	73.76	48.20	2.76
Interactional involvement	376.97	417.76	297.60	4.02*
Perceived interaction quality	28.35	28.74	26.35	1.94
Degree of reported exposure to sibling's friends	21.23	21.03	20.88	0.09
Degree of reported exposure to sibling's friends outside home	8.93	9.03	8.43	0.41
Perceived closeness to sibling	17.53	17.82	18.30	0.19
Comfort level in social settings	19.58	18.66	19.60	0.30
Liking for partner	27.83	28.42	25.80	2.14

$p \leq .05*$

Derived from the Observational Learning Theory and the Trait Theory, Hypothesis 2 predicted that LB participants would generally display higher levels of the behaviors likely to facilitate initial same-sex interactions than FB participants would. Toman's Constellation Theory, however, predicted these same behaviors would occur but for a different reason: Participants with dyadic partners who are a complementary match in rank to their birth order (FB/LB) would perceive greater quality of interactional involvement with their partners than participants paired with partners not a complementary match (FB-FB, LB-LB). Results of the ANOVA revealed a significant main effect of the birth-order composition of the dyads.

The means accountable for the birth-order effect were calculated for all three of the dyad-level birth-order compositions: FB-FB, FB-LB, and LB-LB. Results of the initial mean differences indicated that FB-LB dyads displayed greater interactional involvement than the other two types of dyads. Next, planned contrasts were performed to ascertain whether the three dyad types' means were significantly different from one other on interactional involvement. Results of the planned contrasts demonstrated that the FB-LB dyads displayed significantly more interactional involvement than the FB-FB dyad and the LB-LB dyad. Hence, these results

support Toman's Constellation Theory that FB-LB dyads who were complementary matches in rank would have greater interactional involvement than dyads not matched on rank (FB-FB and LB-LB).

Hypothesis 2 also specified that LB individuals, regardless of dyad type, would generally display more interactional involvement than FB individuals. However, no significant effects were found for any of the specific interaction behaviors.

The findings relevant to Hypothesis 2, therefore, indicate that the Constellation Theory was the only one that received any support of the three theories predicting birth order effects on the initial same-sex, dyadic interactions of two strangers. And this support was found only at the dyad level and only for the global measure of interactional involvement. It was not found at the individual level or for any of the individual behavioral measures. This pattern of results suggests that there is a birth-order composition effect that emerges despite the lack of individual differences based on birth order. The resulting pattern also suggests that the birth-order composition effect is a relatively subtle one that is evident only in an aggregated measure of interaction involvement and not in any particular behavioral component of this aggregated measure. Thus, the fact that FB's were significantly more involved with LB's during their dyad interactions compared to the other two dyadic conditions lends limited support for dyad-level influences.

The third hypothesis, derived from the Trait Theory, predicted that LB participants who have same-sex, older siblings would be better liked by their interaction partners than FB participants who have same-sex, younger siblings. However, Hypothesis 3 was not supported because LB participants who had same-sex, older siblings were not better liked by their dyadic partners than FB participants who had same-sex, younger siblings. Therefore, these findings do not indicate that participants showed preferential liking for any specific birth order, contrary to the Trait Theory's prediction.

Finally, the fourth hypothesis predicted that the Family Constellation Theory would *not* be supported in its prediction that as adults, people who choose spouses and/or friends that are complementary to their own early sibling relationships in terms of sex and seniority/juniority enjoy more satisfying and enduring relationships. Results showed that enjoyableness of friendship and length of friendship were significantly related, which is not surprising in that individuals tend to remain in friendships that they enjoy and are more likely to end friendships that are not pleasing to them. Further results indicated that the birth order of the participant's friend significantly predicted how enjoyable the friendship was when length of friendship was controlled. However, in order for Toman's theory to be supported, the most enjoyable friendships would be those in which the participant and the participant's friend had complementary matches in both rank and sex (e.g., if the participant was a FB male who had younger brothers and if the friend was a LB male who had older brothers).

Results of the planned contrasts also yielded inconsistent findings. Although the birth order of the friend predicted the enjoyableness of the friendship, complementary matches of rank and sex within the dyads were not significant predictors of enjoyableness, as Toman predicted they should be.

Analyzing enjoyableness as a covariate with length of friendship as the dependent variable resulted in a significant effect for the enjoyableness of the friendship and a significant gender X friend's gender interaction effect. However, neither self's gender nor self's birth order was significantly correlated with the length of the friendship, contrary to Toman's prediction.

Again, planned contrasts showed no clear pattern was evident. Similar to enjoyable friendships, complementary matches of sex and gender were not found in long-lasting friendships, as Toman predicted they would be. Thus, results provide support for the final hypothesis which states that the responses on the Friendship Matrix would *not* support the Family Constellation Theory.

In regard to this study's overall findings, the subtle and inconsistent effects that were found for the participants' birth order may suggest that birth-order influence might not be as central and pervasive as some have proposed (Sulloway, 1995, 1996). Unlike many other birth-order studies, the present investigation controlled for variables not previously held constant (e.g., sibship spacing, family size, and siblings' gender). Controlling for these potential confounds may have attenuated, or in some cases eliminated, birth-order effects while actually providing a more accurate view of birth-order influences than that available in other studies.

Before we can draw that conclusion, however, it is important to consider an alternative possibility. Specifically, the lack of consistent results for birth order in the present study may indicate that birth-order effects are salient in some situations but not in others. For example, birth order differences may surface more frequently when children congregate with their parents and other siblings in family gatherings. The interaction of the family environment and birth order may cause effects to become more apparent, such as FB's assuming their role as sibling leaders and LB's acting in charming and/or disruptive ways. Consequently, the family setting may evoke birth order effects that might otherwise go unnoticed in other contexts. Moreover, other situations such as political, economical, or religious upheaval may provoke LB's to act as change agents by inspiring others to alter the status quo (Sulloway, 1995, 1996). Thus, the present study may not have tapped into the situations most likely to evoke relatively strong and consistent birth-order effects. However, all three theories that were investigated predicted that birth-order effects would occur outside the familial context.

5.2 Strengths of the Study

Notably, the present research controlled for sibling configuration (i.e., sibship spacing, family size, and sibling's gender) to investigate birth order, variables which earlier studies have, for the most part, not controlled. Moreover, this study used more comprehensive methods of investigating social behaviors by including both self reports and the unobtrusive behavioral measures collected in the context of the unstructured dyadic interaction paradigm. Using

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unobtrusive behavioral measures within the unstructured dyadic interaction paradigm can improve accuracy (because self-reports are more likely to evoke self-presentation bias or demand characteristics), can allow researchers to capture behaviors which participants may be oblivious to, and can encourage participants to behave naturally and spontaneously while in a lab setting (Ickes et al., 1990; Snyder & Ickes, 1985). With regard to the data analyses, this paradigm allowed data to be investigated at both the individual and the dyadic levels, a necessity in taking proper account of the behavioral, cognitive, and emotional interdependence that characterizes dyadic interactions (Ickes, 1982; Ickes et al., 1990; Ickes et al., 1986; Ickes & Turner, 1983).

Another strength of the present study is that APIM was used to analyze data in order to appropriately analyze the interdependence of the two dyadic partners. Other birth-order researchers have analyzed dyadic partners' data separately, treating each dyadic partner's data as independent of her or his dyadic partner's data. This assumption of independence of responses is unwarranted, however, and can lead to incorrect inferences being drawn (Campbell & Kashy, 2002; Kashy & Kenny, 2000).

This study also further contributes to birth-order literature by extending the Ickes and Turner (1983) birth-order study. In this earlier investigation, researchers investigated birth-order effects in opposite-sex dyads whereas the present study explored birth-order effects in same-sex dyads and found partial support for Toman's theory.

<u>5.3 Limitations of the Study</u>

Confining responses on post-experiment questionnaires only to participants is a limitation of the present study. Perhaps collecting data from close friends and parents might have provided a more complete picture of birth-order effects, especially if these effects are subtle. In addition, only first and last borns were investigated in this study, limiting external validity. Finally, due to the fact that this study investigated primarily college-aged students, generalization of these results is limited to similar populations only.

5.4 Directions for Future Research

Certainly the need is clear for longitudinal birth-order studies to explore the long-term effects of birth order on social relationships, not only for college-aged students but also for younger populations and for opposite-sex samples using adequate controls (Stewart, Stewart, & Campbell, 2001). Moreover, studies investigating existing adult relationships among colleagues and co-workers may uncover additional patterns of social behaviors and attitudes reflecting birth order effects. Also, including data from parents and peers and their influence on participants' social skills would provide a broader perspective on birth-order effects (Saroglou & Fiasse, 2003).

5.5 Conclusion

Competition, love, conflict, and support all describe most sibling relationships. However, as complex and affectively ambivalent as these affiliations can be, children often develop stronger bonds with their brothers and sisters than with their parents (Larson & Richards, 1994; Kowalski & Westen, 2005; McHale & Crouter, 1996). In fact, Cicirelli (1995) has argued that older siblings often influence the development of their younger siblings' beliefs, values, perspectives, and decision making. Essman (1977) further demonstrated that older siblings' social modeling can affect their younger siblings' school and career choices.

Older siblings can also be socialization agents for their younger sisters and brothers by modeling how to interact successfully with peers (Lockwood et al., 2001; Whiteman et al., 2007). Because researchers have linked unsuccessful childhood peer relationships with negative behaviors such as quitting school, delinquency and aggression, smoking, alcohol and drug abuse, development of mental health problems, and involvement in criminal activities (Ary, Tildesley, Hops, & Andrews, 1993; Bank, Patterson, & Reid, 1996; Bard & Rodgers, 2003; Dunn, 2000; Slomkowski, Rende, Novak, Lloyd-Richardson, & Niaura, 2005), early sibling affiliations can be critical to children establishing positive peer relationships (Dunn & McGuire, 1992; McHale, Updegraff, Helms-Erikson, & Crouter, 2001; Nelson et al., 2008; Stocker &

Dunn, 1990; Thompson, 1998; Tucker et al., 1999; Whiteman et al., 2007; Yeh & Lempers, 2004). Thus, the more professionals can understand how sibling relationships affect children's later emotional attachments, the more effective they will be in equipping young people with social skills to deal with others constructively (Lockwood et al., 2001; Stormshak et al., 1996).

Studying sibling relationships is important not only for understanding how children develop socially but also for understanding how they develop intellectually. Specifically, older sibling's connections can help their younger siblings learn how to be considerate of other people's points of view (Brody, 1998; Brown & Dunn, 1992; Dunn, Brown, & Beardsall, 1991; Howe, 1991; Youngblade & Dunn, 1995). In addition, older siblings can expand their younger relatives' mental faculties and influence their regulation of emotions, their self-concepts, and their communication skills, all of which shape later interactions with authority figures, coworkers, colleagues, and spouses (Anderson, Sabatelli, & Kosutic, 2007; Brody & Murry, 2001; Tucker et al., 1999; Weisner, 1989; Whiteman et al., 2007; Zukow-Goldring, 1995). Thus, understanding how older children can influence their younger siblings' social interactions is a critical component of research on children's social-cognitive development (Azmitia & Hesser, 1993; Dunn, 1993; Garber & Dodge, 1991; Stormshak et al., 1996; Whiteman et al., 2007).

APPENDIX A

PRETEST QUESTIONS

Pretest Questions

1. What is your gender?
    a. female
    b. male

2. How old are you?
    a. under 18 years old
    b. 18-21
    c. 22-29
    d. 30-39
    e. 40 or above

3. What is your ethnicity? Please select *only one*:
    a. African-American
    b. Asian
    c. Caucasian
    d. Hispanic
    e. Other

4. Please select the income category that best describes your total household income over the past year. If you are unsure, please indicate your best guess:
    a. less than $10,000
    b. $10,000 - $39,999
    c. $40,000 - $69,999
    d. $70,000 - $99,999
    e. $100,000 or above

5. Please indicate the highest level of education your father completed:
    a. high school diploma or GED
    b. tech school/2-year college cert.
    c. four-year college degree
    d. master's or doctorate degree

6. Please indicate the highest level of education your mother completed:
    a. high school diploma or GED
    b. tech school/2-year college cert.
    c. four-year college degree
    d. master's or doctorate degree

7. Are you a twin?
    a. yes   b. no

8. Are you adopted?
    a. yes   b. no

9. Were you the first child born in your family?
    a. yes   b. no

10. Were you the last child born in your family?
    a. yes   b. no

11. Are you a middle child?
    a. yes   b. no

12. How many sisters do you have?
    a. none
    b. one
    c. two
    d. three
    e. more than three

13. Did you grow up in the same household as your sister(s)?
    a. yes
    b. no

14. Do you have a sister who is your "adjacent" sibling (no other brothers or sisters were born in between you and your sister)?
    a. yes
    b. no

15. If you answered "Yes" to Question 14, are there more than 5 years' age difference between you and your adjacent sister?
    a. yes
    b. no

16. How many brothers do you have?
    a. none
    b. one
    c. two
    d. three
    e. more than three

17. Did you grow up in the same household as your brother(s)?
    a. yes
    b. no

18. Do you have a brother who is your "adjacent" sibling (no other brothers or sisters were born in between you and your brother)?
    a. yes
    b. no

19. If you answered "Yes" to Question 18, are there more than 5 years' age difference between you and your adjacent brother?
    a. yes
    b. no

APPENDIX B

PERCEPTIONS OF INTERACTION QUESTIONNAIRE

Perceptions of Interaction

In the following questions, please reflect on how you felt during the interaction between you and the other participant over the five-minute period you waited together. Try to answer each question as honestly as possible. Your answers will *not* be shown to the other participant and will be used for statistical purposes only.

1. To what degree did the interaction feel familiar and relaxed to you?
    Not at all   Very much
        1   2   3   4   5   6   7

2. How easy was it for you to find things that you could talk about with the other person?
    Not at all   Very easy
        1   2   3   4   5   6   7

3. To what extent did you find the other person's behavior unpredictable?
    Not at all   Very unpredictable
        1   2   3   4   5   6   7

4. To what extent did you find the other person's thoughts and feelings difficult to "read"?
    Not at all   Very difficult
        1   2   3   4   5   6   7

5. How comfortable did you feel during the interaction?
    Not at all   Very comfortable
        1   2   3   4   5   6   7

6. How comfortable do you think the other person felt during the interaction?
    Not at all   Very comfortable
        1   2   3   4   5   6   7

7. Is the other person someone that you would like to spend a lot of time hanging out with?
    No, not at all   Yes, definitely
        1   2   3   4   5   6   7

8. How much do you like the other person?
    Not at all   Very much
        1   2   3   4   5   6   7

9. How much do you think the other person likes you?
    Not at all   Very much
        1   2   3   4   5   6   7

10. How difficult was it for you to find things that you could talk about with the other person?
    Not at all   Very much
        1   2   3   4   5   6   7

11. To what degree did you pay attention to the other person during the interaction?
    Not at all   Very much
        1   2   3   4   5   6   7

12. How anxious did you feel during the interaction?

    Not at all   Very much

      1   2   3   4   5   6   7

13. To what degree did you feel close to the other person during the interaction?

    Not at all   Very much

      1   2   3   4   5   6   7

14. How much of an active part did you take in conversations with this person?

    Not at all   Very much

      1   2   3   4   5   6   7

15. If you met this person in a social setting, would you choose to spend time with this individual?

    Not at all   Very much

      1   2   3   4   5   6   7

16. How similar is this individual's personality to your closest friends' personalities?

    Not at all   Very much

      1   2   3   4   5   6   7

17. Would you invite this person to a party or social event you were having?

    Not at all   Very much

      1   2   3   4   5   6   7

18. How old do you think the other person is?   _____ years old

APPENDIX C

OTHER INTERACTIONS QUESTIONNAIRE

Other Interactions Questionnaire

If you are the first-born child in your family, please proceed to Question # 21.

If you are _not_ the first-born child in your family, please answer the following questions regarding your relationship growing up with your first-born sibling (brother/sister) who shares your gender (same sex):

1. How much did your older, same-sex sibling give you advice about your interactions with peers?
    Not at all   Every opportunity
      1   2   3   4   5   6   7

2. How much did you share your inner feelings or secrets with your older, same-sex sibling?
    Not at all   Every opportunity
      1   2   3   4   5   6   7

3. How much did you discuss important personal decisions with your older, same-sex sibling?
    Not at all   Every opportunity
      1   2   3   4   5   6   7

4. How would you rate the closeness of your relationship with your older, same-sex sibling?
    Not close   Very close
      1   2   3   4   5   6   7

5. How much did you and your older, same-sex sibling fight and argue with each other?
    Not at all   Every opportunity
      1   2   3   4   5   6   7

6. Did your older, same-sex sibling have friends who visited your home when you were present?

Not at all	Once or twice	Infrequently	Occasionally	Frequently	Once a week	More than once a week
1	2	3	4	5	6	7

7. To what degree did you observe your older, same-sex sibling interact with his/her friends?
    Did not observe this much   Observed this a lot
      1   2   3   4   5   6   7

8. How often did you socialize in your home with your older, same-sex sibling and her/his friends?

Not at all	Once or twice	Infrequently	Occasionally	Frequently	Once a week	More than once a week
1	2	3	4	5	6	7

9. How likely were you to use your parents as role models for how to behave socially?
    Not at all   Very likely
      1   2   3   4   5   6   7

10. How often did you socialize *outside* your home with your older, same-sex sibling and his/her friends?

Not at all	Once or twice	Infrequently	Occasionally	Frequently	Once a week	More than once a week
1	2	3	4	5	6	7

11. Did your older, same-sex sibling introduce you to her/his friends in social settings *outside* the home?

Not at all						Every opportunity
1	2	3	4	5	6	7

12. In your opinion, how easily and successfully did your older, same-sex sibling interact with his/her friends?

Not at all						Every opportunity
1	2	3	4	5	6	7

13. How easy was it for you, when you were growing up, to talk with people of your same age in social situations?

Not at all						Very easy
1	2	3	4	5	6	7

14. To what extent, when you were growing up, were you able to form relationships with new people easily?

Not at all						Very easily
1	2	3	4	5	6	7

15. How likely were you to use your close friends as role models for how to behave socially?

Not at all						Very likely
1	2	3	4	5	6	7

16. When you were growing up, how much free time did you spend actively socializing with groups of people, attending parties, shopping, getting involved in group activities, etc.?

Not at all						Every opportunity
1	2	3	4	5	6	7

17. How often did you interact with your older, same-sex sibling in ways that made you act more mature or socially advanced for your age?

Not at all						Very often
1	2	3	4	5	6	7

18. Growing up, how uncomfortable did you feel meeting new people or talking to strangers?

Not at all						Very much
1	2	3	4	5	6	7

19. When you started a new school or were in a new setting growing up, did you quickly become involved in social life?

Not at all						Very much
1	2	3	4	5	6	7

20. Did you prefer to have only one or two very close friends growing up rather than a large circle of friends?

    Not at all   Very much

       1   2   3   4   5   6   7

If you are _not_ the first-born child, please turn to the LAST page of this survey and complete the form, "Friendship Matrix."

If you are the first-born child in your family, please answer the following questions regarding your relationship growing up with your youngest-born sibling (brother/sister) who shares your gender (same sex):

21. How much did your younger, same-sex sibling give you advice about your interactions with peers?

    Not at all   Every opportunity

       1   2   3   4   5   6   7

22. How much did you share your inner feelings or secrets with your younger, same-sex sibling?

    Not at all   Every opportunity

       1   2   3   4   5   6   7

23. How much did you discuss important personal decisions with your younger, same-sex sibling?

    Not at all   Every opportunity

       1   2   3   4   5   6   7

24. How would you rate the closeness of your relationship with your younger, same-sex sibling?

    Not close   Very close

       1   2   3   4   5   6   7

25. How much did you and your younger, same-sex sibling fight and argue with each other?

    Not at all   Every opportunity

       1   2   3   4   5   6   7

26. Did your younger, same-sex sibling have friends who visited your home when you were present?

Not at all	Once or twice	Infrequently	Occasionally	Frequently	Once a week	More than once a week
1	2	3	4	5	6	7

27. To what degree did you observe your younger, same-sex sibling interact with his/her friends?

    Not at all   Every opportunity

       1   2   3   4   5   6   7

28. How often did you socialize in your home with your younger, same-sex sibling and her/his friends?

Not at all	Once or twice	Infrequently	Occasionally	Frequently	Once a week	More than once a week
1	2	3	4	5	6	7

29. How likely were you to use your parents as role models for how to behave socially?

Not at all						Very likely
1	2	3	4	5	6	7

30. How often did you socialize *outside* your home with your younger, same-sex sibling and his/her friends?

Not at all	Once or twice	Infrequently	Occasionally	Frequently	Once a week	More than once a week
1	2	3	4	5	6	7

31. Did your younger, same-sex sibling introduce you to her/his friends in social settings *outside* the home?

Not at all						Every opportunity
1	2	3	4	5	6	7

32. In your opinion, how easily and successfully did your younger, same-sex sibling interact with his/her friends?

Not at all						Every opportunity
1	2	3	4	5	6	7

33. How easy was it for you, when you were growing up, to talk with people of your same age in social situations?

Not at all						Very easy
1	2	3	4	5	6	7

34. To what extent, when you were growing up, were you able to form relationships with new people easily?

Not at all						Very easily
1	2	3	4	5	6	7

35. How likely were you to use your close friends as role models for how to behave socially?

Not at all						Very likely
1	2	3	4	5	6	7

36. When you were growing up, how much free time did you spend actively socializing with groups of people, attending parties, shopping, getting involved in group activities, etc.?

Not at all						Every opportunity
1	2	3	4	5	6	7

37. How often did you interact with your younger, same-sex sibling in ways that made you act more mature or socially advanced for your age?

    Not at all   Very often

      1   2   3   4   5   6   7

38. Growing up, how uncomfortable did you feel meeting new people or talking to strangers?

    Not at all   Very much

      1   2   3   4   5   6   7

39. When you started a new school or were in a new setting growing up, did you quickly become involved in social life?

    Not at all   Very much

      1   2   3   4   5   6   7

40. Did you prefer to have only one or two very close friends growing up rather than a large circle of friends?

    Not at all   Very much

      1   2   3   4   5   6   7

APPENDIX D

FRIENDSHIP MATRIX

Friendship Matrix

Please fill out information on your *closest friends* throughout your lifetime. Feel free to use additional space, if needed.

Friend's First Name	Friend's Gender (Male/Female)	Friend's Birth Order (Oldest child, Middle child, Youngest child, Only child)	How long have you been/were you friends?(# of years)	How enjoyable is/was the friendship to you? (1 – Not enjoyable to 7 – Very enjoyable)

Feel free to use additional space, if needed.

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BIOGRAPHICAL INFORMATION

Colette Jacquot earned a Bachelor of Science degree in English Education from Baptist University of America (BUA) in 1981. After teaching English for four years at BUA, Ms. Jacquot earned her Master of Science degree in Personnel Services from Bob Jones University in 1987. She then taught a year of high school English and a year of fifth grade in Georgia. Leaving academia, she worked in the corporate world for over ten years before returning to college to study psychology. In 2004 Ms. Jacquot earned her second Bachelor of Science degree in psychology from Kennesaw State University. She then began working on her doctorate degree in Experimental Social Psychology at the University of Texas at Arlington in 2004 and is now a fourth-year graduate student.

In regard to projects she has worked on, in 2004 Ms. Jacquot researched the relationship of female shame to sexism, religious fundamentalism, age, and regionalism with Dr. Amy Buddie at Kennesaw State University. Then in 2006 Ms. Jacquot wrote a book chapter on gender and cultural differences in regard to monogamy and then she and a colleague wrote another chapter describing gender and cultural differences regarding depression. The following year Ms. Jacquot worked with three other researchers to study the effects of having agreeable friends in relation to social and emotional adjustment. In the summer of 2007, she and three of her colleagues investigated the profile of maritally aggressive men and found distinct characteristics of abusive adult males. Ms. Jacquot's career interests center on gender and cultural diversity, women's studies, stereotypes, prejudices, and discrimination. She is also interested in clinical depression and other mental disorders.