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SIBLINGS INFLUENCE ON YOUNG ADULTS' DEVELOPMENT: A  
THREE-STUDY DISSERTATION

by

Jenna C. Dayley

A dissertation submitted in partial fulfillment  
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Human Development and Family Studies

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UTAH STATE UNIVERSITY  
Logan, UT

2022

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## ABSTRACT

Siblings Influence on Young Adults' Development: A Three-Study Dissertation

by

Jenna C. Dayley

Utah State University, 2022

Major Professor: Shawn D. Whiteman, Ph.D.

Department: Human Development and Family Studies

The nature and correlates of sibling relationships and sibling influence processes have been examined during childhood and adolescence; however, they have been understudied in early adulthood. Across three studies, this dissertation addressed this gap by examining the implications of sibling modeling and differentiation processes during young adulthood across multiple domains of young adult development. Using data from 2,145 unique sibling pairs from the National Study of Adolescent to Adult Health (Add Health), Study 1 examined whether young adult siblings bidirectionally (i.e., older-to-younger sibling as well as younger-to-older sibling) influenced each other in terms of binge drinking, marijuana use, risky sexual behaviors, civic engagement, and volunteering behaviors. Additionally, this study examined the degree to which sibling closeness exacerbated similarities between siblings. Study 2 investigated the developmental implications of sibling differentiation in young adulthood utilizing data from 1,750 young adults participating in the Sibling Influence on Becoming Adults Study (SIBS). Specifically, across three waves of data, I examined whether sibling differentiation indirectly predicted young adults' well-being by improving sibling relational harmony (i.e., increasing sibling intimacy and decreasing sibling

conflict). Finally, using data from young adult sibling dyads from Penn State Family Relationships Project, Study 3 explored whether domain specific sibling modeling and sibling differentiation uniquely shaped sibling similarities/differences in terms of academic achievement, work prestige, and romantic love.

Study 1 found evidence of bidirectional sibling influence in several domains (but not all); however, these findings were not moderated by sibling closeness. In Study 2, sibling differentiation predicted less harmonious sibling relationships, which in turn, were related to poorer well-being. Finally, Study 3 found evidence for bidirectional sibling influence in terms of romantic love, but not educational or work attainment. Overall, findings suggest that in domains where development continues into young adulthood, older and younger siblings may shape each other's behaviors and attitudes. Although the salience of modeling and differentiation processes may diminish in young adulthood, it is possible that other sibling relational qualities play a more important role in sibling similarities/differences, given the significant changes to the sibling relationship during this period. As such, future research should continue to examine the implications of sibling relationships during young adulthood, paying particular attention to sibling relational qualities like contact, disclosure, and support.

(214 pages)

## PUBLIC ABSTRACT

## Siblings Influence on Young Adults' Development: A Three-Study Dissertation

Jenna Dayley

As the longest lasting close relationship, often extending from birth until death, sibling relationships play an important role throughout the life course. To date, however, only limited work has examined the process by which siblings influence each other during young adulthood. Given that developmental differences between older and younger siblings diminish in young adulthood, it is possible that bidirectional (older-to-younger as well as younger-to-older) are more likely as compared to adolescence (in which top-down or older-to-younger influence has primarily been explored). It is further possible that processes of observational learning, including modeling, and sibling differentiation continue into young adulthood, shaping sibling similarities and differences as well as young adults' overall well-being.

This three-study dissertation addressed these possibilities using extant data from three different studies. First, Study 1 examined the potential for bidirectional sibling influence on young adults' binge drinking, marijuana use, risky sexual behaviors, and volunteering behaviors. Further, this study examined the degree to which sibling closeness exacerbated sibling similarities across these various domains. Next, Study 2 examined whether sibling relationship qualities (i.e., intimacy and conflict) mediated the longitudinal association between sibling differentiation and young adults' well-being. Finally, Study 3 simultaneously examined whether and how domain specific sibling modeling and differentiation shaped sibling similarities and differences in young adults' educational attainment, work prestige, and romantic relationship qualities.

Across the three studies, findings suggested that through different processes, siblings continue to influence each other during young adulthood. Overall, evidence

for bidirectional sibling influence emerged in domains in which development was ongoing for both older and younger siblings during young adulthood (e.g., risky sexual behaviors, romantic relationships); however, evidence for top-down (or older-to-younger) socialization was more persistent across risky behavior domains. Across Studies 1 and 3, results did not support hypotheses that sibling modeling would promote greater similarities between young adult siblings. Study 2, in contrast, provided evidence that sibling differentiation longitudinally and indirectly shaped young adults' well-being through their sibling relationship qualities, albeit in a direction inconsistent with theoretical propositions. Discussion focuses on the themes found across the studies and outlines future directions for research with siblings during young adulthood.

## DEDICATION

To my siblings. As much as I hate to admit it, you are the reason I chose to study siblings. I love you guys.

And for my parents. Thanks Mammy & Pa.



## ACKNOWLEDGMENTS

Coming to the end of an undertaking like this, I see now why people say that they just can't really acknowledge all of the people that helped them along the way. I have included in chronological order (because I guess that is as good a way as any) some noteworthy individuals. For those not specifically mentioned, please know that I am so grateful for all of the support that I have received along the way (to name a few, Morgan and Daniel Falslev, Rosie, Sarah Knowles, Brenna and Addison Gallup, Merissa Cowley, and the whole Dayley gang). I am astounded at the outpouring of love and help along the way—especially during this past semester which has been especially difficult.

Mammy and Pa, thank you for helping me become me. You taught me that hard work is more important than being smart, which I'm pretty sure is the only reason that I thought I could do this in the first place. I hope that one day, my life can turn out like yours. You are so much of what I hope to do and be. Thank you for being such a positive example, and for your constant love and support.

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Shawn—five years is a really long time for one person to put up with another person. But, somehow I got through it haha. Thank you so much! Beyond explaining to me over and over the ways that siblings influence each other, and how data should be cleaned (and a lot of other things), you helped me find new ways to look at things and think more critically. You also taught me the value of going over something again and again (and again and again), until I am sure that it is my best work. Even though it frustrated me—and probably you—occasionally, I appreciate that you helped me to take the time to do things carefully and well—even when my first inclination is to just do things quickly. Thank you for making these past five years one of the most important growing opportunities of my life, and for supporting me throughout. I couldn't have asked for a better person to guide me through my doctoral program. Thank you so much!

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#HoesFoLife

To my committee, Dr. Travis Dorsch., Dr. Aryn Dotterer, Dr. Diana Meter, and Dr. Sarfaraz Serang—thank you so much for helping my dissertation get to where it is! I have appreciated your willingness to provide general and specific feedback. And thank you for being willing to hold two defenses in a single semester—I am sure you weren't thrilled to read my dissertation so soon after reading it the first time, but I really appreciate it!

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Jenna Dayley

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## CHAPTER 1

### Introduction

Young adulthood is an important stage of development wherein individuals make important decisions about their education, work, and romantic relationships, among other domains of development (e.g., J. J. Arnett, 2000; Côté, 2000; Nelson et al., 2007). The decisions young adults make during these years have important implications for their future trajectories (Tanner, 2006). As young adults navigate these years, it is likely that siblings, who play a significant role in development during childhood and adolescence (McHale et al., 2012; Milevsky, 2011), continue to shape each other's thoughts, behaviors, and adjustment. However, the influence of siblings during young adulthood remains understudied. The goal of this dissertation is to examine the potential processes by which young adult siblings influence each other's development, specifically investigating modeling and differentiation as key dynamics. In this chapter, I first discuss theory and research on the transition to adulthood, highlighting important milestones, and examining the merits and shortcomings of emerging adulthood theory as a framework to understand this transitional stage. Then, I review work on sibling modeling and differentiation, providing theoretical foundations, definitions, and empirical support for why these influence processes likely continue to be salient in young adulthood. Finally, I discuss potential domains in which these processes may be especially influential during emerging adulthood.

#### **The Transition to Adulthood**

The transition period between adolescence and adulthood is especially important to understand given the development that continues to occur beyond adolescence.

Part of the reason that scholars have increasingly examined young adult development in recent years is because of how this transition period has changed over the past several decades. As recently as 50 years ago, the path from adolescence to adulthood was relatively clear based primarily on physical maturity and distinct milestones that occurred semi-predictably. For example, youth typically would graduate from high school, find a job, leave home, get married, and begin to have children [although this pattern typically varied across genders; for example, in the past women were less likely to attend college; Settersten et al. (2015); Werts (1968)]. These milestones were predictable and straightforward. Beyond the predictability of milestones for individuals transitioning from adolescence into adulthood, there was significant societal and institutional pressure to follow the established path, thus maintaining the norms of society (Côté, 2000). In fact, a number of transitions that youth experienced often were paired (or coupled) together—youth would leave home to get married, they would get married to start their families—one transition naturally led to the next (Wallace, 1997). Because many life transitions were linked, the pathway to adulthood was systematic and relatively easily negotiated by young adults.

Over the past several decades, however, society has transformed. Arnett (2004) suggested that societal changes could be traced to four main revolutions: (a) The Technology Revolution; (b) the Women's Movement; (c) the Sexual Revolution; and (d) the Youth Movement. Prior to industrialization (the technology revolution) most of people's time was spent either growing or finding food, and in this sense, children served as additional resources as they aided in subsistence efforts, with men expected to provide money and make important decisions for the family, and women expected to maintain the home by cooking, cleaning, and nurturing young children (Blackstone, 2003). Simultaneously, as technology developed, and living conditions improved the average lifespan began to lengthen. In 1800, the global lifespan was approximately 29 years of age, by 1950, the global average had increased

to 46 years, but in the United States, the average life span was 68 years; in 2015, the global life expectancy was 71 years, and in the United States, it was 79 years of age (Roser et al., 2013). With the increased longevity of life, and the introduction of child labor laws (Bakan, 1971), society began to shift to a pattern that enabled adolescents to mature before shouldering (what we now call) adult responsibilities. In other words, youth were now granted a moratorium in which they could explore their identity in terms of love, work, and ideology (Erik Homburger Erikson, 1956). More recently, the shift from manufacturing type jobs to service jobs—jobs that require information and technology skills—have placed an increased importance on education, with many more young adults extending their education beyond the high school, and even beyond the typical four-year university stint [nearly 70% of individuals continue their education beyond high school; J. J. Arnett (2014)].

As society transformed during the course of the industrial revolution, societal patterns simultaneously shifted. Pre-industrialized society was primarily divided by gender, with males and females of all ages cooperating in gendered roles (Côté, 2000). At that time, becoming an adult was primarily a matter of reaching physical maturation and more fully participating in the responsibilities associated with an individual's gender (Côté, 2000). However, as part of the Women's Movement, the roles that were typically assigned based on gender became blurred (Blackstone, 2003). Women began to participate more in society (e.g., securing the right to vote) as well as the workforce, even finding jobs that were once more traditionally male-dominated. As society shifted, gender roles became less rigid, and society began to divide more based on age as opposed to gender (Côté, 2000).

Connected to the new autonomy and freedom granted to women, the sexual revolution also fundamentally changed views on development. Whereas society once condemned sexual relationships outside of marriage, the social mores have loosened, and sexual norms have transformed (Lefkowitz & Gillen, 2006). Indeed,

sexual relationships have been decoupled from marriage, and many now pursue sexual relationships with no intention of pursuing a more serious commitment or children (Garcia et al., 2012). This decoupling of milestones (e.g., marriage, sex, and childbearing) has further influenced the changing definition of adulthood.

Finally, Arnett describes the “Youth Movement” in which being young and vital is celebrated and exalted, and settling into adult responsibilities is disparaged and, when possible, delayed (J. J. Arnett, 2004). This movement reflects the changes we see to the meaning of adulthood; rather than passing these milestones (e.g., marriage, having children), individuals instead perform identity work that will eventually help them transition into adulthood (Côté, 2000; Merser, 1987; Molgat, 2007). In the meantime, while still young, individuals live life to the fullest as youth, before buckling down into the responsibilities of adulthood (J. J. Arnett, 2014). Indeed, rather than anticipating the transition to adulthood, (some) young adults instead find themselves in a perpetual neverland, living instead as lost-boys that never want to grow up.

Scholars suggest that changes that resulted from the technology movement, the women’s movement, the sexual revolution, and the youth movement are tantamount to the “de-institutionalization” (e.g., Hunter, 2009) or “destructuralization” (e.g., Côté, 2000) of adulthood. As part of this de-institutionalization, researchers have noted the “decoupling” of the life course, which includes increased overlap and instability in social roles (e.g., gender roles, new family structures), as well as the decoupling of role trajectories (Côté, 2000; Macmillan, 2005; Mitchell, 2006). Whereas important milestones used to be “coupled” together, now many young adults get married with no intentions to have children, they leave home without planning to get married, and education is not necessarily connected to job training (Macmillan, 2005; Wallace, 1997). Although young adults continue to realize important milestones, the independent nature of their attainment likely shapes individuals’ perceptions

about their status as an adult (Arnett, 1994). In short, because milestones are decoupled and the order of milestones is less predictable, the path from adolescence to adulthood is increasingly individualized.

While the transition to adulthood traditionally included a list of things that an individual would do, as well as physical maturity (Buchmann, 1989; Côté, 2000), adulthood is now seen as a process and a feeling, with significantly more “identity work,” unclear markers, and no singular path (Merser, 1987). Some have called this shift a psychological adulthood (Buchmann, 1989; Côté, 2000). In part, this means that, beyond a change from tangible milestones, the criteria for reaching adulthood are negotiable. Today, in young adulthood, individuals continue with the process of identity development, determining personal values, achieving financial independence, or taking responsibility (J. J. Arnett, 2000; Nelson et al., 2007; Sirsch et al., 2009). Importantly, these changes to this transition period are influenced by country of origin and social class (Macmillan, 2005), with more affluent individuals better able to take advantage of the flexibility associated with these societal changes. Despite these shifts, remaining norms tend to be rooted in traditional values that may not be congruent with modern lifestyles (Settersten et al., 2015). For example, sexual attitudes have moved considerably. In previous generations, social mores precluded sexual behaviors outside of heterosexual marital relations. Today, however, youth are more free to explore their sexual orientation and experiment with sexual behaviors prior to marriage (Garcia et al., 2012). Despite these changes, most youth still value the institution of marriage and will date someone with an extensive sexual history but find those same individuals to be less desirable—a standard that is especially evident for females (Allison & Risman, 2013; Endendijk et al., 2020; Milhausen & Herold, 2002; Sprecher et al., 1997).

In addition to certain milestones becoming less meaningful, the decoupling of milestones means that there are fewer guideposts to direct decision making about

life choices (Côté, 2000, 2006). Indeed, many young adults report feeling paralyzed as they attempt to make life choices, in part because there are so many options (B. Schwartz, 2004), but also because they feel that making one choice will close the door to other potentially attractive options, making commitment even more difficult and delaying life decisions (Henig & Henig, 2013). For example, research demonstrates that the age of marriage (J. J. Arnett, 2014) and the timing of child rearing (Arnett & Taber, 1994) is increasingly delayed, and more young adults are attending college than ever before (J. J. Arnett, 2006). Additionally, as the number of individuals going to college has increased, the launching patterns of the past have changed. Whereas youth used to leave home as a way to establish their independence and get married (M. B. Katz & Davey, 1978), now, many young adults frequently return home following completion of their education, in a pattern that has been called “Returning Young Adult Syndrome” (Schnaiberg & Goldenberg, 1989) and “the boomerang age” (Mitchell, 2006).

### New theory

Overall, the transition from adolescence to adulthood has undergone significant changes over the past 50 years. The decline and fragmentation of distinct milestones makes it increasingly difficult for individuals to navigate this transition and makes the transition to adulthood a time of potential turbulence. As society has shifted and new developmental patterns emerge, some scholars have suggested that it may be time for a new theory that explains these changes. Arnett (2006), in particular, has argued that changes to the developmental transition between adolescence and adulthood constitute a new developmental stage called Emerging Adulthood. Arnett suggests that this stage is characterized as the age of identity exploration, the age of instability, the age of being self-focused, the age of feeling in-between, and the age of possibilities (J. J. Arnett, 2006). In contrast, others suggest that the shifts



in societal norms have not fundamentally changed the way that individuals develop, and a new developmental stage is, therefore, not needed (e.g., Côté, 2014). Rather, these researchers suggest that the extant developmental stages, such as those suggested by Erikson (1966), provide the framework needed to understand this developmental period. In the pages that follow, I review reasons why emerging adulthood should and should not be considered a unique developmental stage.

### **Emerging Adulthood as a Distinct Life Stage**

Although Arnett was the one to coin and popularize the idea of an additional developmental stage called emerging adulthood, he was by no means the first scholar to suggest that there ought to be an additional stage between adolescence and adulthood. For example, Côté, suggested that “the transition to ‘adulthood’ has become more prolonged and more difficult, and those who attempt to move into a ‘psychological adulthood’ can find themselves in a new stage of ‘youthhood’ with its own characteristics....youthhood is more likely an additional step toward adulthood in an increasingly chaotic and confusing world” (Côté, 2000, pp. 3–4). Other scholars have argued that emerging adulthood is a critical turning point in the life course (Tanner, 2006).

Arnett argues that emerging adulthood is a distinct life stage between the ages of 18 to mid-20’s for five reasons: (a) identity exploration; (b) instability; (c) being self-focused; (d) feeling in-between; and (e) exploration of possibilities. He suggests that these features make emerging adulthood a distinct developmental period, in a way that is not captured by other developmental stages.

### *Age of Identity Exploration*

In the past, scholars posited adolescence as the central time when youth explore their identities (Erik Homburger Erikson, 1956). Arnett, however, suggests that this process is increasingly delayed until youth have additional time and independence to more fully explore their identities (J. J. Arnett, 2000). During emerging adulthood, youth are in a unique position to explore their identity. Before youth turn 18, in many ways their freedom is limited; the vast majority live under their parents' supervision, they have limited resources, and are excluded from important adult activities, such as voting (Mandal, 2021). As youth enter emerging adulthood, however, they are increasingly able to make decisions for themselves and engage in behaviors that previously may have been seen as risky but are now normative (e.g., alcohol use), making emerging adulthood an ideal time for identity exploration. In fact, many emerging adults report that they are still developing portions of their identity well into their 20's (Barry et al., 2009).

Erikson suggested that adolescence is the period in which individuals develop their identities in terms of love, work, and ideology (Erik Homburger Erikson, 1956). Arnett, instead, suggests that emerging adulthood is the time for individuals to explore their identity in terms of love and work (J. J. Arnett, 2006). He suggests that identity development is still salient during this period because it is the time when individuals begin to make decisions about their careers and romantic partners. He further argues that in order for individuals to make these choices, they must first know themselves, and have a clear sense of their identity (J. J. Arnett, 2006). Therefore, given the importance of these decisions, individuals must continue to develop their identity to make the decision that is most right for them.

### *Age of Being Self-Focused*

In addition to the age of exploration, Arnett (2006) suggested that emerging adulthood is a period of increased self-focus. Arnett was careful to distinguish self-focus from being self-centered. Whereas adolescents are more prone to fighting with their parents, Arnett reports that emerging adults are more likely to empathize with their parents and to generally be less selfish. Instead, emerging adults' self-focus is related to the importance of exploring their identity (J. J. Arnett, 2006). To a certain extent, individuals cannot explore their identity without focusing on themselves. Emerging adulthood provides ample opportunity for self-focus, as emerging adults spend the most time alone of any age group, aside from the elderly (J. J. Arnett, 2006; Larson, 1990). Additionally, since many young adults have not yet accepted the responsibilities associated with marriage, children, and a career, they have additional freedoms, which allow them to enjoy the perks of limited responsibilities. In fact, some scholars suggest that leisure is a critical context in which emerging adults explore their identity (Layland et al., 2018).

### *Age of Feeling In-Between*

Next, emerging adulthood is described as the age of feeling in-between. Specifically, this is the age when individuals are most likely to say that in some respects, they are an adult, but not in others (J. J. Arnett, 2001). On one hand, emerging adults begin to take on some adult responsibilities and pass adult milestones, such as high school graduation, financial independence, marriage, and childrearing. On the other hand, not accepting all adult responsibilities may leave them feeling in-between (Arnett, 1994). For example, although many emerging adults go to college, they often return home and receive material assistance from parents (S. Whiteman et

al., 2012). Given the duality, many emerging adults indicate that they are not “really” adults—suggesting that in some respects they are adults, and some respects they have not yet reached adulthood. This mindset means that emerging adults are much more willing to take risks, move around, and generally live freer lifestyles than adults (Layland et al., 2018). Indeed, many young adults leave home to attend college, work, or simply to live away from their parents, only to return several years later. Even married couples (as many as 14.85%), at times, return to their parents’ homes [typically for financial reasons; Mitchell (2006)]. In fact, over the past several decades, the number of individuals that return home has increased dramatically, with more than half of 19–21-year-olds and about a third of 22–24-year-olds living at home (Burn & Szoeker, 2016; Mitchell, 2006).

Among young adults who live with their parents, many leave and return (boomerang). Individuals that return home after leaving, report that the most common reasons for their return include life transitions such as being in between jobs, in between relationships, or in between semesters (Mitchell, 2004). Being in between also is reflected in the inability to financially support an independent residence, with those who are unemployed or have lower incomes more likely to live at home [although there is also research which suggests that the opposite is true, that children that come from more wealthy families are more likely to live at home; Burn & Szoeker (2016); Mitchell (2004); Sandberg-Thoma et al. (2015)]. Indeed, the living situation of many young adults reflects the in-between status that Arnett suggests is characteristic of this stage (J. J. Arnett, 2001).

### *Age of Instability*

Arnett (2006) suggests that emerging adulthood is an age of instability. As evidence of this, scholars have reported that there is instability in terms of romance,

living situations, and career paths. First, during emerging adulthood, individuals have the freedom to pursue romantic partners, whether that be through marriage, cohabitation (Bumpass & Lu, 2000), or less serious dating patterns. Indeed, many young adults continue to date less seriously, delaying marriage (Willoughby & James, 2017) choosing instead to hang out and hook up, (Glenn & Marquardt, 2001). Second, emerging adults tend to experience more transient living situations. This transiency may be related to the rise in cohabitation, which some may see as a placeholder for marriage (Bumpass & Lu, 2000) a relationship type that is less stable than marriage (Andersson, 2002; Benson, 2006; Rosenfeld & Roesler, 2019). Beyond the influence of romantic relationships on instability, as mentioned previously, over the past several decades there has been an increasing trend in which youth leave home, only to return again [and sometimes leave and return again; Mitchell (2006); Schnaiberg & Goldenberg (1989)]. Indeed, many individuals report returning to live home because of instability in their life [e.g., financial, social, mental health; Burn & Szoeki (2016); Mitchell (2004); Sandberg-Thoma et al. (2015)]. Third, as individuals are moving from place to place, and gaining romantic experience, many do so with the intention to try new experiences and build a future life for themselves. As part of this, they are defining who they are in their career and increasingly jumping from job to job. In fact, as early as the 1990's the average number of jobs males had throughout their career was seven (Topel & Ward, 1992); a trend that has increased in more recent years to approximately 12.4 jobs from the ages of 18 to 54, according to the bureau of labor statistics (Light, 2005; USLBS, 2021). Importantly, many individuals leave jobs as a way of advancing their career, which is likely related to the previously mentioned changing topography of careers (J. J. Arnett, 2014). Regardless of why individuals experience so many transitions during emerging adulthood, they lend themselves to more instability.

### *Age of possibilities*

Finally, Arnett suggests that emerging adulthood is a unique stage of life because it is an age of numerous possibilities. First, he argues that emerging adults are especially prone to optimism; at times, he suggests, this optimism is unfounded, but emerging adults nevertheless envision a life that is happy and productive (J. J. Arnett, 2006). Second, emerging adults have the chance to transform their lives in ways that were impossible at earlier ages because they did not yet have the autonomy to make independent life choices (J. J. Arnett, 2006). As mentioned, most adults at this stage think of this transition period as a time for them to build their life and establish a trajectory for the rest of their life (Tanner, 2006). For many, they do not yet see themselves as living their life—rather they are working toward it. Third, there is opportunity and autonomy for emerging adults, including variation in the paths they take, whether that be work, school, family, or something else (J. J. Arnett, 2000). In contrast, by the time emerging adults feel they have reached adulthood, Arnett postulates, individuals have converged on a more “traditional” life course, filled with the more conventional markers of adulthood, such as longstanding romantic relationships, stable employment, and child rearing, above and beyond the identity work that is now more closely associated with adulthood.

### **Why Emerging Adulthood is Not a Unique Developmental Period**

Despite the postulations of Arnett and others, there are those who suggest that emerging adulthood is not a unique developmental period (e.g., Hendry & Kloep, 2010; Silva, 2012). The arguments against emerging adulthood as a developmental period range from scholarly skepticism to denunciation of the research conducted

by Arnett and, by extension, his conclusions (Côté, 2014). There have even been debates held about the validity of emerging adulthood as a stage of development (Côté & Arnett, 2005). Whereas initially Côté and Arnett collaborated on some publications about emerging adulthood, eventually, Côté went on to criticize Arnett's characterization of emerging adulthood because Côté suggested that Arnett's methodology was suspect, and the quality of his data was unacceptable, before declaring that the theory of emerging adulthood is a "dangerous myth" (Côté, 2014). Some scholars have given up picking a side and utilize the terms emerging and young adulthood interchangeably (e.g., Konstam, 2007). However, before utilizing the term "emerging adulthood," it is important that scholars recognize the implicit assumptions they make when they use this term. Specifically, scholars who utilize the term "emerging adulthood" accept that this is a new, universal stage between adolescence and adulthood.

However, there are many who do not accept emerging adulthood as a stage. Those who dismiss emerging adulthood as a unique developmental stage do so for four main reasons: (a) they offer counter evidence to Arnett's five domains of development; (b) they suggest that the research done by Arnett is suspect; (c) they suggest that emerging adulthood is a variant to traditional developmental theories; and (d) they point out that emerging adulthood is not a universal stage.

### *Counter Evidence*

Arnett describes emerging adulthood as the age of identity exploration, the age of being self-focused, the age of feeling in-between, the age of instability, and the age of possibilities. However, evidence suggests that these characteristics likely are not unique to a single stage of life. For example, while Arnett describes emerging adulthood as the time of identity development, adolescence has long been seen as a critical period for identity development (Côté, 2009; Meeus, 1996; Schmitt-Rodermund

& Vondracek, 1999; Yates & Youniss, 1998). During adolescence, individuals experience intense changes physically [i.e., pubertal development; Sisk & Foster (2004)] and cognitively [i.e., brain development; Blakemore et al. (2010)], as their bodies and minds mature. Additionally, during adolescence, peer influence becomes increasingly important (Biddle et al., 1980), as youth have greater autonomy from their parents (Baumrind, 2005). As adolescents mature, they also have a variety of new experiences that enable them to explore and develop their identity (Meeus et al., 1999). Further, research indicates that identity development is not confined to adolescence or emerging adulthood and actually continues into adulthood (e.g., Kroger, 2015; Marcia, 2002; Pulkkinen & Kokko, 2000). Thus, the fact that identity development occurs during the stage Arnett calls emerging adulthood, is not clear evidence for an additional life stage.

Next, while Arnett suggests that emerging adulthood is the age at which individuals tend to be self-focused, this too is not evidence for an additional life stage. Specifically, there is research that indicates that being too self-focused during this age is associated with less exploration and commitment in terms of identity development (Adams et al., 1987; Marcia, 1966). Self-focus also can occur at any time in life (e.g., Frankenberger, 2004; Humphreys et al., 2018), not just during emerging adulthood. Similarly, although individuals may feel “in-between” between the ages of 18-30, this is likely because of societal shifts in the meaning of adulthood rather than the emergence of a new stage. Indeed, over the past several decades the transition to adulthood has changed significantly as society has shifted (Merser, 1987). As mentioned, the transition to adulthood is now based less on milestones and more on an individual process of feeling like an adult (Buchmann, 1989; Côté, 2000). Thus, given the changes that are occurring in society, it is possible that individuals feel in-between (at least in part) because the markers for adulthood are less clear, rather than because they are within a unique stage of development.



Arnett suggests that emerging adulthood is a time of instability. While this is supported by empirical evidence—emerging adults experience significant transitions during this time—there also is instability across the lifespan. For example, research has noted that instability arises from unexpected life events [e.g., divorce; Fomby & Bosick (2013)]. Although it is interesting to examine instability during early adulthood because of how this time period sets up a trajectory for future life (Tanner, 2006), this does not mean that instability is unique to this developmental period.

Finally, Arnett suggests that emerging adulthood is the age of possibilities, because emerging adults tend to be optimistic and better able to make their dreams reality compared to adolescents. However, research suggests that in the United States people tend to be optimistic regardless of their age (Côté, 2014; Sharot, 2012). Additionally, during the transition to adulthood, individuals naturally have more autonomy and a greater ability to make decisions for themselves—therefore, this is not necessarily an indication of an individual stage, rather it is a feature of adulthood itself.

### *Suspect Research*

Another reason that some scholars reject the idea of emerging adulthood is because much of the research that has examined this stage has been conducted on relatively smaller groups (J. J. Arnett, 1997, 1998), which has the potential to bias the results. For example, in Arnett's 2006 article where he presents his theory, over 30% of the citations used were his own and many of the papers cited were conceptual. Additionally, several of the samples Arnett used in his work focused on homogeneous groups of white, affluent, college students (e.g., J. J. Arnett, 1997; Arnett & Taber, 1994). This pattern contributes to the idea that the findings presented are biased towards more affluent groups, and therefore are not representative of all

young adults. In fact, given these shortcomings scholars have called for additional work to be done that utilizes qualitative data and more varied samples (Furstenberg, 2016) as well as more sophisticated methodologies (Côté, 2014). Indeed, one way to understand whether emerging adulthood is a unique stage of development is to utilize high-quality, nationally representative, longitudinal data (Furstenberg, 2016).

### *Not-universal*

Another important reason that scholars argue that emerging adulthood does not constitute a unique developmental stage is because it is not universal. For example, Gilmore (2019, p. 630) wrote, “...Arnett makes no claims to universality and readily acknowledges that emerging adulthood depends on a given country’s and cohort’s affluence, relation to globalization, and educational and vocational opportunities.” As previously mentioned, much of the research that has been conducted on emerging adulthood has focused on the affluent within American majority culture [i.e., white middle class families; J. J. Arnett (1997); Arnett & Taber (1994)]. Additional evidence suggests that this “stage” only applies to the affluent. Schulenberg (2012) found that “fast” and “slow” developers (so called because of the speed with which they move through traditional markers of development, such as establishing an independent home, partnering, and becoming a parent) tend to be divided based on socioeconomic status. Similarly, in a study of over 1,400 young adults, Osgood and colleagues (2005) found that there were six clusters of young adults as they transitioned to adulthood, with only one of the clusters resembling Arnett’s stage of emerging adulthood (Osgood et al., 2005). As Côté says (2014), “a class-based assertion would be like claiming that only those who are more affluent experience childhood or adulthood” (p. 181). Some even go so far as to suggest that creation of a life

stage that is specific to the affluent marginalizes those who are less affluent, or wish to pursue traditional life paths has a detrimental influence on the health and well-being of young adults who do not have the same opportunities (Schoon & Schulenberg, 2013). Although Arnett makes some attempt to suggest that emerging adulthood exists across the world (J. J. Arnett et al., 2011), he simultaneously emphasizes that there are variations to this stage that depend on “cultural context, educational attainment and social class” (J. J. Arnett et al., 2011, p. 7). Further, Arnett acknowledges that not all young adults will experience the features associated with the age stage (i.e., they may not be engaged in identity exploration, they may not experience instability, they may not be self-focused, they may not feel in-between, and they may not see a future full of possibilities); however, he argues, they nevertheless would be considered an emerging adult (J. J. Arnett, 2006).

Importantly, Arnett has not clarified how the theory of emerging adulthood fits into the understanding of development across the life course, and especially for those to whom the traditional features of the stage do not apply. Specifically, the theory of emerging adulthood presents a way of understanding development during late adolescence to adulthood, but provides no insights to development in early or late life (J. J. Arnett et al., 2007). Beyond this, Arnett makes no attempt, to provide additional framework to understand this stage of development independent of other theory. Instead, his work borrows terminology and ideas from other theories. For example, Arnett utilizes the term “moratorium” in his research (J. J. Arnett, 2000), which comes from Erikson’s Psychosocial Theory of Development (Erik H. Erikson, 1968), but only makes limited attempts to align his theory with the theoretical assumptions from Erikson’s theory (e.g., Arnett does not suggest a central conflict during emerging adulthood). Similarly, he borrows terminology from Schaie’s (2000) model of cognitive development, discussing the *acquisition* and *achieving* stages in the context of emerging adulthood, and from lifespan developmental systems

perspectives (Baltes, 1987; Lerner, 2004). Although Arnett offers explanations for these processes and terminology that are articulate and clear, the utilization of terminology from a variety of theories, each with unique and potentially antithetical tenets, indicates that emerging adulthood is not a unique stage and theory of development.

*Swallowed up in current stages*

Skeptics of Arnett's claims argue that emerging adulthood can and should be included as part of either adolescence or adulthood. As part of his argument to support this thought, Côté argues that it is a leap to suggest that just because there is a delay in adults' transition, there must therefore be a new stage of development (Côté, 2014). Not only that, but one scholar discusses the difference between structural stage, cultural age, and functional phase: Snarey (1983) suggests that each of these is distinct—although they are often conflated (Snarey et al., 1983). A *structural stage* is a distinct period of development, that is characterized by tasks that are unique to that stage of development. In contrast, a *cultural age* is a historical time period, that is defined by cultural shifts in norms and social expectations (for example, it is widely acknowledged that individuals that grew up during the 1800's experienced a different cultural age compared to millennials today). Finally, a *functional phase* recognizes the relationship between a structural stage and a cultural age. By declaring emerging adulthood as a new stage, in a sense, Arnett is conflating a change in the cultural age (and by extension a functional phase), with a new structural stage of development.

Additionally, the developmental tasks Arnett attributes to emerging adulthood are accounted for in other developmental theories. Specifically, stage and non-stage theories of human development account for the development Arnett attributes to emerging adulthood.

## Psychosocial theory

According to Erikson's (1966) theory of psychosocial development, there are eight stages of development that individuals pass through during the course of their life. Within each stage, individuals are met with a "crisis." Individuals resolve this crisis by bringing the two opposing elements into balance; the balance that an individual finds serves as a mechanism for development and also has implications for psychosocial health in later stages (Erik H. Erikson, 1966).

During adolescence, individuals are in the stage known as *ego identity versus role confusion*. During this crisis, individuals develop their sense of self—their ego identity in terms of work, love, and ideology (Erik H. Erikson, 1966). As individuals work to resolve this crisis and build their sense of self, they are granted a *moratorium*—a socially approved time to explore their identity (Erik H. Erikson, 1993). Later work by Marcia (1966) even went so far as to define an individual's status during the course of their moratorium, to determine their ego identity status. Marcia found that individuals tended to fall into one of four categories, depending on their level of commitment and exploration [diffuse, foreclosed, achieved, and moratorium; Marcia (1966)].

While Arnett suggests that the period of emerging adulthood is a unique stage (J. J. Arnett, 2006), others suggest that as society has shifted, so too have developmental patterns surrounding ego exploration and commitment. Whereas adolescents were once granted exceptional freedom and power—in terms of matrimony, criminal punishment, and employment [although the autonomy and responsibilities granted to adolescents was often gendered, with men given significantly more freedom than women; Jordan (1976)]—adolescents are increasingly restricted in their rights (Mandal, 2021). In the past few decades, examples include legal changes to the age at which individuals can drink alcohol, drive, and marry [without parental consent; Côté (2000)]. Thus, while identity development remains an important part

of adolescence, adolescents are limited in the domains and degree to which they have autonomy to explore. In fact, Côté and others suggest that adolescents are granted an extended moratorium, which extends into adulthood, to explore their identity (Côté, 2006; Munro & Adams, 1977). Even Arnett has called emerging adulthood an extended moratorium, borrowing language from Erikson (J. J. Arnett, 2000).

As individuals resolve the crisis associated with adolescence, they move on to the next stage in Erikson's stages of development: *intimacy versus isolation*. During this stage, individuals explore the extent to which they are able to form intimate relationships on the one hand, or experience isolation on the other. As part of the process to resolve this crisis, young adults begin to more seriously engage in romantic relationships. Individuals who are able to form romantic relationships are likewise able to share of themselves in a fulfilling and positive way; conversely, Erikson suggests that individuals that struggle with this stage tend to have fewer friendships, and poorer romantic relationships (Erik H. Erikson, 1966). Whereas high school graduation was quickly followed by marriage in decades past, young adults are increasingly delaying marriage and family (J. J. Arnett, 2006; Arnett & Taber, 1994). For many young adults, they delay marriage until they have established their career, and have accomplished other financial goals [such as getting out of debt; Bozick & Estacion (2014)]. While the timing of this stage has been delayed, this stage of development can be successfully utilized to understand development during young adulthood.

Therefore, the development that Arnett claims is accomplished during the "unique" period, is actually accounted for in Erikson's stages of psychosocial development. Specifically, while Arnett describes emerging adulthood as the age of identity exploration, instability, being self-focused, feeling in-between, and exploration of possibilities, these developmental tasks are accomplished during Erikson's stages of ego identity

versus role confusion and intimacy versus isolation. Additionally, while the timing of the development has shifted since the time Erikson initially created the theory, this is likely a reflection of a change to the cultural age period, and the expansion of the human lifespan, rather than a change to the stages themselves.

### Non-stage theories

While psychosocial theory, like emerging adulthood, is a stage centered theory, there exist numerous theories that do not rely on stages to understand development. For example, life course theory, bioecological theory, and social cognitive theory all account for development across the lifespan without focusing on stages. Rather, these theories of human development emphasize the importance of contextual factors, personal characteristics, and processes of development without focusing on distinct stages of development.

Life course theory, for example, emphasizes the historical time and place an individual experiences as they undergo transitions in their life (Elder, 1998), highlighting the way that individuals' lives are linked and how those combine to influence development (Bengtson et al., 2012). Similarly, bioecological theory (Bronfenbrenner, 1992) includes at a variety of proximal and distal contexts (and the interactions between the contexts) that influence development. Finally, social cognitive theory, provides a less structured examination of contextual factors, but nevertheless, in Bandura's triadic reciprocal determinism, environmental factors comprise one side of the triangle that drives development and adds context to individual development (Bandura & McClelland, 1977). By investigating these factors—the contextual characteristics, personal attributes, and processes—non-stage theories examine development, and may observe historical and cultural shifts, without making adjustments to existing theory.

*Consolidating the Perspectives*

Although Arnett's suggestion that there is an additional stage of development has gained popularity, it is my position that emerging adulthood is not a unique stage of development. Indeed, many of the characteristics and qualities that he used to define emerging adulthood (i.e., emerging adulthood is the age of identity development, the age of being self-focused, the age of feeling in between, the age of being unstable, and the age of possibilities) are observed throughout the life course and are contextually dependent. Additionally, the assertion that emerging adulthood is a new stage of development, but not a universal stage of development is contradictory. Developmental stages within a theory cannot be limited to specific groups. Finally, Arnett has not made sufficient efforts to situate emerging adulthood as a unique stage of development within a greater theory that examines development across the lifespan.

Despite the limitations associated with the theory on emerging adulthood, what is clear is that development during this time of life is varied and will likely continue to shift as society evolves. Many of the developmental processes that started during individuals' teenage years continue and it is critical to understand the factors that shape their operation and young adults' behaviors, adjustment, and well-being.

**Sibling Relationships in Young Adulthood**

Although the nature and implications of sibling relationships during childhood and adolescence have been studied increasingly over the past 25 years (McHale et al., 2012; Milevsky, 2011), sibling relationships during young adulthood have been investigated less frequently. Perhaps part of the reason that sibling relationships



are relatively ignored during young adulthood is because of the shifts that occur during this period (L. White, 2001). Specifically, while most children grow up with at least one sibling at home (McHale et al., 2012) and spend considerable time together (Dunifon et al., 2017), as adolescents transition to adulthood siblings typically live further apart and have less contact (Jensen et al., 2018; L. White, 2001). Indeed, many youth begin to spend less time with siblings throughout adolescence as their time with peers increases (Lam et al., 2014). Further, most young adults (eventually) move out of the family home to go to college, get a job, or pursue other activities (Schnaiberg & Goldenberg, 1989). When a sibling moves from home, the relationship goes from one of forced proximity that includes regular opportunities to express both intimacy and conflict, to a relationship that individuals must voluntarily maintain (Scharf et al., 2005). Accordingly, during this period siblings tend to report less contact, potentially supporting the notion that sibling relationships are less salient during young adulthood (Jensen et al., 2018; Scharf et al., 2005).

Despite previous work that questions the relative influence sibling relationships have during young adulthood, more recent (though limited) scholarship suggests that siblings continue to be important during young adulthood. Indeed, while siblings report less contact during young adulthood, they also report less conflict (Jensen et al., 2018; Scharf et al., 2005). And, as siblings fight less, they also report greater emotional exchanges and more intimacy (Scharf et al., 2005; S. D. Whiteman, McHale, & Soli, 2011). Given the potential for sibling relationships to become more harmonious (i.e., more intimate and less conflictual), it is likewise possible that the influence processes that occur during youth and adolescence (e.g., modeling and differentiation) continue to influence individuals into young adulthood.

## *Sibling Influence Processes*

### Modeling

Sibling modeling is the idea that individuals learn indirectly from and use their brothers/sisters as examples for how to act and behave. Sibling modeling is rooted in Bandura's (1977) theory of observational learning, which suggests that as individuals observe the behavior and consequences (i.e., rewards or punishments) of those around them, they learn acceptable and valued acts, and ultimately choose to emulate those behaviors or not. Importantly, theory suggests that youth tend to model individuals who are more objectively similar to them (Bandura & Walters, 1963) and demonstrate greater competence in a specific domain (e.g., S. D. Whiteman et al., 2007a). Siblings (especially older), who often have many shared characteristics and typically have a relatively small age difference, are therefore an ideal referent for observational learning, as previous research has demonstrated (Mischel, 1966; Patterson et al., 1984; C. J. Tucker et al., 2001; S. D. Whiteman et al., 2007a). As siblings engage in modeling, they also tend to demonstrate more similarities with their brothers/sisters (e.g., Cassinat et al., 2019; McHale et al., 2009; S. D. Whiteman et al., 2007a).

Sibling modeling has been noted as an explanation for similarities between siblings in across a range of studies and developmental outcomes. During childhood, scholars found that older siblings act as a model of empathy for their younger siblings (C. J. Tucker et al., 1999). Similarly, during adolescence, Whiteman and colleagues (2007) found that when individuals reported higher levels of modeling, they tended to be similar across several domains, including risky behaviors, as well as participation in sports and art. Importantly, in line with theory (Mischel, 1966), these findings were qualified such that individuals were more likely to model their sibling when

their sibling had a higher level of competence within a specific domain (S. D. Whiteman et al., 2007a). Beyond this, sibling modeling has been found to shape adolescents' risky sexual behaviors. Specifically, McHale and colleagues (2009) found that above and beyond shared genes, sibling modeling helped explain sibling similarity in adolescents' risky sexual behaviors, indicating that this socialization process plays a unique role in sibling similarities. Siblings also influence substance use—youth who model their siblings are more likely to demonstrate similarities in alcohol and other substance use (S. D. Whiteman et al., 2013). Importantly these findings were found above and beyond the influence of parents and peers, indicating that siblings play a unique role in the socialization of substance use. Finally, previous work has also demonstrated that siblings influence each other in prosocial domains. For example, adolescents tend to be more similar to their siblings in terms of social responsibility (Kessler et al., 2004) and civic engagement (Bi et al., 2021a) when they report trying to be more like them (i.e., when they model).

Beyond the influence of sibling modeling across domains, the degree to which siblings model each other depends, in part, on the relational and structural characteristics of the sibling dyad. Specifically, sibling intimacy, age difference between siblings, gender composition of the sibling dyad, and birth order all likely to influence the degree to which an individual engages in modeling. Indeed, sibling intimacy has been found to be closely associated with modeling, such that individuals who have more intimate relationships are also more likely to report modeling (S. D. Whiteman et al., 2007b). In fact, these two constructs are related enough that in some instances, researchers used sibling intimacy as a proxy variable for sibling modeling processes (e.g., Feinberg & Hetherington, 2000; Kretschmer & Pike, 2010; McHale et al., 2009; Slomkowski et al., 2001, 2005). However, other work has demonstrated that (when measured) sibling modeling predicts similarities between siblings beyond sibling intimacy (e.g., S. D. Whiteman et al., 2014), indicating that they are unique constructs,

and should be examined concurrently, when possible.

In addition to sibling intimacy, structural characteristics play an important role in the degree to which a sibling is viewed as an effective model (Mischel, 1966). Specifically, age spacing, gender composition, and birth order all play a role in the degree to which an individual will model their sibling. When considering age spacing, there are two opposing theoretical hypotheses at work. The first, that individuals who have higher levels of competence tend to be viewed as more salient models, would indicate that a larger age spacing (i.e., siblings further apart in age) would lead to older siblings being more effective models. The second, that individuals who are more similar should be more salient models, suggests that siblings who are closer in age would be more effective models (Joseph L. Rodgers & Rowe, 1988). The first hypothesis, that a larger age gap would be associated with more modeling, has been supported (S. D. Whiteman, McHale, & Soli, 2011). However, other work has failed to find an association between age spacing and modeling (Joseph Lee Rodgers et al., 1992; S. D. Whiteman et al., 2013).

The gender composition of the sibling dyad is another important structural characteristic that influences the salience of sibling models (Bandura & Walters, 1963; Mischel, 1966). Specifically, theory suggests that models should be more salient when they are more objectively similar; therefore, siblings who share the same gender (i.e., sister-sister and brother-brother dyads) are expected to be more relevant models. However, research supporting this idea is mixed. Some studies have found that same-gender dyads are indeed more likely to engage in sibling modeling (S. D. Whiteman & Christiansen, 2008), and therefore exhibit greater similarities (McHale et al., 2009). In contrast, other work has failed to find greater similarities between same-gender sibling dyads (Samek et al., 2018; Samek & Rueter, 2011; S. D. Whiteman et al., 2014).

Finally, birth order is an important structural characteristic that influences

the degree to which siblings are potentially used as models. Not only do older siblings go through important developmental milestones before their younger siblings, they also generally have more expertise, and therefore act as more salient models throughout youth and adolescence. Indeed, some work has demonstrated that older siblings socialize empathy in their younger siblings—but not vice versa (C. J. Tucker et al., 1999). Similarly, previous research has found birth order differences in terms of language acquisition, suggesting that younger children have the chance to learn from their older siblings (Pine, 1995), but not vice versa.

In the past, scholars have primarily examined modeling patterns during childhood and adolescence (e.g., Crouter et al., 2007; McHale et al., 2009; S. D. Whiteman et al., 2007b), when older siblings primarily serve as a model for their younger siblings. However, it is possible that modeling processes continue to be salient into young adulthood. Indeed, limited research supports this notion, with young adults' reports of modeling being predictive of similarities with their older siblings in their beliefs about marriage, work, and education (Cassinat et al., 2019; Cassinat & Jensen, 2020). Additionally, it is possible that modeling patterns for young adults may shift. Specifically, during young adulthood, sibling relationships become increasingly egalitarian (D. Buhrmester & Furman, 1990) as developmental differences diminish; therefore, it is possible that sibling modeling may become increasingly bidirectional (i.e., older-to-younger and younger-to-older). However, research has yet to explicitly explore this possibility. Therefore, the current dissertation will explore the nature and correlates of sibling modeling during young adulthood.

### Differentiation

In contrast to sibling modeling, which is related to sibling similarities, sibling differentiation (or deidentification), is a process through which siblings become more dissimilar (McHale et al., 2012). Differentiation theory is based on what has

been called the “Cain Complex” (Frances F. Schachter et al., 1976)—the idea that individuals tend to experience intense, potentially detrimental sibling rivalry. Given the potential harm of unwanted and unfavorable comparisons, differentiation theory suggests that individuals mitigate between-sibling comparisons by becoming less alike. This process can be either intentional or subconscious. By becoming different, individuals may form a unique niche within the family, where they are able to be their own person, free from competition and comparison. It is hypothesized that over time, as each sibling forms a unique identity within the family, they will reduce sibling rivalry and therefore promote sibling harmony and individual well-being (Feinberg et al., 2003; Frances F. Schachter et al., 1976).

Previous research has demonstrated the influence of sibling differentiation on adolescent adjustment. Specifically, adolescents report less similarity in terms of deviant behavior and alcohol expectancies when they engage in higher levels of differentiation (S. D. Whiteman et al., 2014). Similarly, Osai and colleagues (2020) found that siblings were less likely to participate in the same primary sport when they differentiated more. In a study of gender development, McHale and colleagues (2001) found evidence for sibling differentiation, such that firstborns’ gender role orientations became more different from their younger siblings over the course of adolescence. Chitwood (2018) even found that during family car rides, siblings may differentiate from each other either by not participating in music making with their sibling, or by finding a distinct way to participate in music making. Finally, Watzlawik (2009) found that siblings who differentiate from each other tend to be different in terms of character traits, looks, and athletic abilities. Although there is evidence that sibling differentiation mitigates sibling similarities, there are studies that fail to find evidence for differentiation dynamics. In these cases, it is possible that shared genetics and shared environmental factors (e.g., same parents) push siblings to be similar, despite differentiation efforts (Feinberg & Hetherington, 2000;

Wong et al., 2010).

When examining sibling differentiation, as with modeling, there are relational (i.e., intimacy) and structural characteristics (i.e., age difference, gender composition, and birth order) that influence the degree to which an individual engages in this process. For example, in one study, differentiation was negatively related to sibling positivity/intimacy (S. D. Whiteman et al., 2007a). When examining structural characteristics of sibling dyads, previous research has focused on ordinal positioning and age-spacing. Specifically, Schachter and colleagues (1976) found that consecutively born siblings were significantly more likely to differentiate than jump pairs (e.g., first and third borns). Considering these findings, it seems likely that siblings who are closer in age are more likely to differentiate from each other. Additionally, given the greater similarity between same gender siblings, brother-brother and sister-sister dyads are theorized to differentiate more from each other than siblings from mixed-gender dyads. Much like modeling, however, empirical findings surrounding this topic are mixed. Some research shows greater differences among same-gender sibling dyads (Grotevant, 1978), whereas other findings suggest that gender constellation is not related to siblings' likelihood of differentiating (Feinberg et al., 2003). Finally, previous research has suggested that birth order is an important factor in the degree to which an individual differentiates. Specifically, because of normative age-graded developmental patterns, firstborns have earlier opportunities to choose their niches and form their identity, thus later-borns should be more likely to differentiate than their older siblings (McHale et al., 2001; S. D. Whiteman et al., 2007a). With that said, research has generally failed to explore the degree to which older siblings engage in differentiation processes.

Given the importance of identity development to the deidentification process, previous scholarship has almost exclusively examined how differentiation influences adolescents (e.g., Feinberg et al., 2003; Osai et al., 2020; Watzlawik, 2009; S. D.

Whiteman et al., 2014). However, limited scholarship has examined differentiation during young adulthood, finding that not only do differentiation process continue, but differentiation also influences sibling similarities in domains that are salient during young adulthood, such as marital centrality (Cassinat & Jensen, 2020). Since recent research has suggested that identity development continues into young adulthood (J. J. Arnett, 2000; Nelson et al., 2007; Sirsch et al., 2009), it is likewise likely that sibling differentiation dynamics remain salient during young adulthood.

### *Developmental Domains of Sibling Influence*

As sibling influence processes (i.e., modeling and differentiation) continue during young adulthood, it is likely that their influence will be most pronounced in domains that are most critical to young adult development. Indeed, limited work has demonstrated sibling influence during young adulthood finding that individuals who modeled their siblings more demonstrated greater similarities in terms of emotional autonomy as well as education and work orientation (Cassinat et al., 2019). Other research examined the role of siblings in identity development, examining levels of identity achievement (Marcia, 1966), indexed utilizing exploration and commitment subscales, finding that siblings influence identity achievement status during early adulthood through modeling, but not differentiation (Wong et al., 2010). Given these findings, which highlight the influence of siblings in domains that are developmentally important to young adults, it is likely that sibling influence extends beyond adolescence and into early adulthood. Specifically, in three different studies, this dissertation will examine the influence of sibling modeling and differentiation processes on diverse young adult outcomes, including romantic relationships, risky behaviors, education and work orientation, prosocial behaviors, and well-being.



## Romantic Relationships

Although understudied in the literature, previous research has demonstrated that siblings play an important role shaping youth's ideas about and actual romantic relationship qualities. For example, Doughty and colleagues (2015) found that sibling relational qualities during adolescence longitudinally predicted romantic relational qualities two years later. Specifically, they found that the relational qualities of the sibling relationship were positively associated with romantic relational qualities (e.g., sibling intimacy/conflict/control positively predicting romantic intimacy/conflict/control), perhaps indicating that sibling relationships prepare individuals for romantic relationships later (East, 2009). Similarly, Shalash and colleagues (2013) found that the conflict styles siblings use during adolescence correspond to conflict resolution strategies utilized in committed adult relationships (Shalash et al., 2013). Additional research suggests that siblings also may indirectly influence romantic relationships during young adulthood through parental differential treatment. Specifically, siblings who reported differential treatment reported more romantic relationship distress (Rauer & Volling, 2007). Finally, one paper specifically examined the influence of sibling modeling on marital centrality, finding that similarities in attitudes were greatest among young adult siblings who reported higher levels of modeling (Cassinat & Jensen, 2020). However, more work is needed to understand whether and how siblings influence young adults' romantic relationship qualities. Specifically, in this dissertation, I will examine the connections between young adult siblings' reports of romantic relationship qualities (e.g., romantic love) and the degree to which sibling modeling and differentiation moderate those associations.

## Risky Behaviors

Significant research has examined the influence of siblings on risky behaviors, including risky sexual behaviors, during adolescence. Early work, for example, suggested

that siblings are likely an important source of sexual information, especially for younger siblings (Spanier, 1977). Consistent with this idea, Pasqualini et al. (2021) found that individuals with a sibling who became sexually active at a younger age were more likely to engage in sexual behaviors early as well, an association that was exacerbated by sibling disclosure (Pasqualini et al., 2021). This indicates that as siblings share their experiences with each other, they likely influence each other's later behaviors. This is consistent with other research that found that siblings uniquely influence adolescents' sexual attitudes and behaviors (Almy et al., 2015), above and beyond peer approval and peer communication (Friedman, 2004), because siblings act as a sources of information regarding sexual behavior (Lindstadt et al., 2020).

Focusing on modeling, Whiteman and colleagues (2014) found that when younger adolescent siblings modeled older sibling's behavior, they demonstrated significantly more similarities—even when controlling for the younger sibling's previous sexual risk behaviors. Further, McHale and colleagues (2009) found that siblings demonstrated greater similarities in their sexual behaviors when they had close relationships (a proxy for sibling modeling), above and beyond the influence of shared genes. Additionally, studies have found that younger siblings consistently engage in sexual behaviors at earlier ages (Joseph L. Rodgers & Rowe, 1988), as compared to their older siblings, especially for younger sisters with older brothers (Joseph Lee Rodgers et al., 1992; Widmer, 1997). Such patterns are especially evident when older siblings are teen parents (East & Jacobson, 2001; Meade et al., 2008). Given the important health (i.e., mental and physical) implications of risky sexual behaviors as well as the developmental salience of this domain during young adulthood, I will examine siblings' influence on these behaviors. Specifically, I will investigate how sibling relational characteristics predict sibling similarities in young adults' risky sexual behaviors in a nationally representative sample.

In addition to risky sexual behaviors, scholars have examined the influence

of siblings on adolescents' substance use behaviors and attitudes. Findings note positive associations between siblings' substance use behaviors across a variety of substances including alcohol (Poelen et al., 2007; Scholte et al., 2008), e-cigarette use [vaping; Fite et al. (2018)], marijuana (Hopfer et al., 2003; Windle et al., 2017), cigarettes (Fagan & Najman, 2005; Slomkowski et al., 2005), and other substances [such as prescription drugs and methamphetamine; Kendler et al. (2013)]. Importantly, consistent with observational learning principles that models are more salient when they share more similarities with the observer, similarities in siblings substance use behaviors tends to be greatest when there is a small age difference between siblings (e.g., Samek & Rueter, 2011) and they are the same gender (e.g., Samek et al., 2015). Notwithstanding, research suggests that there are multiple processes that predict sibling similarity in substance use (S. D. Whiteman et al., 2013). For example, through shared activities and friends (Slomkowski et al., 2005), modeling (S. D. Whiteman et al., 2013), and differentiation (S. D. Whiteman et al., 2014), siblings influence each other's substance use. Importantly, many of these studies found that sibling effects were unique, above and beyond the influence of peers (Poelen et al., 2007; e.g., Scholte et al., 2008), indicating that siblings uniquely influence substance use patterns in adolescence. Given the influence that siblings have on substance use behaviors during adolescence, it is likely that they continue to be influential into young adulthood. This dissertation will address the gap in the literature by investigating similarities in young adults' substance use behaviors and examining the degree to which relational qualities (i.e., sibling warmth as a proxy for modeling) shape similarities between siblings.

## Education and Work

Siblings influence each other's education in numerous ways. Research suggests that siblings demonstrate similarities in terms of their grades, finding that older

siblings who do well in school are more likely to provide academic support to their younger siblings, directly influencing how younger siblings fare in school (Pajoluk, 2013). As older siblings provide support to their sibling, they also improve their own reading and language achievement (Smith, 1990). Additionally, research suggests that the influence of siblings extends into young adulthood, with one study finding that siblings positively influence each other's education orientation (i.e., how important their education is to their eventual life plans). In fact, this association was exacerbated by sibling modeling, such that individuals who reported greater modeling tended to be more similar in terms of their education orientations (Cassinat et al., 2019).

In addition to influencing each other's education, siblings play a role in young adults' ideas and attitudes about work. Research suggests that siblings demonstrate greater similarities in their work orientations and frequently maintain similar patterns in work orientation and prestige throughout the life course (Conley & Glauber, 2005). Research suggests that siblings have the potential to influence career aspirations in two ways: (a) by shaping an individual's attitude towards specific jobs (Splete & Freeman-George, 1985); and (b) by influencing the occupation an individual pursues (Nguyen, 2000; Splete & Freeman-George, 1985). Indeed, one study found that siblings demonstrate significant similarities in attitudes towards occupation, likely due to shared genes and environment (Hauser & Mossel, 1985). Similarly, research suggests that older siblings may influence the eventual occupational attainment (e.g., prestige of occupation) of younger siblings, both through modeling, and in some instances through encouragement and coaching behaviors (Splete & Freeman-George, 1985). This coaching behavior has likewise been found in Vietnamese Americans which reported that older siblings took it upon themselves to give guidance and direction in career aspirations (Nguyen, 2000). Further, one study found that birth order of children was related to occupational attainment, with older siblings more likely to receive support, and therefore more likely to attain higher occupational

status (Splete & Freeman-George, 1985). Given that siblings continue to influence each other's attitudes about work and occupational attainment, this dissertation will examine the degree to which sibling modeling and differentiation shape similarities and/or differences in these domains in early adulthood.

### Prosocial Behaviors

Siblings play an important role in the development of prosocial behaviors, especially in terms of volunteering behaviors. During adolescence, many youth engage in volunteering behavior with parents (Sartor & Youniss, 2002) and family (Littlepage et al., 2003). Siblings likely influence each other in terms of their volunteering behaviors, although only limited work has examined this relationship (Maiya et al., *Revise & Resubmit*). Previous work found that the number of siblings in a family is positively associated with adult volunteering (Harper et al., 2016; Sundeen, 1988). Additionally, some have theorized (Sundeen & Raskoff, 1994) and demonstrated that siblings share similarities in their volunteering behaviors (Francis, 2011). Indeed, siblings tend to be more similar in their volunteering behaviors than non-related individuals (J. Kim & Morgül, 2017). In short, given the potential influence that siblings have on prosocial behaviors, this dissertation will examine the ways that siblings influence participation volunteering in young adulthood.

### Well-being

Finally, research has demonstrated that siblings play an important role in shaping well-being during adolescence (Wolke & Skew, 2012) and likely continue to play a role during young adulthood (Sherman et al., 2006). Specifically, past research has demonstrated that sibling relational qualities play an important role in adolescents' well-being. Youth with conflictual sibling relationships [which are common; J.-Y. Kim et al. (2006); Kettrey & Emery (2006); Campione-Barr & Smetana

(2010)], tend to demonstrate greater aggression (J. L. Martin & Ross, 1995), more antisocial behavior (K. J. Conger & Conger, 1994), and worse peer adjustment (Bank et al., 2004). In contrast, individuals who have more positive sibling relationships report that their relationship is highly rewarding (Hodapp et al., 2010) and tend to be happier and have greater self-esteem and well-being (Sherman et al., 2006). Given the influence of siblings throughout the life course, it is likely that sibling relationships continue to shape well-being during young adulthood (V. Cicirelli, 2013; Sherman et al., 2006). In fact, theory suggests that sibling differentiation serves to improve youth's sibling relational qualities (Frances F. Schachter et al., 1976). Moreover, previous empirical work suggests that sibling relational qualities play a role in well-being (e.g., Campione-Barr & Smetana, 2010; J.-Y. Kim et al., 2006; Wolke & Skew, 2012). Therefore, the final paper in this dissertation will examine the degree to which sibling differentiation shapes young adults' well-being through their sibling relationship qualities.

### **Current Dissertation**

Across three related studies, this dissertation will examine the influence of siblings during young adulthood in developmentally salient domains. Study 1 utilized the National Study of Adolescent to Adult Health, a nationally representative longitudinal dataset that includes 2,145 unique sibling pairs. This study specifically examined whether sibling closeness (as a proxy for modeling processes) and the gender composition of the sibling dyad moderated the associations between young adult siblings' binge drinking behaviors, marijuana use, risky sexual behaviors, and volunteering. Finally, I examined the potential bidirectional influence of siblings during young adulthood using an Actor Partner Independence Model (APIM).

Using data from the Sibling Influence on Becoming Adults Study (SIBS),

which includes longitudinal data from 1,750 participants, Study 2 investigated the developmental implications of sibling differentiation. Specifically, I examined whether sibling differentiation indirectly influenced young adults' well-being through their sibling relational qualities (i.e., sibling conflict and sibling intimacy). Further, I tested whether differentiation dynamics were more strongly related to sibling relational qualities for same- versus mixed-gender dyads, as predicted by theory.

Finally, Study 3 utilized data from the Penn State Family Relationships Project (FRP), a longitudinal study that includes 203 families, with data from mothers, fathers, and their two eldest children spanning middle childhood through young adulthood. Specifically, this study utilized data from wave 11—when the eldest children were young adults—and examined whether modeling and differentiation dynamics shape sibling similarities and differences in young adults' educational achievement (i.e., overall college grade point average), work attainment (i.e., prestige of current job), and romantic love.

## CHAPTER 2

### Sibling Influence in Young Adulthood: Testing Bidirectional and Modeling Hypotheses

Young adulthood is an intense period of development. During these years, young adults consolidate their identities and engage in potentially new and developmentally critical behaviors (e.g., J. J. Arnett, 2014; Nelson et al., 2007), including substance use (J. J. Arnett, 2005), romantic relationships and risky sexual behaviors (J. J. Arnett, 2000), and civic involvement behaviors (Hawkins et al., 2009). The patterns of behavior and identities that young adults establish during this life stage form trajectories for future behavior that often have lifelong consequences (Shulman et al., 2005). Compared to adolescence, less is known about how socialization agents shape development in these domains as young adults gain increasing independence (J. J. Arnett et al., 2007; McElhaney et al., 2009). Moreover, research on how siblings influence development during young adulthood has lagged behind other research on socialization agents, such as peers and romantic partners (Oliveira et al., 2020), despite research that suggests that siblings act as important and unique sources of influence of influence during childhood and adolescence. The present study addressed this gap by examining how siblings influence each other's behaviors in young adulthood across several critical domains of adult development (i.e., substance use, risky sexual behaviors, and volunteering).

#### *Socializing agents during young adulthood.*

During young adulthood, despite becoming increasingly independent, individuals are still influenced by a variety of socialization agents (J. J. Arnett et al., 2007).



Most previous research has focused on the ways that parents (e.g., Luyckx et al., 2007), peers (e.g., Lefkowitz et al., 2004), and romantic partners (e.g., Angulski et al., 2018) influence development during young adulthood. During adolescence, peers and romantic partners become increasingly important sources of socialization. Just before entering adulthood, adolescents show numerous similarities to their peers, which are associated with two primary processes: (a) homophily (or assortative pairing)–similarities between youth and peers occur in part because youth select peers that are already similar to them (Kandel, 1978); and (b) through socialization that occurs as individuals spend time together (Lam et al., 2014). Peer similarities are apparent in a variety of domains during adolescence, including class attendance (Kassarnig et al., 2017), delinquency (Weerman & Smeenk, 2005), substance use (Cleveland & Wiebe, 2003), and weight concerns (Badaly, 2013).

Despite societal changes to patterns of coupling during young adulthood [i.e., getting married later, more varied coupling patterns; J. J. Arnett (2014); Schulenberg et al. (2004)], marriage continues to be a salient developmental task, with most young adults expecting to marry at some point (Health Statistics, 2021). Further, marriage remains an important milestone that acts as a marker of adulthood attainment (R. D. Conger et al., 2000). As with peers, romantic partners are an important socialization agent during young adulthood (Simon et al., 2008; Wiersma et al., 2011). Indeed, romantic partners influence individuals through processes that are similar to those seen in adolescent peers [i.e., homophily and shared time; Furman & Simon (2008); Simon et al. (2008)]. Specifically, previous research has found similarities between romantic partners in terms of alcohol and drug dependence (DeLay et al., 2016; Low et al., 2007), substance use generally (Etcheverry & Agnew, 2009; Wiersma et al., 2011), financial competence (Curran et al., 2018), behavior problems (Aikins et al., 2010), and psychosocial functioning (Simon et al., 2008).

Research on how siblings influence development in young adulthood lags behind

that of other close personal relationships (Oliveira et al., 2020), with only 2.4% of family science research focusing on siblings (Perez-Brena et al., 2022). This oversight is surprising given that more than 80% of youth grow up with at least one sibling (McHale et al., 2012) and siblings spend considerable time together during childhood and adolescence (Dunifon et al., 2017). Given their ubiquity, it is not surprising that siblings (especially older siblings) serve as important models for (in)appropriate behavior during adolescence. Indeed, observational learning theory principles highlight that siblings are ideal sources of social learning and comparison (Mischel, 1966). In fact, there are several structural characteristics of sibling relationships that may shape the degree to which siblings are effective models. Observational learning theory suggests that siblings are most likely to be modeled (or imitated) when they are: (a) more objectively similar (e.g., the same gender); (b) have a more nurturing relationship; and (c) have higher level of expertise (Bandura & Walters, 1963; Mischel, 1966; J. S. Tucker et al., 2005). First, with respect to objective similarity, some research suggests that youth from same-gender sibling dyads are more likely to model one another as compared to siblings from mixed-gender dyads (McHale et al., 2009; S. D. Whiteman & Christiansen, 2008). Second, siblings that share a more nurturing, intimate relationship (a feature of most sibling relationships, despite their ambivalence towards each other) are more likely to look towards their brothers and sisters as models (McHale et al., 2004; Rowan, 2016). Finally, individuals that have higher levels of expertise are more likely to be viewed as salient models; older siblings are, therefore, more likely to serve as models for their younger siblings during childhood and adolescence than vice versa (Bandura & Walters, 1963; Mischel, 1966). Research has failed to examine whether this pattern continues into young adulthood. On the one hand, older siblings may remain more salient models given differences in the timing of new milestones (i.e., ability to enter certain tasks such as higher education and long-term romantic relationships sooner). On the other

hand, sibling relationships become less hierarchical as developmental differences (i.e., physical and cognitive maturity) diminish in young adulthood. Furthermore, young adults demonstrate significant variability in the timing of developmental milestones (Macmillan, 2005; Willoughby & James, 2017), suggesting that bidirectional sibling influences (i.e., older-to-younger *and* younger-to-older) may be more prevalent in young adulthood.

In sum, theory suggests that older, same-gender, close-in-age siblings that share intimate relationships with their younger brothers/sisters are most likely to serve as salient models for their younger siblings to observe and potentially imitate. Support for some, if not all, of these factors in shaping similarities between siblings has been found across several developmental domains during adolescence, including substance use (Rowe & Gulley, 1992; S. D. Whiteman et al., 2013; Windle, 2000), extra-curricular activities (Osai et al., 2020), deviant and sexual behaviors (McHale et al., 2009; S. D. Whiteman et al., 2014), social responsibility (Kessler et al., 2004), and civic engagement (Bi et al., 2021a). Although less studied than during childhood and adolescence, research indicates that siblings continue to be important socialization agents across developmental domains during young adulthood. Indeed, recent research has found that although sibling contact often decreases as siblings move away from home, many young adults report increased warmth and decreased conflict during this time (Jensen et al., 2018)—an important indication that sibling relationships remain salient during young adulthood. Further, studies have shown that siblings' attitudes influence young adults' ideas about romantic relationships, including young adults' attitudes towards marriage (Cassinat et al., 2019). Siblings (and especially sisters) also act as confidants and sources of support in terms of romantic relationships (Killoren & Roach, 2014). Recent work shows that through modeling processes siblings influence each other in other important developmental domains during young adulthood, such as emotional autonomy, education orientation, and

work orientation (Cassinat et al., 2019). Much of this research, however, has been limited to cross-sectional examinations of sibling influence and siblings' behaviors during young adulthood. As such, a critical next step for research is to identify whether sibling socialization processes are uniquely influential (i.e., accounting for individuals' behaviors during adolescence) during young adulthood in additional developmental domains as well as whether bidirectional patterns of sibling influence emerges.

*Young adulthood as a continuation of development beyond adolescence*

During adolescence, youth experience rapid physical and cognitive development (Petersen, 1988). These changes are often linked with identity development (Meeus et al., 1999) and the emergence of risky and prosocial behaviors. For example, during adolescence, youth may begin to experiment with substances (Grady et al., 1986), develop attitudes about sexuality, and, in many cases begin to engage in risky sexual behaviors (McHale et al., 2009). Simultaneously, youth experience development in positive domains, including volunteering behaviors (Johnson et al., 1998) and civic engagement (Crocetti et al., 2012). Given the physical and mental health implications associated with risky and prosocial behaviors (Raposa et al., 2016; S. J. Schwartz et al., 2015), it is likely siblings continue to be important socialization agents in developmentally salient domains during young adulthood.

Research and theory demonstrates that development that begins in adolescence continues into young adulthood in a variety of domains, including identity development (J. J. Arnett, 2015), personality development (Bleidorn & Schwaba, 2017), and issues that influence future prospects, such as work ideology and career choices (Erik Homburger Erikson, 1956). Other research has documented the continued behavior development of young adults. Specifically, scholars have examined changes

in young adults' participation risky behaviors (e.g., Chassin et al., 2002; Flory et al., 2004) as well as prosocial domains (e.g., Larson et al., 2006; Schumacher & Connaughton, 2020). As development continues in these domains, it is likely that sources of socialization that were important during adolescence, such as siblings, continue to be important into and throughout young adulthood.

### Substance Use

During young adulthood, substance use is especially volatile as individuals experiment with and explore various legal and illegal drugs (J. J. Arnett, 2005), such as alcohol and marijuana (P. Chen & Jacobson, 2012). In fact, young adults are much more likely to use substances than youth, given the high level of exploration associated with this life stage (J. J. Arnett, 2000). Alcohol is a critical substance to examine given the shift during this developmental period. Specifically, during young adulthood, alcohol use transitions from an illegal, risky activity, to legal and normative (Maggs & Schulenberg, 2004). Critically, the substance use patterns that young adults form during this time influence lifelong patterns of use and other health behaviors (Flory et al., 2004).

Binge drinking behaviors—consuming five or more drinks (male), or four or more drinks (female), in about two hours (NIAAA, 2020)—peak among 18- to 25-year-olds (Naimi et al., 2003). Short-term correlates of binge drinking include automobile accidents (Movig et al., 2004) and engaging in risky sexual behaviors (Fergusson & Lynskey, 1996; Ritchwood et al., 2015). In the longer-term, binge drinking is associated with higher levels of later risk for substance use problems (e.g., Merline et al., 2004; Patrick & Schulenberg, 2011), including abuse and/or dependence (Chassin et al., 2002). Additionally, according to one study, binge drinking is linked to higher depression, crime, and lower rates of high school completion as well as lower enrollment in secondary schools (Hill et al., 2000). Given the prevalence of

binge drinking during young adulthood as well as the long-term correlates, it is critical to understand the factors that shape young adults' engagement in binge drinking. In fact, research reveals an important predictor of binge drinking in young adulthood is earlier (i.e., younger) age of initiation to alcohol use (e.g., DeWit et al., 2000; Ellickson et al., 2001).

During young adulthood, beyond the legal and normative transition to alcohol use, individuals also experiment more with other substances, including marijuana (H. R. White et al., 2006). Importantly, some research has found that the transition to young adulthood is an especially vulnerable time for youth to experiment with marijuana (J. S. Tucker et al., 2005). Among the consequences of marijuana use are worse academic performance [i.e., lower grades and less class attendance; Arria et al. (2015)], greater alcohol use (Gunn et al., 2018), and later drug involvement (Scheier & Griffin, 2021). Additionally, individuals that engage in marijuana use in young adulthood are more likely to have later dependence problems and difficulties with emotion regulation (Brook et al., 2016) and to engage in other high-risk behaviors including risky sexual behaviors (Guo et al., 2002). Research indicates that an important predictor of marijuana use includes having friends that used marijuana (Kosterman et al., 2000; Windle & Wiesner, 2004). Given the consequences of marijuana use, it is critical to understand more about substance use patterns in young adults.

### Risky Sexual Behaviors

In addition to greater involvement in substance use, young adults are increasingly likely to engage in sexual behaviors as compared to adolescents (Lefkowitz & Gillen, 2006). Although sexual behaviors are increasingly normative during this developmental period, many young adults engage in sexual behaviors that are risky, such as casual sexual experiences [i.e., hooking up; Garcia et al. (2012)]. Having more sexual partners is considered a risky behavior, given the increased chances for sexually transmitted

diseases and unwanted pregnancy (Grabovac et al., 2020; Kelley et al., 2003). Importantly, engagement in one risky sexual behavior is often linked to other risky sexual behaviors. For example, research suggests co-morbidity between individuals' number of sexual partners and failure to consistently use condoms (Ashenhurst et al., 2017). Furthermore, individuals that have more sexual partners are at greater risk for sexual victimization [especially for women; Testa et al. (2007)] and are more likely to engage in substance use behaviors (Cavazos-Rehg et al., 2011). Given the health implications of number of sexual partners, it is important to understand more about the socialization of these behaviors.

### Volunteering

Beyond risky behaviors, young adulthood is an important time for the development of prosocial behaviors, including volunteering. Involvement in civic behaviors, including volunteering, is linked with greater well-being and less risky behaviors (Larson et al., 2006; Ludden, 2011). Not only that, but during adolescence and young adulthood, individuals begin to form lifelong attitudes about volunteering and civic behaviors (Schumacher & Connaughton, 2020). During adolescence, many youth engage in volunteering behavior with parents (Sartor & Youniss, 2002) and as a requirement for high school graduation and/or college admittance (Marcelo, 2007). In contrast, during young adulthood, many individuals move away from home, away from the pressure of parents, and volunteering transitions to volitional behavior. Importantly, individuals that volunteer report greater well-being (Chan & Mak, 2020) and purpose (Okun, 2016). Volunteering also is linked with stronger intrinsic work values (Johnson et al., 1998). In short, given the importance of prosocial development, it is important to understand more about their predictors and correlates in young adulthood.

## **The current study**

Young adulthood is an important time of development when individuals explore their beliefs and attitudes and engage in (often) new activities in a variety of domains and build lifelong patterns of behavior (J. J. Arnett, 2000). Although young adults increase their autonomy and independence during this period of life, partners from numerous close relationships, including parents, peers, romantic partners, and siblings continue to be important socialization agents (Oliveira et al., 2020). Building on recent work focused on the importance of sibling relationships during young adulthood (e.g., Cassinat & Jensen, 2020; Jensen et al., 2018; Killoren et al., 2015), the present study examined the impact of sibling influence processes in critical developmental domains of young adulthood (i.e., substance use, risky sexual behaviors, and volunteering), using longitudinal, nationally representative data. Rooted in observational learning theory and using Actor-Partner Interdependence Models (APIM), I hypothesized that older and younger siblings' behaviors in each domain will be positively associated. Further, consistent with observational learning principles, it was expected that these associations would be more pronounced among siblings that reported higher levels of relationship closeness and were the same gender. Critically, these APIM models tested whether patterns of sibling socialization followed traditional top-down perspectives (i.e., older-to-younger sibling) or reflect increased bidirectionality in young adulthood. Finally, these associations were examined net of markers of previous behavior within each domain, gender, parents' education, race, and co-residence with siblings. Additionally, for alcohol and marijuana use these associations were examined net of friends' behaviors, an important predictor of substance use (Miller et al., 2021; Schuler et al., 2019).



## Methods

### *Participants*

Data for this study come from Waves II and III of the National Longitudinal Study of Adolescent Health to Young Adult Health (Add Health). Data were limited to the sibling pairs subsample, which included 3,122 unique sibling pairs that were linked together; this number was reduced to 2,145 pairs after non-sibling pairs (e.g., cousins, foster siblings) were removed. On average, during Wave II, older siblings were 17.28 ( $SD = 1.55$ ) and younger siblings were 15.65 ( $SD = 1.59$ ) years of age. During Wave III (the first young adult wave) older siblings were 22.73 ( $SD = 1.54$ ; Range: 18-27) years of age and were 52.03% female; younger siblings averaged 21.03 ( $SD = 1.60$ ; Range: 18-26) years of age and were 53.66% female. The majority of sibling dyads were the same gender (61.45%). Additionally, 64.29% of the sample was White, 22.91% were African American/Black, and 16.30% of the sample was Hispanic or Latino. On average parents had slightly more than a high school degree. See Table 1 for demographic information.

### *Procedure*

Data for Add Health were initially collected utilizing a clustered sampling design of 132 high schools that were representative of US schools with respect to region of country, urbanicity, size, type, and ethnicity. All students at these schools were eligible to participate; parents were informed in advance of data collection and given the chance to direct their children to not participate in the study. Ninety-thousand students participated in a self-administered, in-school questionnaire. A subset of

**Table 2.1:**

*Demographic characteristics of participants and their sibling as reported by participants*

	Older Sibling (N = 2,145) M (SD) or proportion	Younger Sibling (N = 2,145) M (SD) or proportion
Age Wave III	22.73(1.54)	21.03(1.6)
Age Difference	1.70 (1.51)	—
Mother's Education Level	5.32 (2.35)	5.36 (2.33)
Father's Education Level	5.42 (5.08)	5.42 (2.34)
Number of Siblings	3.69 (2.54)	3.60 (2.42)
Female	.52	.54
Same Gender Sibling Dyad	.61	—
Coresidence with sibling	.23	—
Biological Status	.48	—
Ethnicity		
African American	.23	—
European American	.64	—
Other	.13	—
Hispanic	.16	—

Education: 1 = 8th grade or less, 2 = More than 8th grade, but did not graduate high school, 3 = Went to a business, trade or vocational school instead of high school, 4 = High school graduate, 5 = Completed a GED, 6 = Went to a business, trade or vocational school after high school, 7 = Went to college but did not graduate, 8 = Graduated from a college or university, 9 = Professional training beyond a four-year college or university

20,745 students also had the potential to participate in in-home interviews in Wave I which took place between September 1994 and December 1995. Participants that were selected to participate in the in-home interviews indicated times that they were available for an interview; interviewers then visited their home and asked a series of questions that lasted approximately one to two hours. During Wave II, which was collected from April to August 1996, included nearly 15,000 individuals that participated in interviews and 14,738 youth that participated in surveys; Wave III, which was collected from August 2001 and April 2002 included just over 15,000 interviews and 15,197 that completed surveys.

Sibling pairs were identified during Wave I based on answers to the in-school survey. Individuals that indicated they had siblings were sampled, with oversampling to ensure inclusion of sibships with varying levels of genetic relatedness, including full siblings, step-siblings, foster and adopted siblings and cousins (Harris, 2013). Finally, the Institutional Review Board at the University of North Carolina – Chapel Hill approved all procedures for the ADD Health study.

## *Measures*

### Binge Drinking

During Wave II, individuals reported their overall drinking behaviors using a dichotomous variable that asked, “Have you had a drink of beer, wine, or liquor—not just a sip or a taste of someone else’s drink—more than two or three times?” (0 = *No*, 1 = *Yes*); 51.60% of older siblings, and 43.32% of younger siblings indicated that they had drunk alcohol in the past. Binge drinking at Wave III was measured using a single item that asked, “During the past two weeks, how many times did you have five or more drinks on a single occasion, for example, in the same evening?” This variable was dummy coded (0 = *No*, 1 = *Yes*) to indicate whether participants engaged in binge drinking or not. 41.52% of older siblings and 47.96% of younger siblings indicated that they have engaged in binge drinking in the past two weeks.

### Marijuana Use

Marijuana use at Wave II was measured using a single item that asked, “Have you tried or used marijuana?” (0 = *No*, 1 = *Yes*); 24.85% of older siblings and 24.94% of younger indicated that they had used marijuana in the past. Marijuana use at Wave III was measured using a single item that asked participants “In the past year, have you used marijuana” (0 = *No*, 1 = *Yes*). 41.64% of older siblings and 43.60% of younger siblings indicated that they have used marijuana in the past year.

### Risky Sexual Behavior

Sexual behaviors at Wave II were measured by asking participants, “Have you ever had sexual intercourse?” 54.83% of older siblings and 37.39% of younger

siblings indicated that they had had sexual intercourse. In Wave III, individuals were asked, “With how many partners have you ever had vaginal intercourse, even if only once?” Participants were then able to indicate how many sexual partners they had ever had, up to 50 (Older:  $M = 6.34$ ;  $SD = 7.75$ ; Range = 0 - 50; Younger:  $M = 5.88$ ,  $SD = 7.72$ ; Range = 0 - 50).

### Volunteering

To assess previous volunteering behaviors, at Wave III, individuals were asked to retrospectively report on their volunteering behaviors. Specifically, individuals were asked, “At any time during your adolescence, when you were between 12 to 18 years old, did you regularly participate in volunteer or community service work? Don’t count things like washing cars or selling candy to raise money.” (0 = *No*, 1 = *Yes*). 41.82% of older siblings, and 42.48% indicated that they regularly volunteered as an adolescent. Volunteering behaviors in young adulthood were measured with a single item that asked, “During the last 12 months did you perform any unpaid volunteer or community service work?” Participants indicated if they have (1) or have not (0) participated in volunteering behaviors (26.41% of older siblings and 27.20% of younger siblings reported engaging in volunteering behaviors during the past year).

### Sibling Closeness

Following McHale and colleagues (2009), sibling closeness was measured using four items that were asked on a 5-point scale from 0 = *Never* to 4 = *Very often*. Example items included, “How close do you feel to (him/her)” and “How often do you and (he/she) quarrel or fight?” As needed, items were reverse coded, such that higher scores denote greater closeness. Items were then averaged across the four items to create a total score (older:  $M = 2.19$ ,  $SD = .96$ ,  $\alpha = .81$ ; younger:  $M =$

2.23,  $SD = .97$ ,  $\alpha = .82$ ).

### Demographic Information

Individuals reported on key demographics, as well as other factors that were related to young adult behaviors. In each of the analyses, I controlled for the target's gender (0 = *Female*, 1 = *Male*), age, and race (0 = *Non-white*, 1 = *White*). Additionally, sibling gender composition (0 = *Same gender*, 1 = *Mixed gender*) was used as a moderator. Beyond this I examined the differences in siblings' residences, dummy coded to capture individuals that lived with their siblings versus those that did not (1 = *Live together*, 0 = *Do not live together*); very few siblings lived together (23.08%).

## Results

### *Analytic Strategy*

To address study hypotheses, I ran a series of Actor-Partner Interdependence Models (APIM) within the structural equation framework using MPlus (Version 8.6; Muthen & Muthen). APIMs (Kenny et al., 2020) allow for simultaneous estimation of both actor effects (e.g., the influence that older and younger siblings have on their own behavior) and partner effects (e.g., the influence that older and younger siblings have on each other's behavior). These analyses also examined whether partner (or sibling) effects were moderated by markers of observational learning, specifically sibling closeness and gender composition of the sibling dyad (resulting in six total interactions per dependent variable: two two-way interactions and a three-way interaction for both older and younger siblings). For dichotomous dependent variables (i.e., binge drinking, marijuana use, and volunteering), logit links estimation

was used; number of sexual partners was modeled as a continuous dependent variable.

Covariates included participants' gender, age, and race, as well as co-residence with sibling (0 = *Do not live together*, 1 = *Live together*). All continuous predictors were centered at their mean. Interaction terms were then created by multiplying siblings' previous behavior with each of the moderators (i.e., sibling closeness and gender composition of the sibling dyad), and then including them as separate terms in each model. Data were analyzed using the maximum likelihood estimator in MPlus.

Bivariate correlations and descriptive statistics of study variables, independent variables, and moderators are presented in Table 2.

### *Binge Drinking*

For binge drinking, analyses were limited to those who provided values on Wave II variables, resulting in a sample 1,590 sibling pairs. Complete results are presented in Table 3. For younger siblings, drinking during adolescence was significantly associated with binge drinking during young adulthood (OR = 1.59, 95% CI = [1.15, 2.20]). Specifically, younger siblings that reported drinking alcohol at Wave II were 1.59 times more likely to engage in binge drinking at Wave III. Consistent with top-down models of sibling influence, older siblings' earlier drinking was prospectively linked to younger siblings' binge drinking during young adulthood (OR = 1.72, 95% CI = [1.29, 2.29]). Younger siblings were 1.72 times more likely to binge drink at Wave III if their older sibling reported drinking alcohol at Wave II. Inconsistent with observational learning hypotheses this main effect was not qualified by interactions with sibling closeness or gender composition of the sibling dyad.

Turning to older siblings, drinking during adolescence was significantly associated with binge drinking during young adulthood (OR = 1.38, 95% CI = [1.06, 1.80]).

**Table 2.2:***Bivariate Correlations and Means for Study Variables (N = 1065)*

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Sex Composition	—										
2. Age Difference	0.13***	—									
3. YS Intimacy	-0.19 ***	-0.09 *	—								
4. OS Binge	0.04	-0.08 *	-0.03	—							
5. OS Marijuana	0.09*	NA	-0.04	0.23***	—						
6. OS Condom	0.01	-0.09 *	0.02	0	-0.12 ***	—					
7. OS Volunteering	0.01	0	0.09*	-0.01	-0.04	0.12***	—				
8. YS Binge	-0.02	-0.02	0.04	0.13***	0.08*	-0.01	-0.02	—			
9. YS Marijuana	0	0.03	-0.05	0.1***	0.23***	-0.05	-0.04	0.22***	—		
10. YS Condom	0.02	0	0.02	-0.03	-0.04	0.13***	0.07*	NA	-0.16 ***	—	
11. YS Volunteering	-0.05	0.06	0.09*	0.02	0.02	0.05	0.1***	-0.01	-0.05	0.14***	—
<i>M</i>	0.39	1.7	0	0.42	0.42	2.83	0.26	0.48	0.44	3.15	0.27
<i>SD</i>	0.49	1.51	0.97	0.49	0.49	2.58	0.44	0.5	0.5	2.55	0.45

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Specifically, older siblings that reported drinking alcohol at Wave II were 1.38 times more likely to engage in binge drinking at Wave III. Inconsistent with bidirectional influence hypotheses during young adulthood, younger siblings' earlier drinking was not associated with older siblings' binge drinking during young adulthood. Also, inconsistent with observational learning hypotheses, the younger-to-older sibling main effect was not qualified by interactions with sibling closeness or gender composition of the sibling dyad.

**Table 2.3:**

*APIM analysis of older and younger sibling influence on binge drinking behaviors during young adulthood.*

Variable	Older Sibling			Younger Sibling		
	b	SE	OR	b	SE	OR
Sex	-.90***	.13	.41	-.87***	0.13	0.42
Age	-.18***	.04	.83	-.09*	0.04	0.92
Race	.73***	.14	2.07	.74***	0.14	2.1
Coresidence	.20	.15	1.22	.08	0.15	1.08
Sex Composition	.06	.13	1.06	.11	0.14	1.12
Sibling Intimacy	.08	.08	1.08	-.09	0.08	0.91
Wave 2 O Drinking	.32*	.14	1.38	.46**	0.17	1.72
Wave 2 Y Drinking	.24	.16	1.28	.54***	0.15	1.59
Friend Drinking	.18***	.05	1.20	.04	0.05	1.04
Sex Composition X Intimacy	-.04	.14	.96	.16	0.15	1.18
Sex Composition X Y Drinking	-.10	.26	.91			
Sex Composition X O Drinking				-.39	0.27	0.68
Sibling Intimacy X Y Drinking	.08	.16	1.08			
Sibling Intimacy X O Drinking				-.08	0.16	0.92
Intimacy X Y Drinking X Sex Composition	.12	.27	1.13			
Intimacy X O Drinking X Sex Composition				.44	0.29	1.56

AIC = 3119.99; BIC = 3270.39

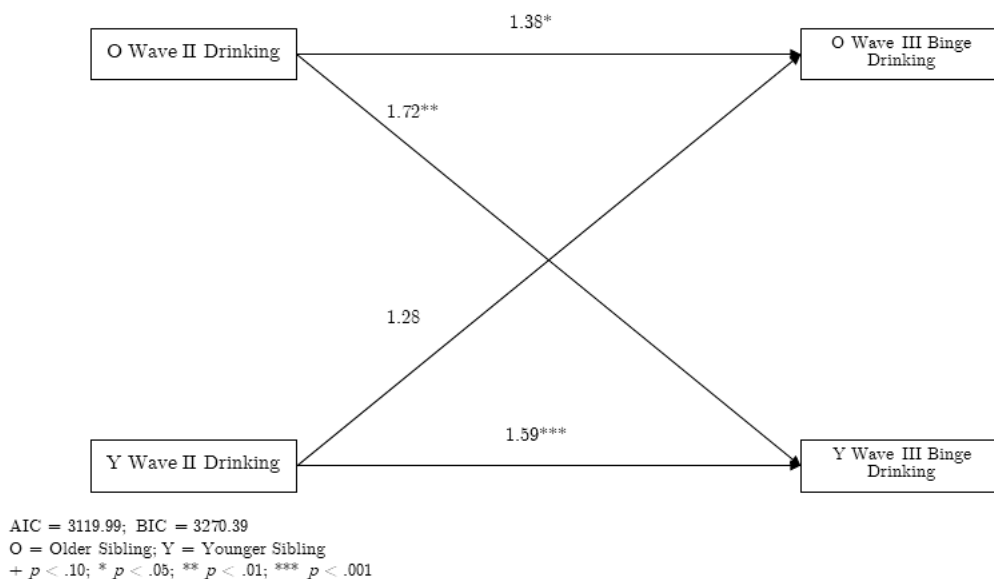
O = Older Sibling; Y = Younger Sibling

+  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

### *Marijuana Use*

For marijuana use, analyses were limited to those that had participated in Wave II, reducing the analytic sample to 1,838 participants. Complete results are presented in Table 4. For younger siblings, marijuana use during adolescence was





**Figure 2.1:**

*Simplified output for APIM model examining sibling influence on binge drinking behaviors*

significantly associated with marijuana use during young adulthood (OR = 3.49, 95% CI = [2.64, 4.61]). Specifically, younger siblings that reported using marijuana at Wave II were 3.49 times more likely to use marijuana at Wave III. Additionally, consistent with top-down models of sibling influence, older siblings' marijuana use during adolescence was prospectively related to younger siblings' marijuana use during young adulthood (OR = 1.84, 95% CI = [1.37, 2.48]). Specifically, younger siblings that had an older sibling that used marijuana at Wave II were 1.84 times more likely to use marijuana at Wave III. However, inconsistent with observational learning hypotheses, this main effect was not qualified by interactions with sibling closeness or sibling dyadic sex composition.

For older siblings, marijuana use during adolescence was significantly associated with marijuana use during young adulthood (OR = 4.43, 95% CI = [3.39, 5.78]). Specifically, older siblings that reported using marijuana at Wave II were 4.43 times more likely to use marijuana at Wave III. Inconsistent with a bidirectional sibling

influence hypothesis, younger siblings' marijuana use at Wave II did not significantly predict older siblings' marijuana use at Wave III. Additionally, this model failed to find evidence of observational learning hypotheses, as all interactions were non-significant.

**Table 2.4:**

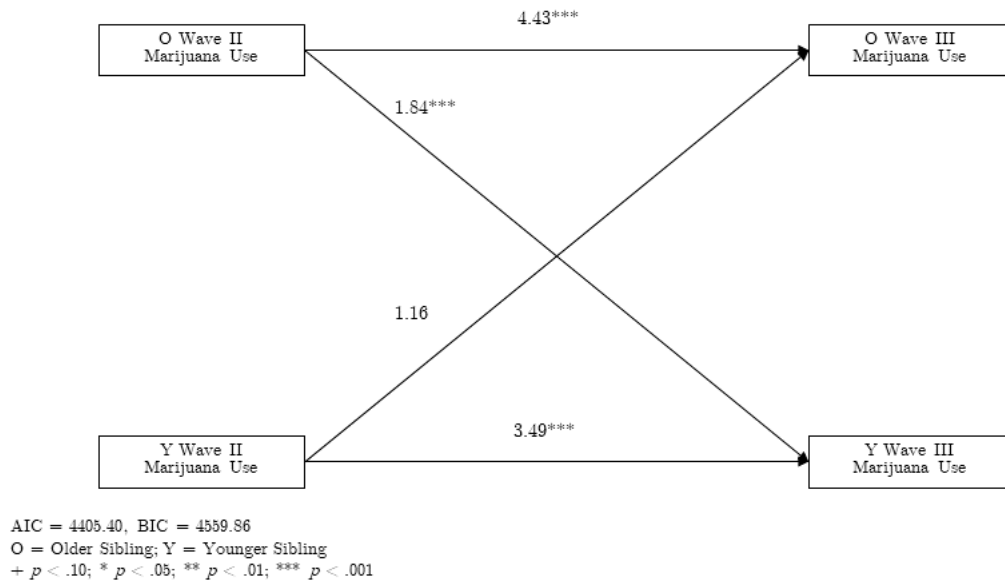
*APIM analysis of older and younger sibling influence on marijuana use during young adulthood.*

Variable	Older Sibling			Younger Sibling		
	b	SE	OR	b	SE	OR
Sex	-0.44***	0.11	0.65	-0.53***	0.11	0.59
Age	-0.11**	0.04	0.9	-0.12***	0.03	0.89
Race	0.61***	0.11	1.84	0.78***	0.11	2.17
Coresidence	0.04	0.13	1.04	0.26*	0.13	1.3
Sex Composition	0.3*	0.13	1.35	0.11	0.13	1.12
Sibling Intimacy	-0.09	0.08	0.91	-0.16*	0.08	0.86
Wave 2 O Marijuana	1.49***	0.14	4.43	1.25***	0.15	1.84
Wave 2 Y Marijuana	0.15	0.16	1.16	0.61***	0.14	3.49
Friend Marijuana Use	0.16**	0.06	1.17	0.13*	0.06	1.13
Sex Composition X Intimacy	0.01	0.13	1.01	0.07	0.14	1.07
Sex Composition X O Marijuana Use				-0.46+	0.24	0.63
Sex Composition X Y Marijuana Use	-0.06	0.26	0.94			
Sibling Intimacy X O Marijuana Use				0.28+	0.16	1.32
Sibling Intimacy X Y Marijuana Use	-0.12	0.16	0.9			
Intimacy X O Marijuana Use X Sex Composition				-0.25	0.25	0.78
Intimacy X Y Marijuana Use X Sex Composition	0.14	0.27	1.14			

AIC = 4405.40, BIC = 4559.86  
O = Older Sibling; Y = Younger Sibling  
+  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

### *Risky Sexual Behavior*

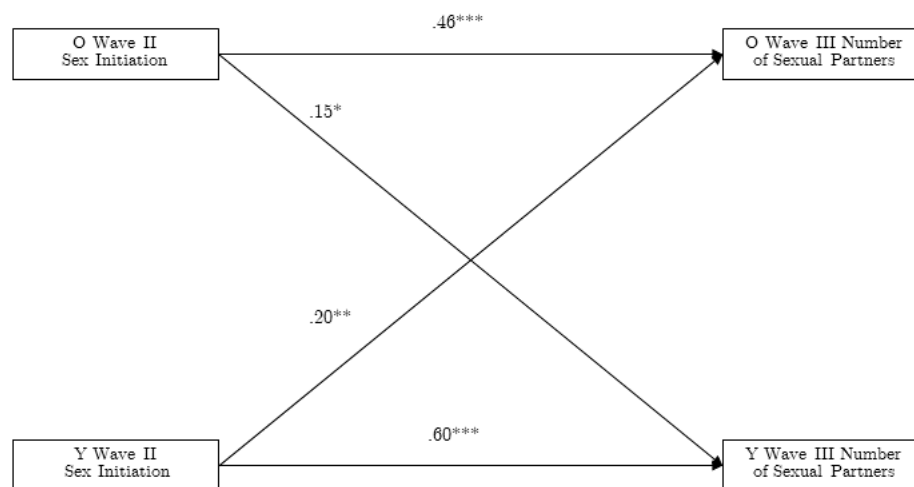
Examining risky sexual behaviors, the final analytic model included 1,792 individuals that participated in Wave II. For full results see Table 5. The number of sexual partners that younger siblings reported during young adulthood was positively related to sexual initiation at Wave II ( $b = 4.39$ ,  $p < .001$ ,  $\beta = .60$ ). Consistent with top-down hypotheses of sibling influence, older siblings' sexual initiation during adolescence was positively related to younger siblings' number of sexual partners at Wave III ( $b = 1.10$ ,  $p < .05$ ,  $\beta = .15$ ). Finally, inconsistent with observational learning hypotheses, this main effect was not qualified by interactions with sibling closeness or sibling dyadic sex composition.



**Figure 2.2:**

*Simplified output for APIM model examining sibling influence on marijuana use*

For older siblings, having had sex during adolescence was positively related to the number of sexual partners reported during young adulthood ( $b = 3.48$ ,  $p < .001$ ,  $\beta = .46$ ). Consistent with a bidirectional sibling influence hypothesis during young adulthood, younger siblings' sexual initiation during adolescence was positively associated with older siblings' number of sexual partners at Wave III ( $b = 1.53$ ,  $p < .01$ ,  $\beta = .2$ ). However, inconsistent with observational learning hypotheses, this main effect was not qualified by interactions with sibling closeness or gender composition of the sibling dyad.



$\chi^2 = 20.65(18)$ ,  $p = .30$ , RMESA = .009, CFI = .992, TLI = .982, SRMR = .012  
 O = Older Sibling; Y = Younger Sibling  
 +  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Figure 2.3:**

*Simplified output for APIM model examining sibling influence on number of sexual partners*

**Table 2.5:**

*APIM analysis of older and younger sibling influence on number of sexual partners during young adulthood.*

Variable	Older Sibling			Younger Sibling		
	b	SE	$\beta$	b	SE	$\beta$
Sex	-1.83***	0.37	-0.24	-1.61***	0.35	-0.22
Age	-0.08	0.13	-0.02	0.03	0.12	-0.01
Race	-0.12	0.39	-0.02	0.26	0.37	0.04
Coresidence	0.04	0.46	0.01	0.43	0.43	0.06
Sex Composition	0.26	0.49	0.03	0.93	0.56	0.13
Sibling Intimacy	-0.28	0.27	-0.04	0.1	0.29	0.01
O Sexual Initiation	3.48***	.41	0.46	1.1*	0.47	0.15
Y Sexual Initiation	1.53**	.50	0.2	4.39***	0.4	0.6
Sex Composition X Sibling Closeness	0.24	0.35	0.02	-0.29	0.34	-0.02
Sex Composition X O Sex Initiation				-1.32+	0.73	-0.08
Sex Composition X Y Sex Initiation	-0.11	0.78	-0.01			
Y Intimacy X O Sexual Initiation				-0.28	0.41	-0.03
O Intimacy X Y Sexual Initiation	0.63	0.45	0.05			
Y Intimacy X O Sexual Initiation X Sex Composition				0.25	0.52	0.02
O Intimacy X Y Sexual Initiation X Sex Composition	0.25	0.67	0.01			

$\chi^2 = 20.65(18)$ ,  $p = .30$ , RMESA = .009, CFI = .992, TLI = .982, SRMR = .012

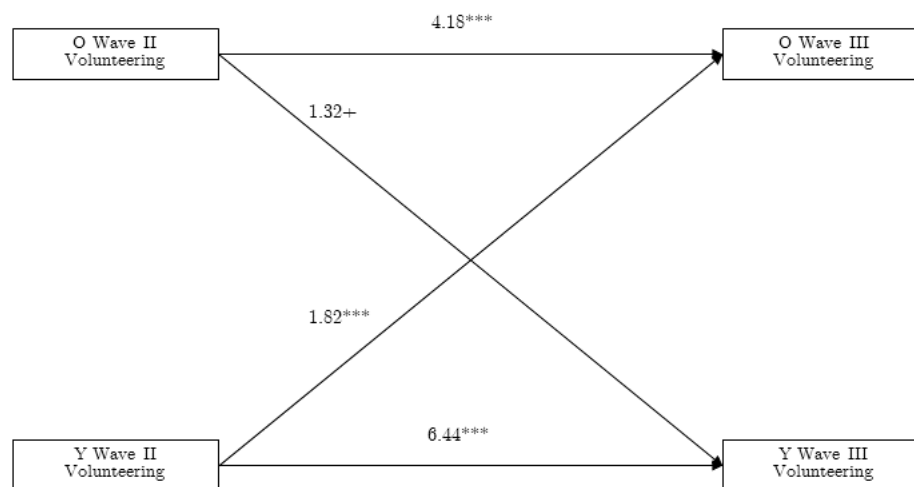
O = Older Sibling; Y = Younger Sibling

+  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

### *Volunteering*

Finally, examining volunteering behaviors, observations were limited to the 1,881 individuals that participated in Wave III. See Table 6 for full results. Younger siblings that participated in volunteering during adolescence were more likely to participate in volunteering behaviors in young adulthood (OR = 6.44, 95% CI = [5.08, 8.16]). Specifically, younger siblings that volunteered during adolescence were 6.44 times more likely to volunteer at Wave III. Inconsistent with the hypothesis of top-down sibling influence, there was no significant relationship between older siblings' adolescent volunteering and younger siblings' young adult volunteering; rather this effect was at a trend level (OR = 1.32, CI = [.99, 1.77],  $p = .06$ ). Further, this effect was not qualified by interactions with sibling closeness or gender composition of the sibling dyad, failing to support the observational learning hypotheses.

Turning to older siblings, adolescents that participated in volunteering behaviors during adolescence were more likely to volunteer during young adulthood (OR = 4.18, 95% CI = [5.08, 8.16]). Specifically, older siblings that volunteered at Wave II were 4.18 times more likely to volunteer at Wave III. Supportive of the idea that sibling influence becomes more bidirectional during young adulthood, older siblings that had a younger sibling who volunteered at Wave II were more likely to volunteer at Wave III (OR = 1.82, CI = [1.36, 2.43]). Specifically, older siblings that had a younger sibling that volunteered during adolescence were 1.82 times more likely to volunteer during young adulthood. Finally, similar to other models, none of the interactions testing observational learning hypotheses were statistically significant.



AIC = 3872.84, BIC = 4016.87

O = Older Sibling; Y = Younger Sibling

+  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Figure 2.4:**

*Simplified output for APIM model examining sibling influence on volunteering behaviors*

**Table 2.6:**

*APIM analysis of older and younger sibling influence on volunteering behavior during young adulthood.*

Variable	Older Sibling			Younger Sibling		
	<i>b</i>	<i>SE</i>	OR	<i>b</i>	<i>SE</i>	OR
Sex	-0.11	0.11	0.9	-0.03	0.12	0.97
Age	-0.08*	0.04	0.92	-.07*	0.04	0.93
Race	0.12	0.12	1.12	.57***	0.13	1.76
Coresidence	0.08	0.14	1.08	-.29*	0.14	0.75
Sex Composition	0.27	0.17	1.31	0.08	0.17	1.09
Sibling Intimacy	0.13	0.11	1.14	-0.01	0.1	0.99
O Volunteering Wave II	1.43***	0.12	4.18	.28+	0.15	1.32
Y Volunteering Wave II	.60***	0.15	1.82	1.86***	0.12	6.44
Sex Composition X Sibling Intimacy	-0.06	0.17	0.94	0.19	0.18	1.21
Sex Comp X Y Volunteering	-0.24	0.24	0.79			
Sex Comp X O Volunteering				-0.26	0.24	0.77
Intimacy X Y Volunteering	0.03	0.15	1.03			
Intimacy X O Volunteering				0.22	0.15	1.25
Intimacy X Sex Comp X Y Volunteering	-0.01	0.25	0.99			
Intimacy X Sex Comp X O Volunteering				-0.3	0.26	0.74

AIC = 3872.84; BIC = 4016.87

O = Older Sibling; Y = Younger Sibling

+  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

## Discussion

During young adulthood, individuals experiment and explore various risky (e.g., substance use and risky sexual behaviors) and prosocial (e.g., volunteering) behaviors. Although young adults are increasingly autonomous, many are still influenced by socialization agents that were salient during adolescence including parents and peers (Lefkowitz et al., 2004; Luyckx et al., 2007). Limited work, however, has investigated how siblings, who are unique socialization agents during adolescence [McHale et al. (2012); Milevsky2011], may influence each other's behaviors during young adulthood. It is possible that as sibling relationships become more egalitarian during young adulthood that sibling influence will become increasingly bidirectional. Whereas older siblings primarily influence younger siblings during childhood and adolescence, in a top-down socialization process, younger siblings may begin to influence older siblings during young adulthood. Congruent with observational learning principles, it is further possible that sibling influences will be more pronounced when they share more intimate relationships and when they are the same gender. The present study examined these possibilities by testing the longitudinal implications of sibling influence on young adults' risky and prosocial behaviors. Using an APIM framework, I specifically tested whether top-down or bidirectional models of sibling socialization were evident and whether sibling influences were enhanced by markers of observational learning.

Overall, support for the emergence of bidirectional sibling influence during young adulthood was mixed. Evidence for top-down (older-to-younger) sibling influence was apparent across markers of risky behaviors (i.e., binge drinking, marijuana use, and number of sexual partners), but not for prosocial behaviors (i.e., volunteering). During young adulthood, it is possible that older siblings continue to serve as trainers

of deviant and risky behaviors. Indeed, research during adolescence shows that older siblings may train their younger siblings to be increasingly antisocial, resulting in sibling similarities in deviant behaviors (Patterson et al., 1984; Slomkowski et al., 2001). Such training may be apparent in shared engagement in risky behaviors as well as older siblings providing the settings in which youth can engage in substance use and other risky behaviors (Joseph Lee Rodgers et al., 1992; Rowe & Gulley, 1992). It is possible that these processes continue in early adulthood, especially for drinking related outcomes, as alcohol use becomes legal for those 21 years of age and older. Further, it is possible that evidence for top-down influence was the result of developmental similarity between the siblings across the longitudinal waves. Specifically, younger siblings at Wave III were at the age (21.03 years) in young adulthood when substance use tends to peak (K. Chen & Kandel, 1995; Johnston et al., 2007). Older siblings' substance use behaviors during Wave II when they were entering young adulthood (about 17 years old), therefore, may have been especially salient to younger siblings at Wave III, when they were in a similar high-risk time of development.

Unlike risky behaviors, evidence for older-to-younger sibling influence was not statistically significant for young adults' volunteering behaviors. Perhaps the observed trend level effect was due to how volunteering was measured. Unlike the other measures, volunteering during adolescence was measured retrospectively (i.e., at Wave III when participants reported on their volunteering during Wave II and Wave III). As such, this measure demonstrated a much higher level of stability between waves which may have limited the ability to detect sibling influence.

Evidence for bottom-up (younger-to-older) sibling influence was present for number of sexual partners and volunteering behaviors, but not binge drinking or marijuana use. Perhaps evidence for bidirectional influence on the number of sexual partners is the result of normative changes in the age of first marriage. Given the societal delay in age of marriage (Willoughby & James, 2017), it is possible that



neither older nor younger siblings have settled into a single monogamous relationship. Along with the delay to marriage, many individuals explore their sexual identities during young adulthood. Given that older and younger siblings are both still in the stage of life where they are exploring and experimenting with sexual experiences (Garcia et al., 2012; Lefkowitz & Gillen, 2006), it is possible that siblings' experiences continue to influence each other. Specifically, previous research has demonstrated that younger siblings tend to initiate sexual experiences at younger ages (Pasqualini et al., 2021; Joseph L. Rodgers & Rowe, 1988); therefore, it is possible that younger siblings tend to have more risky attitudes towards sex overall, which may then shape older siblings' attitudes about sexuality and sexual behaviors during this period of exploration.

Turning to volunteering behaviors, it is possible that bottom-up influences may be due, in part, to the stage of life that individuals are in. During early young adulthood, life is especially volatile as individuals experience multiple life transitions. In fact, research reveals that during this period individuals are more prone to altruism (Oesterle et al., 2004). Given this orientation towards altruism and freedom to explore various aspects of their identities (Erik Homburger Erikson, 1956; Marcia, 2002), it is possible that young adults in their late teens and early 20s have the opportunity to engage in various prosocial behaviors, including volunteering. However, as older siblings move into middle to later young adulthood, they may have less freedom to engage in such activities. Therefore, their younger siblings' behaviors may be especially salient.

It is possible that bottom-up influence did not extend to substance use because of differences in older and younger siblings' development as young adults. Previous research shows that as individuals progress through young adulthood, their engagement in risky behaviors (especially binge drinking) declines (Jager et al., 2015; Kanny et al., 2020). Therefore, it is possible that younger siblings' earlier behaviors (in

late adolescence) were less relevant for their older siblings' later substance use (in middle young adulthood) given this developmental decline in use. As mentioned earlier, older siblings' experiences during the early stages of young adulthood in Wave II may have been especially salient for younger siblings' substance use during the same developmental time-period which was assessed in Wave III. As such, it is possible that bidirectional influence may be more apparent when both siblings are in middle-to-late young adulthood and future research would benefit from exploring such patterns. In contrast, when examining risky sexual behaviors, this study found evidence for bidirectional influence. This finding is logical in light of the increasingly delayed age of marriage, which means that siblings were likely both still engaging in exploration of sexual and romantic relationships at Waves II and III. However, it is possible that as young adults begin to settle into marriage and more stable relationships, the way that siblings influence each other may shift. For those that do not settle down at the same time, it is unlikely that siblings will continue to influence each other. Yet, for those that both enter stable relationships (i.e., maintain their developmental similarities), it is possible that the ways that siblings influence each other will likewise shift. Specifically, it is possible that siblings may now act as a source of support for that relationship, offering advice on how to communicate or work through conflict.

My hypotheses that observational learning processes, specifically that sibling closeness and gender composition of the sibling dyad would moderate cross-sibling (older-to-younger as well as younger-to-older) effects was not supported. On the one hand, it is possible that during young adulthood observational learning processes, which have been shown to be relevant during adolescence (e.g., Bi et al., 2021b; McHale et al., 2009; S. D. Whiteman et al., 2007a), are less relevant. Indeed, much focus in popular media has been placed on young adults' experiencing life for themselves and living life to the fullest, so much so that perhaps observational learning becomes

even less influential at a time when behaviors are transitioning from deviant and dangerous to legal and expected (i.e., drinking at 18 is not legal, however, drinking at 21 is basically a rite of passage). On the other hand, it is possible that hypothesized observational learning moderation was not found because sibling closeness is not a suitable proxy for sibling modeling during young adulthood. During adolescence, sibling closeness is often measured in part by asking participants how much time is spent together, which provides increased opportunities for individuals to model and observe the behavior of their sibling. During young adulthood, however, siblings increasingly do not live together, and intimacy may, therefore, not be a sufficient proxy for modeling behaviors.

It is also possible that sibling gender composition did not moderate associations because of the implications of gender change during young adulthood. During childhood and early adolescence, youth consistently prefer same gendered peers (Bukowski et al., 1993; Lam et al., 2014; C. L. Martin & Fabes, 2001). This segregation is likely one of the ways that individuals are socialized, as it provides them more opportunities to “do gender” (Bukowski et al., 1993). However, as individuals transition through late adolescence and into adulthood, they begin to de-segregate and spend more time with other-gender peers (Lam et al., 2014). It is possible that as individuals begin to spend more time with other gender peers, the importance of gender in sibling relationships likewise diminishes (J.-Y. Kim et al., 2006; Lam et al., 2012). It is also possible that siblings’ similarities observed in this study were, at least in part, the result of shared genes and environments and not related specifically to observational learning processes. Future behavioral genetic work should endeavor to disentangle such possibilities.

### *Limitations and Conclusions*

There were several methodological shortcomings that limit the conclusions of the study. First, data for this study, while comprehensive and nationally representative, were collected beginning more than two decades ago. During the past several decades, societal shifts have continued, especially in views regarding marijuana use and sexuality. Participants in this study also were young adults before the advent of social media and other pervasive societal trends that are common now. For example, sibling influences in young adulthood may be heightened today, as it is easier for young adult siblings to maintain contact and share their experiences with each other via social media. Therefore, it is important to keep in mind the potential generational gap that exists between these data and current young adult behaviors. Despite this limitation, being able to simultaneously examine older and younger siblings' behavior, and in some instances, to control for peer behavior, utilizing a nationally representative sample provides an important foundation that future work can build on.

Second, there were several limitations associated with the measures used in the study. For example, when examining substance use behaviors, the study utilized different instruments across the longitudinal waves. Specifically, in Wave II participants were asked about their lifetime use of substances (i.e., if they had ever used a substance). In Wave III, questions focused on substance use behavior over the past 3 months. Similarly, when measuring the number of sexual partners an individual had, at Wave II they only asked if an individual had or had not had vaginal intercourse; whereas in Wave III, participants were asked to report on the number of sexual partners that they ever had (participants could indicate zero if they had never had sex). Although these constructs are highly related (as demonstrated by the high stability coefficients for binge drinking, marijuana use, and number of sexual

partners), they are distinct. Therefore, when possible, future work should examine longitudinal influences of siblings utilizing the same measures over time.

Third, as mentioned earlier, information about volunteering behaviors was only asked at Wave III—with participants indicating if they had or had not engaged in volunteering during adolescence and if they currently volunteered. Because information was asked retrospectively, it is possible that young adults' current civic engagement behaviors shaped their recollections of their past participation, a threat to internal validity (Toftthagen, 2012). Future work should avoid utilization of retrospective techniques in order to more fully understand the influence of siblings on young adults' volunteering behaviors.

Fourth, an important consideration when utilizing the Add Health dataset is the age of the data; Waves 1 and 2 were collected nearly 30 years ago and Wave 3 was collected 20 years ago. This datedness limits the potential conclusions that can be drawn from these findings. Specifically, young adult sibling relationships have likely shifted considerably over the past several decades with the advent of social media, and other changes in communication and contact (Lindell et al., 2015). Therefore, future work would benefit from examining how these advancements in technology and communication may alter processes of sibling influence. For example, it is important to explore potential ways in which sibling contact patterns may impact sibling influence.

Finally, in these data sibling modeling was not specifically measured, rather sibling closeness was used as a proxy. Although closeness has been successfully used as a proxy for modeling in the past (McHale et al., 2009), these constructs are distinct (S. D. Whiteman et al., 2007a). Therefore, future research would benefit from distinct measurement of sibling modeling to more fully assess the processes by which siblings influence each other.

Despite these limitations, this study contributes to literature about socialization

agents during young adulthood. Indeed, older and younger siblings were found to uniquely shape each other's risky and prosocial behaviors during early adulthood. Although evidence for bidirectional influence was mixed across outcomes, it is important to note the potential shift in direction of socialization (i.e., from younger-to-older) as sibling relationships become more egalitarian and less hierarchical during young adulthood. Additionally, given age-graded normative development during childhood and adolescence, it is possible that younger siblings may "catch up" to their older siblings developmentally in young adulthood, and may therefore have increasing opportunities to influence their older siblings. In sum, the present study demonstrated that sibling influence of risky and prosocial behaviors continues into young adulthood, and it is therefore critical for future research to continue to focus on the implications of this unique family relationship.

## CHAPTER 3

## The Implications of Sibling Differentiation for Young Adults' Well-Being: Indirect Effects through Sibling Relationship Qualities

Sibling relationships are among the most ubiquitous (McHale et al., 2012) and long-lasting (V. Cicirelli, 2013) of all close relationships. Over 80% of youth have a sibling (McHale et al., 2012) and during childhood and early adolescence siblings spend up to half of their discretionary time together (Dunifon et al., 2017; McHale & Crouter, 1996). Sibling relationships, while often intimate and warm (J.-Y. Kim et al., 2006), are also among the most violent and conflictual (Campion-Barr & Smetana, 2010; Kettrey & Emery, 2006). Indeed, significant scholarly attention has investigated the nature and correlates of sibling rivalry, including the detrimental influence of this sibling relational quality (Greer & Myers, 1992; Leung & Robson, 1991). For example, sibling rivalry is associated with decreased warmth (Stocker et al., 1997) and increased conflict (Howe et al., 2011; Stocker & Youngblade, 1999) between siblings. There is a process, however, that can potentially protect against the detrimental effects of sibling rivalry: sibling deidentification (Frances F. Schachter et al., 1976).

In short, theory suggests that through deidentification processes siblings become more different from one another, thus reducing the frequency of comparison, and thereby limiting sibling rivalry and conflict and increasing sibling harmony. As sibling conflict is decreased and sibling intimacy deepens, deidentification theory further suggests that improvements in individual well-being will be promoted (Frances F. Schachter et al., 1976). Importantly, deidentification processes are especially salient as individuals engage in identity development, a process which begins in adolescence and continues into young adulthood (J. J. Arnett, 2015; Nelson et al.,

2007); though research has rarely examined the operation and implications of deidentification processes during young adulthood. The present study addresses this gap and will explore the longitudinal implications of sibling deidentification processes during young adulthood, including their connections to sibling relationship qualities and well-being.

### *Sibling Relationships*

Sibling relationships have the potential to shape development and adjustment across the lifespan. For example, research suggests that sibling relationship qualities influence well-being during adolescence (Wolke & Skew, 2012). Sibling harmony, the balance of positive and negative emotions, may be indexed utilizing several indicators, including sibling intimacy (e.g., J.-Y. Kim et al., 2006; Solmeyer et al., 2014), sibling closeness (Samek & Rueter, 2011; e.g., Weaver et al., 2003), sibling positivity (Deater-Deckard & Dunn, 2002; Feinberg & Hetherington, 2000), sibling affection (Padilla-Walker et al., 2010), and sibling warmth (C. J. Tucker et al., 2013; Waite et al., 2011). These related constructs are typically related to positive developmental and relational outcomes among youth. For example, examining nearly 400 families, Padilla-Walker and colleagues (2010) found that sibling affection was longitudinally associated with youth's self-regulation and prosocial behaviors. Youth with more positive sibling relationships tend to be happier and have greater self-esteem and well-being (Sherman et al., 2006). Sibling warmth longitudinally predicted increases in academic performance and prosocial communication—even when controlling for maternal warmth and conflict (Lam et al., 2021). Sibling intimacy has even been found to be related to health behaviors in siblings such that individuals that report more intimate relationships with their siblings tend to report more exercise behaviors and more healthy attitudes (Senguttuvan et al., 2014). Finally, sibling



affection and positivity are negatively related to externalizing behaviors, indicating that beyond the positive implications of relational harmony, sibling relationships may be protective against negative outcomes (Deater-Deckard & Dunn, 2002; Padilla-Walker et al., 2010).

In contrast, disharmony in sibling relationships, which is also indexed in a number of ways (Deater-Deckard & Dunn, 2002; e.g., sibling conflict, sibling negativity, McHale et al., 2012), is generally associated with more negative adjustment outcomes during childhood and adolescence. For example, sibling negativity is positively associated with externalizing behaviors (Deater-Deckard & Dunn, 2002), aggression (J. L. Martin & Ross, 1995), antisocial behavior (K. J. Conger & Conger, 1994), and worse peer adjustment (Bank et al., 2004). Other longitudinal work demonstrated the within-individual relationship between sibling conflict and risky behaviors, such that at times when youth indicated higher levels of sibling conflict, they likewise reported more risky behavior than normal (Solmeyer et al., 2014). Similarly, utilizing a sample of 189 African American families, Whiteman and colleagues (2015) found that increased sibling negativity was longitudinally associated with increased depressive symptoms among adolescents. Another study found that sibling conflict uniquely predicts longitudinal decreases in academic performance, even after controlling for demographic variables and maternal relational qualities [i.e., warmth and conflict; Lam et al. (2021)]. Sibling conflict has even been found to be related to health, with one study reporting that high levels of sibling conflict are associated with an increased risk of being overweight during adolescence (Senguttuvan et al., 2014). Although research has demonstrated that sibling relational qualities are linked to adjustment and well-being across the lifespan (V. Cicirelli, 2013; e.g., Sherman et al., 2006), they remain understudied during early adulthood (Campione-Barr, 2017; K. J. Conger & Little, 2010).

### *Sibling Deidentification*

Sibling deidentification is rooted in Adler's theory of individual psychology (H. L. Ansbacher & Ansbacher, 1959). According to Adler, from birth individuals have a sense of inferiority that pushes them to obtain new knowledge and skills (H. L. Ansbacher & Ansbacher, 1959). This sense of inferiority stems from frequent comparison with siblings (Dunn, 1988; Festinger, 1954); in fact, these comparisons are thought to shape the development of rivalry between siblings. Sibling rivalry is theorized to be especially acute for sibling dyads that are more objectively similar (e.g., same-sex dyads; Schachter et al., 1978), which is especially critical given the similarities that exist between siblings given their shared genes and environment (Gruder, 1971; Gruder et al., 1975; Wheeler, 1966; Wheeler et al., 1982). Sibling rivalry may be especially detrimental for younger siblings who tend to have less expertise and therefore experience higher levels of upward comparison [i.e., they compare themselves with individuals that demonstrate higher levels of expertise; Festinger (1954)], which is associated with poor self-esteem (e.g., Brewer & Weber, 1994) and depression (e.g., Bessenoff, 2006).

Deidentification theory suggests that siblings endeavor (either consciously or unconsciously) to become more different from each other as a way to discourage unwanted comparisons, and in turn, reduce sibling rivalry. By becoming more different, individuals form a niche within their family that protects them from comparison, leading to an increase in self-esteem (Tesser, 1980) and overall well-being (Frances F. Schachter et al., 1976). Specifically, theory suggests that individuals experience greater overall well-being in part because siblings that differentiate more are expected to share more intimate and less conflictual relationships (Frances F. Schachter et al., 1976). Thus, through sibling deidentification, sibling relationships may become more harmonious (i.e., more intimate and less conflictual), which then may lead to

more overall well-being.

Empirical research exploring the correlates of sibling deidentification, however, is mixed in terms of support for this proposition. Consistent with theory, previous research has found that sibling differentiation is associated with greater differences between adolescent siblings in both attitudes and behaviors (S. D. Whiteman et al., 2010; S. D. Whiteman & Christiansen, 2008). Research has also found that differentiation is associated with less rivalry between siblings (Feinberg et al., 2003). Yet, other work suggests that differentiation is not always related to more harmonious sibling relationships (i.e., more intimacy and less conflict). For example, Whiteman (2007) and colleagues found that for younger siblings' efforts to differentiate were positively associated with more conflictual sibling relationships. Other work found that the gender composition of the sibling dyad played a moderating role in how differentiation was related to sibling relationships qualities (S. D. Whiteman et al., 2010). On the one hand, for youth from mixed-gender dyads, extreme levels ( $\pm 2$  SD) of differentiation (both high and low) were linked with more sibling positivity and less negativity. On the other hand, in same-gender dyads, differentiation dynamics were associated with less positivity and more negativity. In fact, it is possible that differences between siblings may play a part in increased conflict in sibling dyads (Feinberg et al., 2003). Indeed, Raffaelli (1992) found that conflict is an important way that siblings may articulate the differences between themselves, as individuals with unique goals and opinions; hence, differences between siblings may exacerbate conflict rather than resolving it. Finally, although theory suggests that differentiation ought to lead to greater intimacy between siblings, some work suggests that there is a negative association between sibling differentiation and intimacy (Doughty, 2015; S. D. Whiteman et al., 2007a). Given these findings it is possible that differentiation is concurrently associated with greater conflict between siblings but may lead to improvement in sibling relationships (i.e., increased intimacy and decreased conflict)

over time.

In sum, research findings suggest that sibling deidentification/differentiation efforts are consistently related to sibling relational qualities, however, the nature of these relationships is not always consistent with theoretical propositions. As such, it is important to continue to investigate the correlates of sibling deidentification as well as to understand how this process shapes sibling relational qualities (and adjustment) during early adulthood.

### *Deidentification During Early Adulthood*

To the degree that sibling deidentification has been studied, scholars have examined this process during adolescence (Doughty, 2015; Feinberg & Hetherington, 2000; e.g., S. D. Whiteman et al., 2007a, 2010). The focus on deidentification during adolescence is logical given the importance of identity development in during this period (S. D. Whiteman et al., 2007a). There are two elements of identity development that simultaneously occur during adolescence: (a) identity development as an individual, and (b) identity development within the family context. Although less work has focused on the idea of identity development as “what not to be” as opposed to “what to be,” it is one of the ways in which adolescents and young adults develop their sense of self. Indeed, previous research has demonstrated that having a foil, or an antagonist, can be an important part of choosing what to be [i.e., by choosing what not to be; Way et al. (2008)]. In fact, there may be pressure from society [as in the case of gender; Archer (1989); P. A. Katz (1986)] or from parents (Noble et al., 2017) for individuals to become different from their siblings. Importantly, when parents encourage their children to become different, it is almost exclusively within the context of the family. By becoming different from siblings, individuals are able to create a unique niche within the family [e.g., the smart one, the athletic

one; Feinberg & Hetherington (2000)]. Thus, a burgeoning sense of self, which is a critical developmental process during adolescence, is a potential driver of sibling deidentification (Frances F. Schachter et al., 1976).

In recent years, however, there has been a societal shift, such that the process of identity development, which begins in adolescence, extends into the young adult years. Today, young adults are granted an extended moratorium to continue their identity development (Côté, 2006; Munro & Adams, 1977). Thus, for many young adults, sibling differentiation processes remain relevant as they continue to establish their identities. This idea is strengthened by work examining establishing the relevance of other sibling comparative processes (e.g., sibling modeling) during young adulthood (e.g., Cassinat & Jensen, 2020).

### *Well-Being*

Past research suggests that well-being includes several related domains. For example, Diener (2000) noted that affect and life satisfaction are major components of young adults' well-being. Negative affect includes symptoms of depression (ADAA, 2018). Millions of Americans suffer from depression, and it is the leading cause of disability for individuals aged 15 to 44. Depression is characterized by hopelessness, lack of energy and motivation, and difficulty feeling emotion, in addition to other symptoms (Costello, 1993). For those who suffer from this disability it is often difficult to feel anything, let alone positive emotions (Starkstein et al., 2005). It is, therefore, unsurprising that lack of negative affect—or lack of depressive symptoms—is a key aspect of well-being.

Life satisfaction is another key marker of well-being (Ed Diener, 2000). Life satisfaction is a cognitive, judgmental process in which individuals think about their life and determine if their most important goals are being achieved and their

greatest needs are met (ED Diener et al., 1985). Diener worked to create a scale that would assess life-satisfaction (ED Diener et al., 1985), yet readily acknowledged that this important domain is only a part of well-being.

## **Present Study**

Through differentiation processes, siblings (consciously or unconsciously) endeavor to become more different from each other (Frances F. Schachter et al., 1976; S. D. Whiteman et al., 2014), in part, to reduce potentially unfavorable comparisons between them (Feinberg et al., 2003). In turn, the reduction of unwanted comparisons between siblings is expected to promote sibling harmony, and, therefore, enhance overall well-being (Frances F. Schachter et al., 1976). Further, given the importance of sibling similarity in the prevalence of differentiation (Grotevant, 1978), it is likely that same gender siblings will be more likely to differentiate from each other. However, to date, only limited research has examined this hypothesized association. Integrating these propositions into a comprehensive model and utilizing three waves of data from a longitudinal study of sibling relationships during early adulthood, the present study will investigate whether sibling relationship qualities (i.e., intimacy and conflict) undergird the associations between sibling differentiation processes and young adults' well-being. Rooted in sibling deidentification theory, I hypothesize that higher levels of sibling differentiation will be associated with greater sibling intimacy and less sibling conflict, which in turn, will be related to greater well-being. Additionally, I expect that the associations between sibling differentiation and sibling relationship qualities will be stronger for young adults from same-gender dyads as opposed to mixed-gender dyads.

## Method

### *Participants*

Data were drawn from the Sibling Influence on Becoming Adults Study (SIBS), a three-year longitudinal study examining the nature and implications of young adults' sibling relationships. Wave 1 included 1,750 American young adults between the ages of 18 and 29 years with at least one living sibling (see Table 1). Although not nationally representative, the ratio of participants from each state compared to the entire sample nearly mirrored the ratio of each state's population compared to the national population. Participants were primarily White (75%); on average, participants made between \$40,000 and \$50,000 and had some college education. Each participant reported on their closest aged sibling; while many individuals had only one other sibling (40%), on average participants averaged 2.2 other siblings ( $SD = 1.49$ ). Participants were evenly split by gender (50% women); likewise, sibling dyads were roughly equal in terms of gender composition (older brother-younger brother = 26.63%; older sister-younger sister = 24.51%; older brother-younger sister = 23.37%; older sister-younger brother = 25.49%). The average age difference between siblings was 4.06 ( $SD = 3.38$ ) years, and a small majority of participants reported on an older sibling (50.3%).

### *Procedure*

Data were collected through Amazon Mechanical Turk (MTurk). Individuals on MTurk were eligible for the study only if they had successfully completed 500 tasks with a 95% approval rating, had at least one living sibling, were between

18 and 29 years old, and lived in the United States. A five-question screener was utilized to determine eligibility. Eligible participants were then provided with an online consent form. After consenting to participate, participants were asked questions about themselves and about their perception of their sibling's attitudes. Perceptions of others' attitudes are critical to development and choices, and in some cases may be more important to behavior than the others' actual beliefs or perceptions (McGrath & MacMillan, 1992; Yadlosky et al., 2017). All questions were presented in a randomized order. In all, 10,709 people took the screener questions; 2,444 of those were eligible for participation. One potential participant did not consent.

Throughout the surveys, participants were asked several attention-checking questions (e.g., "I have been to every country on earth," "If you are paying attention then select somewhat disagree."), to ensure high quality data and that responses were not coming from computerized programs. Participants ( $n = 693$ ) who incorrectly answered any attention checking question were excluded from the data but were paid the honorarium. Wave 1 data were collected in February and March of 2017. The Wave 1 survey took on average 36.44 minutes to complete ( $Median = 29.04$  minutes,  $SD = 28.98$ ), and participants were paid an honorarium of \$2.25.

Wave 2 data were collected from July to October of 2018. Participants were invited to participate in Wave 2 using email addresses that individuals provided at Wave 1; each participant was emailed a unique link to the Wave 2 survey. The survey took an average of 60.95 minutes to complete ( $Median = 44.02$  minutes,  $SD = 56.98$ ). At Wave 2, individuals received \$4 for their participation in the survey. During Wave 2 741 individuals participated in the survey. There were significant differences between participants who completed both waves as opposed to Wave 1 only. First, women were more likely than men to drop out of the survey  $\chi^2$  ( $DF = 1$ ,  $N = 1750$ ) = 15.74,  $p < .001$ . Second, there were significant differences based on age, such that older individuals were more likely to drop out of the study ( $t(1646.4)$



= 3.96,  $p < .001$ ). Third, when examining key study variables, there were significant differences between individuals that dropped out and those that did not in terms of intimacy ( $t(1673.67) = -3.08$ ,  $p < .01$ ), life satisfaction ( $t(1568.14) = -3.09$ ,  $p < .01$ ) and depressive symptoms ( $t(1606.27) = 2.97$ ,  $p < .01$ ). These findings suggest that individuals who dropped out of the study between Waves 1 and 2 tended to have less intimate siblings relationships, lower levels of life satisfaction, and more depressive symptoms. However, there were no differences based on race, or income, or in levels of differentiation and sibling conflict.

Wave 3 was collected from April to October 2020. Similar to the procedures for Wave 2, all Wave 1 participants were emailed an invitation to participate in Wave 3. The Wave 3 survey, on average, took 75.74 minutes to complete (*Median* = 37.97 minutes, *SD* = 206.77). During Wave 3, individuals again received \$4 for their participation in the survey. During Wave 3, 557 individuals participated in the survey. There were significant differences between waves 1 and 3 in terms of: (a) sex, such that females were more likely than males to drop out of the Wave 3 survey  $\chi^2$  ( $DF = 1$ ,  $N = 1750$ ) = 8.26,  $p < .001$ ; and (b) income, such that individuals with higher incomes were more likely to drop out of the study ( $t(1185.08) = 2.65$ ,  $p < 0.01$ ). However, there were no differences based on age, race, or any of the key study variables (i.e., differentiation, sibling intimacy, sibling conflict, life satisfaction or depression). The Internal Review Board of Brigham Young University approved all procedures.

Finally, this study utilized planned missingness to improve the quality of the data (Raghunathan & Grizzle, 1995). Specifically, a three-form planned missing data design (Graham et al., 1996; Graham, 2012) was utilized across all three measurement occasions, such that in scales that had more than 3 items, 25% of the items were randomly not presented to participants (different variables were missing for each participant) and were therefore randomly missing across the surveys. Because the

items are missing completely at random [MCAR; Little & Rubin (2019)], no bias was introduced to the data from this technique. Finally, missing data were accounted for utilizing multiple imputation, which, in addition to robustly accounting for the planned missing data, is best suited to dealing with multiple types of missing data simultaneously [i.e., MCAR and MNAR data; Gomer (2019); Gomer (n.d.)]. All descriptive data and results were pooled across imputed datasets.

### *Measures*

*Differentiation.* Sibling differentiation was measured with the Sibling Influence Scale (S. D. Whiteman et al., 2007a, 2010). On a Likert scale ranging from 1 = *Strongly Disagree* to 5 = *Strongly Agree* participants rated their agreement with nine items, and items were averaged ( $M = 3.03$ ,  $SD = .03$ ). Example items included “I want people to know that I am not the same as my brother/sister,” and “I try to be different from my sister/brother,” with higher scores denoting greater differentiation efforts.

*Sibling conflict and intimacy.* Sibling conflict and intimacy was measured using eight items (three for conflict and 5 for intimacy) from Stocker and McHale (1992). Participants indicated their agreement with items on a Likert-type scale ranging from, 1 = *Never* to 5 = *Very Often*. Example items for conflict included, “How often do you and your sibling get upset or mad at each other?” and “How often do you and your sibling argue with each other?” Example closeness items included, “How often do you and your sibling go to each other for advice or support?” and “How important is your sibling to you?” Higher scores for both constructs indicate greater conflict/intimacy. Items were averaged together for both sibling conflict ( $M = 2.43$ ,  $SD = .03$ ), and intimacy ( $M = 3.38$ ,  $SD = .04$ )

*Depressive symptoms.* Symptoms of depression were measured using the Depression

Anxiety Stress Scales (DASS), which includes seven items (Lovibond & Lovibond, 1995). Participants were instructed to consider the past week when answering the questions that utilized a Likert-type scale ranging from 1 = *Did not apply to me at all* to 5 = *Applied to me very much, or most of the time*. Example items included, “I felt that I had nothing to look forward to,” and “I felt I wasn’t worth much as a person.” For analysis, these items were reverse scored and averaged together with higher numbers indicating less depression ( $M = 3.21$ ,  $SD = .02$ ).

*Life satisfaction.* Life satisfaction was measured utilizing the Satisfaction with Life Scale (ED Diener et al., 1985). The scale is comprised of five items that were measured on a Likert scale from 1 = *Strongly disagree* to 7 = *Strongly agree*. Example items include, “In most ways my life is close to ideal,” and “So far I have gotten the important things I want in life,” and items were averaged together with higher scores indicating greater life satisfaction ( $M = 4.44$ ,  $SD = .05$ ).

## Results

### *Analytic Strategy*

Prior to analysis, I examined patterns of missing data. As mentioned, the SIBS study employed a planned missingness design where measures with three or more items randomly had 1/4 of the items (rounded down) missing from the survey to reduce participant burden and create random patterns of missing data. In addition to the planned missingness, which resulted in MCAR data, this study also experienced significant attrition, in ways that were either missing at random (MAR) or missing not at random (MNAR). Following recommendations from Gomer and colleagues (2019; 2022), when there is more than one type of missing data in a given dataset, missing data were accounted for utilizing multiple imputation.

Although Full Information Maximum Likelihood (FIML) estimation provides excellent estimates, multiple imputation (MI) is the best method when there are multiple patterns of missingness, as in this case [i.e., planned missingness and differential attrition; Gomer (2019); Gomer (n.d.)]. For imputations, I utilized the predictive mean matching method, which can be used on any type of variable (including ordered, non-ordered, numeric and binary variables) to create 50 datasets with imputed data. Following imputation, I created new variables by averaging together imputed values for scale variables across each of the 50 datasets. These new variables were then utilized as manifest variables in the structural regression (see Figure 1).

To examine whether the association between sibling differentiation processes and young adults' well-being was mediated by sibling conflict and sibling intimacy, I first examined the feasibility of including life-satisfaction and depressive symptoms as a single well-being factor in my final model (depression was reverse scored such that higher values indicated fewer depressive symptoms and greater overall well-being). Then, to test the hypothesized indirect effects model, I conducted a structural regression using the open-source statistical program R (R Core Team, 2018) utilizing the structural equation modeling package lavaan (Rosseel, 2012). Following estimation of my models, all estimates were pooled across the 50 datasets utilizing the runMI function in the semTools package (Jorgensen et al., 2021).

All variables were included as manifest variables, except well-being, which was a latent factor with two indicators: life-satisfaction and depression. Given the theoretical implications of sibling gender composition [i.e., that due to similarity, same gendered siblings should be more likely to differentiate; Frances F. Schachter et al. (1976)], I also tested whether gender composition moderated the relationship between sibling differentiation and sibling relational qualities (i.e., sibling intimacy and sibling conflict in a moderated mediation model). Finally, because sibling differentiation theory suggests that characteristics of sibling dyads will have important implications

regarding individuals' tendencies to differentiate, participants' gender, age difference between siblings, birth order, and sibling relational status (biological siblings versus other relationship) were controlled for on all endogenous variables (i.e., differentiation, sibling intimacy, sibling conflict, and well-being). See Table 2 for bivariate correlations between study variables.

**Table 3.1:**

*Bivariate Correlations and Means for Study Variables (N = 551)*

Variable	1	2	3	4	5
1. Differentiation W1	—				
2. Intimacy W2	-0.29 ***	—			
3. Conflict W2	0.24***	-0.15 ***	—		
4. Depression W3	0.04	-0.07	0.15***	—	
<i>M</i>	3.03	3.58	2.52	1.75	4.51
<i>SD</i>	0.88	1.06	1.05	0.81	1.65
* $p < .05$ , ** $p < .01$ , *** $p < .001$					
5. Life Satisfaction W3	0.02	0.14***	-0.08	-0.57 ***	—

### *Structural Regression*

I first examined the feasibility of including young adults' well-being as a single latent factor indexed by life satisfaction and depressive symptoms. Given that this factor was indexed by only two indicators, paths for both life satisfaction and depressive symptoms to well-being were fixed to one. Results from this model yielded good fit. Specifically, fit indices from the single-factor model indicated were adequate ( $\chi^2 = 725.20$  ( $DF = 66$ ,  $N = 1,750$ ),  $p < .001$ , CFI = 1.00, TLI = 1.03, SRMR = .01, RMESA = .00) and both factors loaded onto the latent well-being factor (Depression  $\lambda = -.71$ ; Life satisfaction  $\lambda = 1.65$ ). Therefore, in the final model, life satisfaction and depression were included as indicators on the latent construct of well-being.

There was no support for the hypothesis that sibling gender composition moderated

the relationship between sibling differentiation and sibling intimacy ( $b = .01$ ,  $se = .08$ ,  $\beta = .01$ ,  $p = .95$ ) or between sibling differentiation and sibling conflict ( $b = -.00$ ,  $se = .08$ ,  $\beta = -.00$ ,  $p = .95$ ). Therefore, the final analytic model excluded these interaction terms; however, given their theoretical relevance, I maintained sibling gender composition as a control variable on all endogenous variables.

The final model assessing the longitudinal indirect effects of sibling differentiation on young adult well-being through sibling relationship qualities demonstrated adequate fit ( $\chi^2 = 747.62$  ( $DF = 30$ ,  $N = 1,750$ ),  $p < .001$ , CFI = .96, TLI = .87, SRMR = .03, RMSEA = .00). Examining the associations between control and study variables, sibling relational status, none of the control variables were significant predictors of well-being. Sibling relational status also was negatively related to sibling intimacy such that non-biological siblings reported less intimate relationships ( $b = -.24$ ,  $se = .05$ ,  $\beta = -.15$ ,  $p < .001$ ). Gender composition also was negatively related to sibling intimacy such that young adults from mixed gender sibships reported less intimate sibling relationships ( $b = -.12$ ,  $se = .05$ ,  $\beta = -.07$ ,  $p < .05$ ). Turning to sibling conflict, a negative relationship was found between relative birth order and conflict, such that younger siblings reported less conflict in their relationship ( $b = -.16$ ,  $se = .04$ ,  $\beta = -.11$ ,  $p < .001$ ). Finally, a negative relationship was found between sibling relational status and conflict such that non-biological siblings reported lower levels of conflict ( $b = -.08$ ,  $se = .04$ ,  $\beta = -.07$ ,  $p < .05$ ).

Inconsistent with hypotheses, sibling differentiation at Wave 1 was not directly related to well-being at Wave 3 ( $b = -.02$ ,  $se = .03$ ,  $\beta = -.02$ ,  $p = .55$ ). Additionally, inconsistent with theoretical propositions, differentiation at Wave 1 was significantly negatively (as opposed to positively) related to sibling intimacy at Wave 2 ( $b = -.36$ ,  $se = .04$ ,  $\beta = -.26$ ,  $p < .001$ ), and significantly positively (as opposed to negatively) related to sibling conflict at Wave 2 ( $b = .12$ ,  $se = .03$ ,  $\beta = .11$ ,  $p < .001$ ). Consistent with study hypotheses, sibling intimacy at Wave 2 was significantly positively related

to young adults' well-being at Wave 3 ( $b = .04$ ,  $se = .02$ ,  $\beta = .06$ ,  $p < .05$ ), and sibling conflict at Wave 2 was significantly negatively related to well-being at Wave 3 ( $b = -.06$ ,  $se = .02$ ,  $\beta = -.06$ ,  $p < .01$ ).

Sibling differentiation was indirectly related to well-being through sibling intimacy ( $b = -.02$ ,  $se = .01$ ,  $\beta = -.01$ ,  $p < .05$ ); however, the direction of this indirect association was inconsistent with theoretical propositions. The indirect path from differentiation to well-being through conflict was at a trend level ( $b = -.01$ ,  $se = .00$ ,  $\beta = -.01$ ,  $p = .10$ ). Finally, the total effect of differentiation on well-being also was non-significant ( $b = -.04$ ,  $se = .03$ ,  $\beta = -.04$ ,  $p = .14$ ). See Table 2 and Figure 1 for full model depiction.

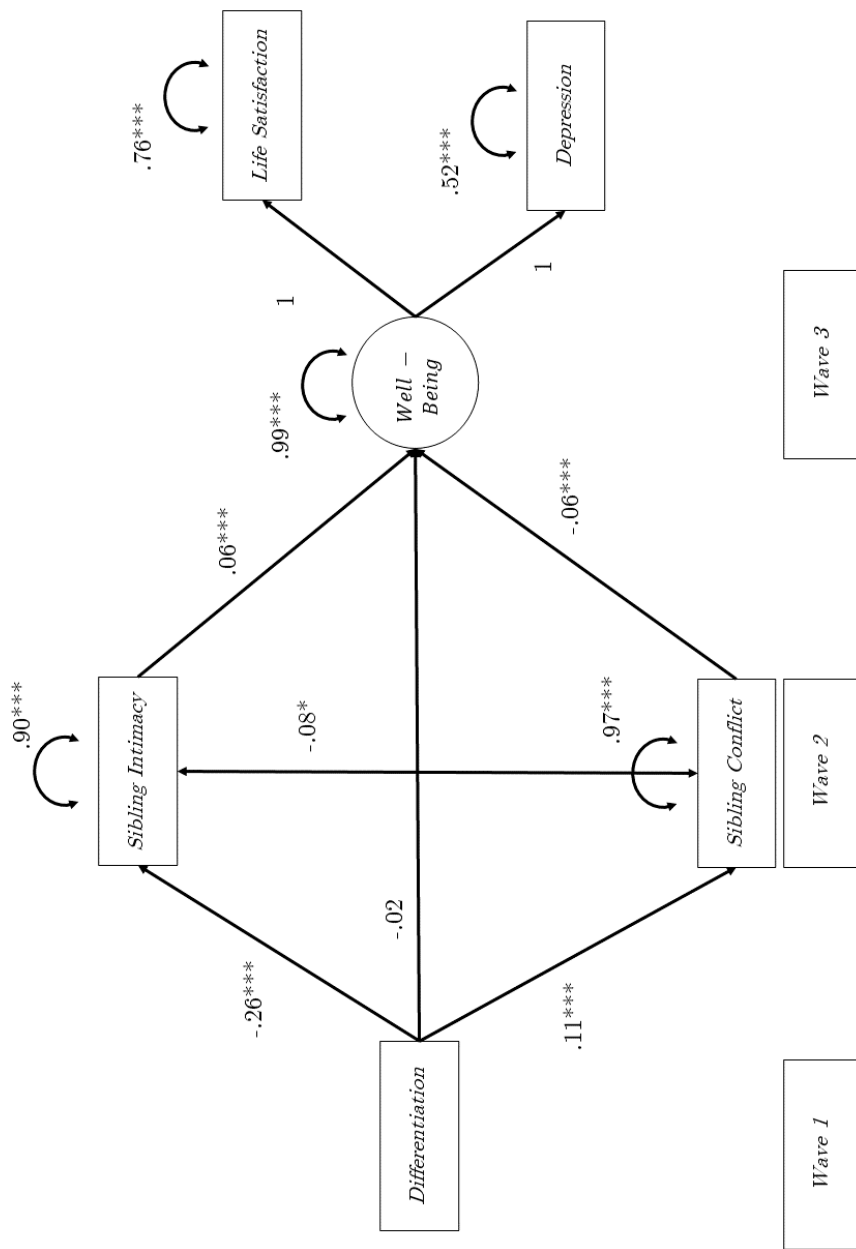
**Table 3.2:**

*Results from analytic model estimating the indirect effects of sibling differentiation on young adults' well-being through sibling relationship qualities.*

	Unstandardized coefficients	SE	p value	Standardized coefficient ( $\beta$ )
<b>Predictors</b>				
Well-Being $\leftarrow$ Intimacy	0.04	0.02	0.03	0.06
Well-Being $\leftarrow$ Conflict	-0.06	0.02	0.01	-0.06
Intimacy $\leftarrow$ Differentiation	-0.36	0.04	<.001	-0.26
Conflict $\leftarrow$ Differentiation	0.12	0.03	<.001	0.11
<b>Controls</b>				
Well-Being $\leftarrow$ Sex	0.04	0.03	0.2	0.03
Well-Being $\leftarrow$ Birth order	-0.02	0.03	0.53	-0.02
Well-Being $\leftarrow$ Age Difference	0.00	0.01	0.47	-0.02
Well-Being $\leftarrow$ Sibling Relationship	-0.03	0.03	0.37	-0.02
Well-Being $\leftarrow$ Gender Composition	-0.03	0.03	0.34	-0.02
Intimacy $\leftarrow$ Sex	-0.06	0.05	0.28	-0.03
Intimacy $\leftarrow$ Birth order	-0.02	0.06	0.1	-0.05
Intimacy $\leftarrow$ Age Difference	0.00	0.01	0.17	-0.04
Intimacy $\leftarrow$ Sibling Relationship	-0.03	0.05	<.001	-0.15
Intimacy $\leftarrow$ Gender Composition	-0.03	0.05	0.03	-0.06
Conflict $\leftarrow$ Sex	0.02	0.04	0.71	0.01
Conflict $\leftarrow$ Birth Order	-0.16	0.04	<.001	-0.11
Conflict $\leftarrow$ Age Difference	-0.01	0.01	0.24	0.04
Conflict $\leftarrow$ Sibling Relationship	-0.24	0.04	0.03	-0.07
Conflict $\leftarrow$ Gender Composition	-0.12	0.04	0.65	-0.01
<b>Variances</b>				
Well-being	0.44	0.03	<.001	0.99
Depression	-0.15	0.02	<.001	0.52
Life Satisfaction	1.39	0.06	<.001	0.76
Intimacy	0.75	0.03	<.001	0.9
Conflict	0.48	0.02	<.001	0.97
<b>Indirect Effects</b>				
Well-being $\leftarrow$ Differentiation through Intimacy	-0.02	0.01	0.03	-0.01
Well-being $\leftarrow$ Differentiation through Conflict	-0.01	0.00	0.10	-0.01
Total effect	-0.04	0.03	0.14	-0.04

Fit Statistics:  $\chi^2 = 747.62$  ( $DF = 30$ ,  $N = 1,750$ ),  $p < .001$ , CFI = .96, TLI = .87, SRMR = .03, RMSEA = .00





**Figure 3.1:**

*Full model specification examining the influence of differentiation on sibling relational qualities and well-being*

Indirect effect of differentiation on well-being through Intimacy:  $-.01^*$   
 Indirect effect of differentiation on well-being through conflict:  $-.01+$   
 Total effect of differentiation on well-being:  $-.04+$   
 Fit Statistics:  $\chi^2 = 747.62$  ( $30, N = 1,750$ ),  $p < .001$ , CFI =  $.96$ , TLI =  $.87$ , SRMR =  $.03$ , RMSEA =  $.04$   
 $+ p < .10$ ;  $* p < .05$ ;  $** p < .01$ ;  $*** p < .001$   
 Controls used: Gender composition (same vs. mixed), participant gender, age difference between siblings, birth order, sibling relationship (biological vs. other)  
 All coefficients are standardized.

## Discussion

Sibling relationships are ubiquitous (McHale et al., 2012), with many adolescents spending significant portions of their discretionary time together (Dunifon et al., 2017). Sibling differentiation (or deidentification) is one of the processes through which siblings influence each other during adolescence. Sibling deidentification theory specifically suggests that siblings consciously or unconsciously endeavor to become more different from each other (Frances F. Schachter et al., 1976) in order to promote their unique identities within the family. As they become less similar, they are able to form unique niches in the family, which is proposed to reduce rivalry between siblings (Tesser, 1980). As rivalry decreases, theory further suggests that sibling conflict should decrease and intimacy should increase, resulting in an overall more harmonious sibling relationship. This improvement in the quality of the sibling relationship should, in turn, be associated with an increase in well-being (Frances F. Schachter et al., 1976). To date, studies have addressed pieces of these propositions primarily with adolescent-aged samples, but the comprehensive model has not been tested. Research also has failed to examine the implications of differentiation processes in young adulthood, a period in which identity development continues. The present study addressed these gaps by examining the longitudinal implications of sibling differentiation during young adulthood, specifically investigating whether differentiation indirectly influences young adults' well-being via their sibling relationship qualities.

Overall, study findings were inconsistent with sibling differentiation theory, but were congruent with previous research that has examined the cross-sectional associations between sibling differentiation and sibling relational qualities during adolescence (Doughty, 2015; Raffaelli, 1992; S. D. Whiteman et al., 2007a). Specifically,

while theory suggests that sibling differentiation promotes sibling intimacy, I found the opposite. This negative association between differentiation and sibling intimacy is in line with previous empirical work with adolescent-aged samples that showed a significant difference between sibling dyads that model and differentiate, with differentiating dyads showing significantly less intimacy (S. D. Whiteman et al., 2007a). Similarly, Doughty (2015) found that sibling dyads that reported higher than average levels of differences reported lower levels of intimacy. As opposed to limiting rivalry, perhaps sibling differentiation minimizes shared connections and engagement and provides siblings with fewer opportunities for intimate exchanges. Indeed, work on relational homophily demonstrates that individuals seek out those that are more similar to themselves (McPherson et al., 2001). Thus, for siblings that differentiate, it is possible that the differences between them preclude shared activities and positive emotional exchanges.

While theory suggests that differentiation should be associated with less conflictual relationships, I again found the opposite. It is possible that differentiation may be associated with higher levels of conflict because conflict may in part be how siblings articulate differences between themselves (Raffaelli, 1992). Therefore, perhaps as individuals form a unique niche within their family, conflict may be an important part of this process rather than an outcome. Importantly, Doughty (2015) found that sibling differences increased during early adolescence before leveling off and then increasing again in late adolescence. It is possible that because this study examined young adults, that there will eventually be a leveling off later in adulthood, and differentiation may then be related to less conflict. Longer-term longitudinal studies are needed to examine such possibilities. Additionally, when examining differentiation, future studies should consider utilizing analytic approaches that may shed light on this developmental process. Specifically, pattern analytic methods (e.g., latent class analysis; growth mixture modeling) that can examine multiple

relationship dimensions simultaneously may provide unique insight into how differentiation is linked to different constellations of sibling relationship qualities (e.g., low intimacy and low conflict), which may better illuminate theoretical postulations.

Although the directional associations between sibling differentiation and sibling relationship qualities were inconsistent with theory, the links between sibling relational qualities and young adults' well-being were as expected. Specifically, more harmonious sibling relationships (i.e., more intimate and less conflictual) were positively associated with well-being. Previous research has demonstrated how sibling relational qualities shape individual adjustment, with more intimacy in sibling relationships associated with more happiness, self-esteem, and well-being (Sherman et al., 2006). Although siblings tend to have less conflict with each other during young adulthood, they nevertheless maintain intimate relationships (Jensen et al., 2018), which may benefit their overall well-being. Aligned with study hypotheses, a negative relationship was found between sibling conflict and well-being. In contrast to the influence of sibling intimacy, higher levels of sibling conflict have been associated with more loneliness and worse mental health (Stocker et al., 1997)—a pattern that extends into later adulthood (Stocker et al., 2020). Taken together, these findings indicate that even though siblings may have less contact with each other during young adulthood (Jensen et al., 2018), sibling relational qualities likely continue to influence individual well-being in important ways.

Inconsistent with sibling deidentification theory and previous empirical work (S. D. Whiteman et al., 2010), sibling gender composition did not moderate the relationship between sibling differentiation and sibling relational qualities. During youth and adolescence, it is especially common for individuals to segregate based on gender (Bukowski et al., 1993; Lam et al., 2014; C. L. Martin & Fabes, 2001); however, in beginning in late-adolescence and continuing into young adulthood individuals begin to de-segregate, spending more time with their opposite gender

peers (Lam et al., 2014). It is possible that similar patterns exist for siblings in young adulthood. Whereas sibling gender composition during childhood and adolescence may influence the degree to which siblings differentiate (S. D. Whiteman et al., 2010), it is possible that gender-based motivations decline in young adulthood and differentiation efforts are linked to other personal qualities.

Finally, unlike most other research that has focused on the period of adolescence, this study examined differentiation during young adulthood. While previous work has suggested that differentiation during young adulthood may decrease (Doughty, 2015), this study demonstrates that differentiation dynamics may continue into this developmental period. Beyond demonstrating the continued influence of sibling differentiation, this study shows that this sibling influence process continues to shape young adults' sibling relational qualities, and therefore their overall well-being. Given that societal shifts indicate that young adulthood is increasingly a time for continued identity development (Côté, 2000; Nelson et al., 2007) and the centrality of identity development to deidentification theory (Frances F. Schachter et al., 1976), it is logical that differentiation would continue to be a salient process during this period of life. It is possible that as individuals solidify their identity in later adulthood, differentiation may then become a less salient influence process and the hypothesized positive effects (i.e., increased sibling harmony) will emerge. As such, future work would benefit from examining the implications of sibling differentiation in later adulthood.

### *Limitations and Conclusions*

It is important to consider this study's findings in light of its limitations. First, although these data were longitudinal and captured the implications of sibling differentiation over time, they did not examine patterns of intraindividual change. Future work

should explore how changes in youth's and young adults' differentiation are related to changes in their sibling relationship qualities over-time.

Second, this study experienced a large amount of attrition between waves. While MTurk has successfully been used in the past to collect high-quality data (M. Buhrmester et al., 2016; Schleider & Weisz, 2015), users may have a tendency to drop out at higher rates as they leave MTurk. Notwithstanding, to best account for this attrition, I used the most modern techniques (Gomer, n.d., 2019) to account for different patterns of missingness (i.e., MCAR and MNAR) and effectively model the data. Third, although this study included a large sample of young adults, data were not representative of the target population (i.e., young adults in the United States). Therefore, future work should utilize data that are more representative of young adults generally. Fourth, while this study suggests that sibling differentiation during young adulthood may be indirectly associated with lower well-being, it is possible that this is because young adults are in a different life stage. Indeed, theory suggests that one motivation for differentiation is to protect from unwanted, unfavorable comparisons between themselves and their siblings (especially from their parents). During adolescence, these comparisons may be especially acute—therefore it may be beneficial to differentiate from siblings. However, during young adulthood, when individuals are less likely to co-reside in their parents' home, sibling differentiation may not be a defense mechanism that acts as a protection against unwanted comparisons. Instead, during young adulthood differentiation may be a process that exacerbates the differences between siblings, reducing harmony and overall well-being. Given this possibility, it is crucial that future work examines the implications of differentiation longitudinally from adolescence and into young adulthood.

Despite these limitations, this study contributes to the literature on the nature and implications of sibling differentiation. To date, most work has been cross-sectional and failed to investigate how sibling differentiation shapes well-being over time.

Additionally, limited research has examined sibling differentiation in young adulthood, and this study makes it clear that sibling differentiation continues to influence siblings' relational qualities. Although sibling differentiation is often discussed as an important process (Frances F. Schachter et al., 1976; S. D. Whiteman et al., 2007a), the central tenants of the theory (i.e., that sibling differentiation overall leads to more harmonious sibling relationships, and, therefore, greater overall well-being) have been understudied. The findings from this study suggest that perhaps that implications of differentiation may change over time, with differentiation related to lower quality sibling relationships during young adulthood, and, in turn, poorer individual well-being.

## CHAPTER 4

### Domain Specific Sibling Modeling and Differentiation and Sibling Similarities and Differences in Young Adulthood

#### **Introduction**

Sibling relationships are among the longest-lasting social relationships that individuals experience (V. G. Cicirelli, 1994), often continuing from birth to death. During childhood and adolescence, scholars have demonstrated that siblings influence each other through a variety of social and psychological processes (East, 2009; McHale et al., 2012). Among these processes are modeling and differentiation, dynamics that drive for similarities and/or differences between siblings (often under the same circumstances). Modeling, which is grounded in Bandura's theory on observational learning (1963), is a process through which siblings become more similar. In contrast, sibling differentiation, rooted in theories of individual psychology (Adler, 1930) and psychoanalysis (Frances Fuchs Schachter et al., 1978), is a psychological dynamic that pushes siblings to become more distinct. To date, most research on sibling modeling and differentiation has focused on the period of adolescence (Feinberg et al., 2003; Osai et al., 2020; e.g., S. D. Whiteman et al., 2007a). The present study builds on this work by exploring the extent to which these two different processes push for similarities or differences between siblings in critical domains of development in young adulthood.



### *Modeling*

Research documents sibling similarities in domains ranging from intelligence (Plomin & DeFries, 1980), to personality (Daniels, 1986), to adjustment (Feinberg et al., 2005), to attitudes about substance use (S. D. Whiteman et al., 2014). Within this literature, there are two prevailing theoretical paradigms that submit why siblings should demonstrate similarities. The first theoretical paradigm behavioral genetics, which suggests that through shared genes (heritability) and shared environments, siblings become similar (Plomin & DeFries, 1980). Indeed, research on siblings provides an excellent opportunity to examine the relative influences of genes and environments. Behavioral genetic research capitalizes on the cascade of shared genes and environments that naturally occur within various types of sibling relationships — ranging from most similar in terms of genes and environments (i.e., monozygotic twins; 100% genetic similarity), to fraternal siblings (e.g., dizygotic twins and biological siblings; 25% - 75% genetic similarity), to those who do not share genetic resemblance (e.g., adopted siblings; 0% genetic similarity). Using a behavioral genetics design, Plomin and DeFries (1980) found that the heritability of an individual's intelligence (as measured by IQ) was between .50 and .70, indicating that genes play a significant role in sibling similarities in intelligence. Importantly, despite this heritability, this work denotes sizable environmental influence on intelligence (i.e., .30 to .50). Turning to personality, scholars have found that the heritability of the Big Five Personality Dimensions (neuroticism, extroversion, openness, agreeableness, and conscientiousness) was between 41% and 61% (Jang et al., 1996). Yet, Daniels (1986) found that parental differential treatment (PDT) accounted for between 6-26% of variation in child personality, indicating that environmental processes (i.e., PDT) as well as heritability shape an individual's personality. Rende and colleagues (2005) found that shared genes and environments both played a role in

sibling similarities in adolescents' substance use (drinking and smoking). Specifically, a social process (which they called a "social contagion") independently predicted sibling similarities in these domains above and beyond shared genetics (Rende et al., 2005). Studying age at first sexual encounter, Harden (2012) examined the phenotypic associations between siblings and the timing of their sexual debut and found that siblings tended to be more similar than non-related individuals. However, using behavioral genetic data from the National Study of Adolescent Health, McHale and colleagues (2009) demonstrated sibling similarities in sexual behaviors were uniquely (i.e., above and beyond the effects of shared genes) influenced by social processes from siblings. The interplay of genes and shared environments within sibling dyads provides insights into the heritability of specific traits—which contribute to sibling similarities. However, this body of research also clearly demonstrates the critical influence of social processes in shaping similarities in siblings' behaviors.

Indeed, research suggests that sibling similarities tend to be greater when youth report modeling their brothers and sisters (S. D. Whiteman et al., 2007b). Modeling, rooted in observational learning theory (Bandura & Walters, 1963), suggests that individuals learn through the observation of those around them. Whether the behavior of a model is reproduced is dependent on the outcome of the model's behavior; that is whether the behavior is rewarded or punished (Bandura, 1965). Importantly, observational learning occurs most frequently between individuals who are objectively similar and have warm, intimate relationships (Mischel, 1966). Within the sibling context, similarity is often expressed in terms of gender, with same-gendered siblings thought to be more powerful models. Research examining this issue, however, is mixed with some studies finding greater evidence of modeling and sibling similarities among same-gender siblings (e.g., McHale et al., 2009) and others failing to do so (e.g., S. D. Whiteman et al., 2007b, 2010). In addition to objective similarity, demonstrating competence is an important factor in determining

if an individual will model the behaviors of those around them (Mischel, 1966). Given the age-grading of sibling relationships during childhood and adolescence, older siblings often have greater developmental capacities and abilities and are therefore excellent models for their younger brothers and sisters to observe and potentially emulate (Mischel, 1966).

In childhood and adolescence research documents that sibling modeling plays an important role in youth's socialization and development. For example, Crouter and colleagues (2007) found that in middle childhood and adolescence siblings help shape youth's gender attitudes. Specifically, youth with older brothers generally reported more traditional gender role attitudes, whereas youth with older sisters were generally less traditional in their gender role attitudes. It is important to note, however, that this work did not explicitly test observational learning/modeling mechanisms. In a more explicit test of observational learning/modeling processes, Whiteman and colleagues (2007) found that sibling similarities in risky behavior, peer competence, sports interests, and art interests were greatest when older siblings reported higher levels of intimacy in the sibling relationship and when the older sibling was more competent in a particular domain. McHale and colleagues (2009) found that adolescent siblings who shared more intimate relationships tended to be more similar in their risky sexual behaviors—specifically their number of sexual partners as well as their attitudes towards sex. Importantly, as mentioned earlier, these findings were found above and beyond the influence of shared genes, indicating that siblings socialization processes operate and influence behavior independent of genetic similarity (McHale et al., 2009). Finally, scholars have examined the influence of sibling modeling on substance use attitudes (R. D. Conger & Conger, 1996; Rowe & Gulley, 1992) and behaviors (Slomkowski et al., 2005; S. D. Whiteman et al., 2013), as well as other risky behaviors (Patterson et al., 1984). In general, these studies document that sibling similarities in risky behavior domains are greatest

when siblings either report higher levels of modeling (S. D. Whiteman et al., 2013) or report more positive relationships with their siblings (Rowe & Gulley, 1992; Slomkowski et al., 2001).

Importantly, datasets assessing observational learning or modeling dynamics are rarely collected; therefore, numerous studies utilize relational intimacy scales, including social connectedness, as proxies for modeling processes (McHale et al., 2009; Slomkowski et al., 2001; e.g., Slomkowski et al., 2005). Given the theoretical relationship between modeling and intimacy, this is advantageous because it still enables scholars to study sibling similarities even without studying modeling specifically. However, when possible, measuring sibling modeling processes is advantageous. For example, this sibling influence process is important given the way it shapes individuals' attitudes (e.g., S. D. Whiteman et al., 2013) and behaviors (e.g., R. D. Conger & Conger, 1996). Not only that, but previous work that has examined both sibling modeling and intimacy have found that modeling uniquely predicts sibling similarities, above and beyond the contributions of relational intimacy alone (e.g., S. D. Whiteman et al., 2014).

In sum, during childhood and adolescence, sibling socialization processes, including modeling, shape similarities between siblings in term of their attitudes and behaviors. It is unclear, however, whether this type of social influence continues into early adulthood when sibling contact may be less frequent (Jensen et al., 2018; Stocker et al., 1997; L. White, 2001) and relationships become more volitional (Scharf et al., 2005). Despite more limited contact, recent research indicates that sibling relationships tend to become more intimate [likely given reduced conflict; Jensen et al. (2018)] and the support young adults receive from siblings remains stable (Guan & Fuligni, 2016). Thus, it is possible that social influence from siblings continues into early adulthood, especially given that relational intimacy (often used as a proxy for modeling) grows. The results of several recent studies support the continued influence of siblings

into early adulthood. For example, Cassinat et al. (2020) found that sibling modeling moderated the association between siblings' reports of marital centrality [how important marriage is to their life goals; Cassinat & Jensen (2020)], with similarity greater among young adults who reported greater modeling. Similarly, another study found that sibling modeling was predictive of sibling similarities in terms of emotional autonomy, education orientation, and work orientation—domains that are especially salient during young adulthood (Cassinat et al., 2019). Finally, utilizing longitudinal data across 10 years, Whiteman and colleagues (2007) found that sibling influences continue from adolescence and through early adulthood, shaping similarities in siblings' deviant behaviors and excessive alcohol use.

### *Differentiation*

Sibling differentiation, or deidentification (Frances F. Schachter et al., 1976), is a process through which siblings become more dissimilar (Neaves & Crouch, 1990; Frances Fuchs Schachter et al., 1978). Rooted in individual psychology and psychoanalytic traditions (H. Ansbacher, 1956; Frances F. Schachter et al., 1976), scholars examining sibling deidentification hypothesized that within the family siblings became more different as a way to reduce cross-sibling comparisons and rivalry (Frances F. Schachter et al., 1976). Through differentiation (or deidentification) processes, youth form unique niches that protect themselves from potentially unfavorable comparisons, thus reducing the rivalry between siblings and improving their overall sense of well-being (Feinberg et al., 2003). Importantly, this process is proposed to occur both consciously and unconsciously. Deidentification theory suggests, in direct contrast to observational learning and modeling perspectives, that differentiation processes are likely to be more pronounced for siblings who are more objectively similar (Frances F. Schachter et al., 1976; Frances Fuchs Schachter et al., 1978; Frances Fuchs Schachter & Stone,

1988). Siblings that are more similar in age and gender are more likely to become a source of frequent comparison (Festinger, 1954); therefore, differentiation is proposed to occur in an effort to reduce comparisons and avoid potentially unfavorable contrasts. Thus, siblings in consecutively-born dyads (similar in age) and same-gendered dyads (i.e., brother-brother and sister-sister dyads) are expected to differentiate more from each other than siblings from non-consecutively born dyads (i.e., jump pairs) and mixed-gender dyads. Much like research on sibling modeling, however, empirical findings surrounding this topic are mixed. Some studies show greater differences among same-gender sibling dyads (Grotevant, 1978), whereas other findings suggest that gender constellation is not related to siblings' likelihood of differentiating (Feinberg et al., 2003). (Less work has considered the moderating role of birth order adjacency.)

To date, much of the research that has examined sibling differentiation/ deidentification has focused on adolescence, likely because this is a period of intense identity development (Erik H. Erikson, 1968). An individual's identity enables them to move forward with purpose (Kroger & Adair, 2008) and a salient sense of identity plays a central role in decision making and role performance (Burke & Reitzes, 1981). Thus, as individuals begin to niche-pick within their family (or engage in role performance), a salient sense of self is essential. Critically, research and theory suggest that identity development continues into early adulthood (J. J. Arnett, 2000; Nelson et al., 2007; Sirsch et al., 2009); therefore, it is likely that sibling deidentification/differentiation dynamics continue to be a salient process for young adults.

Although less scholarly attention has been placed on sibling deidentification as compared to modeling, previous research has demonstrated that differentiation plays a role in several areas of adolescent adjustment. For example, Whiteman et al. (2014) found that adolescent siblings that reported differentiating had divergent patterns in terms of their delinquent behaviors and expectancies about alcohol. Similarly, individuals that reported differentiating from their siblings were less

likely to participate in the same primary sport during adolescence (Osai et al., 2020). McHale and colleagues (2001) discovered that firstborns tended to become more different from their younger siblings in terms of gender role orientations over time. Watzlawik (2009) found that siblings were most likely to demonstrate differences in terms of character traits, looks, and athletic abilities. Finally, evidence for sibling deidentification even has been demonstrated within the context of music participation during family car rides (Chitwood, 2018). Specifically, during car rides, Chitwood (2018) found that when one sibling initiated impromptu singing in the car, the other sibling deidentified in two ways: (a) by not participating in music making with their sibling(s); or (b) by finding a way of participating with their siblings that was distinct from other family members (for example by trying to sing a different song or by dancing in a distinct way). Notwithstanding the results of these studies, the literature on sibling influences is sometimes inconsistent in finding evidence for differentiation. This inconsistency is likely due to the fact, in line with behavioral genetics work, that shared genes and environmental influences push youth towards similarities even in instances where youth differentiate from their sibling (Feinberg & Hetherington, 2000; Wong et al., 2010).

While research is clear that modeling and differentiation processes shape sibling similarities and differences across a variety of domains, it is important to note that some youth neither model nor differentiate from their siblings. That is, some siblings choose to ignore, neglect, or not reference their brothers or sisters as either models or foils for their attitudes and behaviors (S. D. Whiteman et al., 2007a; S. D. Whiteman & Christiansen, 2008). Similarly, while modeling and differentiation operate towards different ends, they are independent processes, and individuals may engage in both processes simultaneously (S. D. Whiteman et al., 2014). In such cases, it may be that the operation of modeling versus differentiation processes vary across critical domains of development.

*Domain Specificity*

To date, most scholars studying modeling and differentiation have examined these processes (or proposed their operation) generally, rather than looking at the extent to which individuals model or differentiate within specific domains. Observational learning theory, however, suggests that expertise plays an important role in modeling behaviors (Mischel, 1966). Thus, it seems likely that siblings would be more likely to model their sibling in specific domains where they demonstrate competence. Similarly, given deidentification theory's emphasis on niche picking within families, it is logical that siblings differentiate in certain domains (but perhaps not all) to demonstrate their uniqueness (Feinberg et al., 2003). The domains that are most salient to individuals change throughout development. For example, during youth and adolescence, the transition from dependence on parents, to relative autonomy becomes increasingly important (McElhaney et al., 2009). As individuals move into young adulthood, individuals shift their orientations to domains like education, work, and romantic relationships.

Although there is considerable variation in what are appropriate developmental markers of adulthood—including financial independence (Baggio et al., 2015), taking responsibility for one's actions (J. J. Arnett, 2001), and emotional autonomy (Nelson et al., 2007; S. J. Schwartz et al., 2005)—education, work, and romantic relationships are among those that are most consistently discussed. Specifically, Arnett (2001) and Nelson and colleagues (2007) stressed that an important part of adulthood is the capability to provide for a future family. Individuals who plan to care for a family must solidify their orientation towards education and work (Baggio et al., 2015; S. J. Schwartz et al., 2005). Not only this, but given the life circumstances of young adults—who are regularly moving away for the first time, often to pursue further education (Mitchell, 2006)—these domains are likely present in the minds



of young adults who are navigating their way in the “adult” world. Finally, during young adulthood, individuals begin to engage more seriously in coupling behaviors, often with the intent to eventually marry. Arnett (2001) suggests that stable romantic relationships are an important step towards becoming an adult. Thus, orientations towards education and work as well as romantic relationship experiences are salient areas of young adult development from which siblings may learn from each other’s examples and experiences and/or look for opportunities to differentiate.

### **Present Study**

A growing body of research demonstrates that sibling modeling and differentiation are processes that shape adolescents’ and young adults’ behaviors, attitudes, and adjustment. Research reveals that sibling modeling is related to similarities between siblings in terms of risky sexual behaviors (McHale et al., 2009), risky behaviors generally (Patterson et al., 1984), adjustment (Feinberg et al., 2005), and attitudes about substances (S. D. Whiteman et al., 2014); differentiation processes are related to diverging behaviors in terms of delinquent activities and expectancies about alcohol (S. D. Whiteman et al., 2014), primary sport participation (Osai et al., 2020), gender role orientation (McHale et al., 2001), and music participation (Chitwood, 2018). With a few exceptions (Osai et al., 2020; S. D. Whiteman et al., 2007a, 2010, 2014), these two processes are rarely studied concurrently with expectations for their operation and salience varying across domains. During young adulthood, education and work orientation as well as romantic relationships are critical domains of development.

Addressing gaps in the current literature on the operation of modeling and differentiation in specific domains and early adulthood, the present study investigated the degree to which siblings’ reports of modeling and differentiation in specific domains (i.e., education, work, and romantic relationships) exacerbated or mitigated

the associations between young adult siblings' experiences in these same domains, while controlling for age, gender, and socio-economic status. I hypothesized that greater endorsement of modeling in these domains would be related to stronger associations between siblings' behaviors within each domain. In contrast, I expected that reports of differentiation in each domain would be linked to weaker associations between siblings' education orientations, work orientations, and romantic relationship qualities, respectively.

## Methods

### *Participants*

Data were drawn from Wave 11 of the Penn State Family Relationships Project, a longitudinal study of families that included mothers, fathers, and their eldest two children from 203 families (in Wave 1). Data for Wave 1 were collected in 1995-1996 and Wave 11 data were collected in 2010-2011. Families were predominantly White, working/middle class, and in maritally intact. In Wave 11, retention was between 74.88-77.34% for older siblings and 70.44-75.86% for younger siblings across data collection procedures. As of Wave 11, 4.93% of older siblings, and 20.20% of younger siblings had lived with lived with at least one of their parents during the past three months. During Wave 11, young adults' romantic partners were also invited to participate. For older siblings, 99 romantic partners (43.29% female), and for younger siblings, 67 romantic partners (47.69% female) participated.

*Procedure*

To recruit participants, in Wave 1, letters were sent home with fourth and fifth grade students in 16 school districts in a northeastern state. Families that were interested in participating returned a postcard and were then contacted by phone to confirm they were eligible to participate: parents were not divorced, and the family included two siblings in the target age range. While it is unknown how many families qualified and chose to not participate, of those that returned a postcard, and met the criteria, over 90% agreed to participate.

Throughout the study, data were collected through in home interviews (which later transitioned to web surveys) as well as phone interviews. During the home interviews, wherein each family member provided informed consent, family members were interviewed separately, in a process that typically lasted between 2 to 3 hours. In Wave 11, when many participants had moved away from home, young adults continued to participate in phone surveys, and were also invited to participate in a web-based survey. During the phone interview, which lasted approximately 30 minutes, individuals provided information on their current work and relationship status. Based on their answers to these questions, participants provided additional information regarding their romantic relationships during the web survey. In Wave 11, young adult participants were paid \$100 for their participation in both the phone and web survey. All procedures for this study were approved by the Institutional Review Board at The Pennsylvania State University.

## *Measures*

### Demographic Characteristics

Age was calculated based on their date of birth and when they took the survey (Older:  $M = 26.26$ ,  $SD = 0.8$ ; Younger:  $M = 23.69$ ,  $SD = 1.18$ ). Gender was collected at Wave 1 of data collection for each participant (Older = 54% female, Younger = 50% female). Finally, socio-economic status (SES) of the family was calculated by creating a z-score for parent education.

### Modeling & Differentiation

Modeling and differentiation were assessed during the Wave 11 web survey using subscales of the Sibling Influence Scale (S. D. Whiteman et al., 2007a, 2010). For this study, the measure was adapted to measure the degree to which individuals modeled and differentiated from their siblings in education, work, and romance separately. For each item, questions were answered on a 5-point Likert scale from 1 = *Strongly Disagree* to 5 = *Strongly Agree*. Example items include, “[Sibling] gives me advice about my [education/work and career/romantic relationships]” and “In thinking about my [education/work and career/romantic relationships I have learned that I should do things differently than [Sibling] did.” Modeling and differentiation in each domain was assessed via four items, including modeling in the education domain (Older:  $M = 3.32$ ,  $SD = 0.77$ ,  $\alpha = 0.73$ ; Younger:  $M = 3.32$ ,  $SD = 0.77$ ,  $\alpha = 0.66$ ), the work domain (Older:  $M = 3.09$ ,  $SD = 0.93$ ,  $\alpha = 0.79$ ; Younger:  $M = 3.49$ ,  $SD = 0.83$ ,  $\alpha = 0.7$ ), and in the romantic relationship domain (Older:  $M = 2.95$ ,  $SD = 0.74$ ,  $\alpha = 0.68$ ; Younger:  $M = 2.95$ ,  $SD = 0.74$ ,  $\alpha = 0.65$ ), as well as differentiation in the education domain (Older:  $M = 3.32$ ,  $SD = 0.91$ ,  $\alpha = 0.71$ ; Younger:  $M = 2.74$ ,  $SD = 0.98$ ,  $\alpha = 0.73$ ), the work domain (Older:  $M$

= 2.57,  $SD = 0.93$ ,  $\alpha = 0.83$ ; Younger:  $M = 2.49$ ,  $SD = 0.94$ ,  $\alpha = 0.73$ ), and the romantic relationship domain (Older:  $M = 2.81$ ,  $SD = 0.88$ ,  $\alpha = 0.71$ ; Younger:  $M = 2.84$ ,  $SD = 0.94$ ,  $\alpha = 0.76$ ).

### Grade Point Average

Questions about grade point average during college were asked during the phone interview portion of data collection, to participants that attended college (Older  $N = 106$ ; Younger  $N = 75$ ). Specifically, interviewers asked, “Next, I would like to know about your grades. Please look at Response Scale C, which is a list of grade point averages, and tell me which best represents your cumulative GPA from college,” and respondents then answered on an 8 point scale (1 = 3.7 - 4.0, 2 = 3.3 - 3.69, 3 = 3.0 - 3.29, 4 = 2.7 - 2.99, 5 = 2.3 - 2.69, 6 = 1.0 - 2.29, 7 = 0.7 - .99, 8 = Below .69). Each point on the scale roughly corresponds a change between the letter grade, and a plus or minus (i.e., 1 = A+, 2 = A, 3 = A-, etc.). However, to ease in interpretation, this variable was reverse coded such that higher scores indicate better grades, and divided by two, to put them on a four-point scale (i.e., 4.0 = A average, 3.0 = B average, 2.0 = C average, etc.), as is typical of most schools (Older:  $M = 2.11$ ,  $SD = 0.99$ ; Younger:  $M = 2.24$ ,  $SD = 1.05$ ).

### Work Prestige

During Wave 11 phone interviews, participants were asked to report on their labor force participation (Older  $N = 136$ ; Younger  $N = 114$ ). Specifically, young adults reported on their current job, including their job title as well as their duties and responsibilities associated with that job. Based on their job title and role, they were given a prestige score using National Opinion Research Center (NORC) Prestige Codes, which gauge the prestige of various occupations based on public perception (Nakao & Treas, 1992), with higher scores indicating more prestige (Older:  $M =$

49.87,  $SD = 12.79$ ; Younger:  $M = 45.01$ ,  $SD = 13.53$ ). Physicians, for example, have a score of 86.05, whereas cashiers have a score of 29.45 (Davis et al., 2006). (Older: skew = -0.05, kurtosis = -0.9; Younger: skew = 0.36, kurtosis = -0.94).

### Romantic Partner Love

During Wave 11, as part of the web survey collection, if participants had been involved in a romantic relationship for at least three months, they were asked to report on the qualities of their romantic relationship. Ninety-nine older siblings reported on their romantic relationship, and 64 younger siblings reported on their romantic relationship.

Nine-items from Relationships Questionnaire (Braiker & Kelley, 1979) were used to assess love for their romantic partner. On a scale from 1 = *Not at all* to 9 = *Very much* scale, participants rated their love for their romantic partner. Example items include “To what extent do you have a sense of “belonging” with *romantic partner*,” and “To what extent do you love *romantic partner* at this stage?” Total scores were created by summing all 9 items with higher scores indicating higher levels of love (Older:  $M = 73.04$ ,  $SD = 7.92$ ,  $\alpha = 0.91$ ; Younger:  $M = 73.04$ ,  $SD = 8.71$ ,  $\alpha = 0.88$ ). (Older: skew = -1.57, kurtosis = 3.3; Younger: skew = -1.81, kurtosis = 4.04).

## Results

### *Analytic Strategy*

Given varying patterns of missing data on key study variables (i.e., college GPA, occupational prestige, and romantic love), six independent datasets (i.e., one for each sibling per dependent domain) were created for each set of analyses

to maximize the number of cases utilized for older and younger siblings. For each set of analyses, missing data were examined using the ‘mice’ package in R (R Core Team, 2018), which generates multivariate imputations by chained equations (van Buuren & Groothuis-Oudshoorn, 2011). Imputations utilized the predictive mean matching technique which can be used for any variable type (including ordered, non-ordered, numeric, and binary variables) to create 50 imputed datasets for each analysis. Following imputation, all continuous variables were centered at their mean and interaction terms were created. Next, to examine study hypotheses, I conducted a series of regressions pooled across imputations using the ‘pool’ function in ‘mice’ (van Buuren & Groothuis-Oudshoorn, 2011) to pool estimates across the 50 imputed datasets for each set of analyses. Separate models tested sibling similarities across each dependent variable (i.e., education, work, and romantic relationships) for both older and younger siblings. To test if sibling similarities were greater when siblings modeled, net of differentiation, for each domain (i.e., education, work, romantic relationships), I estimated two regression models, one to examine main effects (Model 1), and one to examine the proposed interaction between modeling/differentiation and their sibling’s behavior in each domain (Model 2). The main effects model included siblings’ behavior, modeling, differentiation, gender composition of the sibling dyad (0 = *same gender dyad*; 1 = *mixed-gender dyad*), sibling intimacy, and demographic control variables. The second model included an interaction between main study variables, specifically siblings’ behavior and modeling/differentiation. Significant interactions were probed using the procedures suggested by Aiken and West (Aiken et al., 1991).

See Table 1 through 6 for bivariate correlations between study variables within each specific dataset.

**Table 4.1:**

*Bivariate Correlations and Means for Younger Siblings' Imputed Education Dataset N = 75.*

	1	2	3	4	5	6	7
1. Older Education	-						
2. Younger Education	0.07	-					
3. Older Age	-0.05	-0.04	-				
4. Parents' Education	0.17	0.17	-0.19	-			
5. Y Sibling Intimacy	-0.10	0.01	-0.06	-0.06	-		
6. Y Sibling Differentiation	0.07	-0.12	0.05	-0.06	-0.02	-	
7. Y Sibling Modeling	-0.02	-0.02	-0.20	-0.07	0.15	-0.13	-
Mean	3.49	3.38	24.12	0.35	26.56	3.35	3.34
SD	0.06	0.06	0.11	0.11	0.72	0.10	0.10

**Table 4.2:**

*Bivariate Correlations and Means for Older Siblings' Imputed Education Dataset N = 106.*

	1	2	3	4	5	6	7
1. Older Education	-						
2. Younger Education	0.07	-					
3. Older Age	0.03	0.03	-				
4. Parents' Education	0.15	0.02	-0.02	-			
5. O Sibling Intimacy	-0.02	0.02	0.04	-0.07	-		
6. O Sibling Differentiation	0.08	0.04	-0.04	0.09	-0.16	-	
7. O Sibling Modeling	-0.05	-0.05	-0.10	-0.09	0.13	-0.27	-
Mean	3.44	3.49	26.27	0.34	26.94	2.30	3.59
SD	0.05	0.07	0.08	0.09	0.55	0.21	0.16

**Table 4.3:**

*Bivariate Correlations and Means for Younger Siblings' Imputed Work Dataset N = 114.*

	1	2	3	4	5	6	7
1. Older Work	-						
2. Younger Work	-0.02	-					
3. Younger Age	0.21	0.31***	-				
4. Parents' Education	0.10	0.20*	0.03	-			
5. Y Sibling Intimacy	0.11	-0.07	0.01	-0.03	-		
6. Y Sibling Differentiation	0.08	-0.01	0.01	0.25	-0.15	-	
7. Y Sibling Modeling	0.21	-0.08	-0.06	-0.24*	0.25*	-0.24**	-
Mean	3.48	3.38	23.81	0.35	27.42	2.47	3.67
SD	0.07	0.06	0.11	0.11	0.72	0.11	0.09



**Table 4.4:**

*Bivariate Correlations and Means for Older Siblings' Imputed Work Dataset N = 136.*

	1	2	3	4	5	6	7
1. Older Work	-						
2. Younger Work	-0.02	-					
3. Older Age	0.06	0.23	-				
4. Parents' Education	0.01	0.18*	-0.04	-			
5. O Sibling Intimacy	0.23**	0.08	-0.03	-0.00	-		
6. O Sibling Differentiation	-0.10	0.00	-0.17	0.05	-0.35***	-	
7. O Sibling Modeling	0.06	0.02	0.05	-0.01	0.44***	-0.46***	-
Mean	49.87	45.22	26.26	0.07	17.35	2.74	2.99
SD	1.10	1.23	0.07	0.08	0.55	0.09	0.10

**Table 4.5:**

*Bivariate Correlations and Means for Younger Siblings' Imputed Love Dataset N = 64.*

	1	2	3	4	5	6	7
1. Older Love	-						
2. Younger Love	0.18	-					
3. Younger Age	-0.05	-0.08	-				
4. Parents' Education	0.01	-0.02	0.05	-			
5. Y Sibling Intimacy	0.10	0.09	-0.02	-0.27*	-		
6. Y Sibling Differentiation	-0.16	0.39*	0.05	-0.09	-0.41***	-	
7. Y Sibling Modeling	0.10	-0.21	-0.07	-0.13	0.63***	-0.51***	-
Mean	72.77	73.04	24.15	0.14	27.16	3.03	3.03
SD	1.42	1.09	0.13	0.12	0.82	0.11	0.11

**Table 4.6:**

*Bivariate Correlations and Means for Older Siblings' Imputed Love Dataset N = 99.*

	1	2	3	4	5	6	7
1. Older Love	-						
2. Younger Love	0.13	-					
3. Older Age	-0.06	0.08	-				
4. Parents' Education	0.12	0.01	-0.07	-			
5. O Sibling Intimacy	0.26***	0.03	-0.08	-0.03	-		
6. O Sibling Differentiation	-0.12	-0.12	-0.02	0.08	-0.37***	-	
7. O Report of Sibling Modeling	-0.06	0.13	0.05	-0.08	0.52***	-0.43***	-
Mean	73.04	71.45	26.442	0.03	25.5	2.86	2.81
SD	0.80	1.29	0.09	0.10	0.56	0.10	0.09

**Table 4.7:**

*Pooled Results for Ordinary Least Squares Regression Examining Younger Sibling's GPA*

Variables	Model 1		Model 2	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Intercept	3.28***	0.23	3.30***	0.24
YS Age	0.00	0.08	0.01	0.08
YS Gender	0.10	0.15	0.09	0.15
Parent Education	0.04	0.08	0.04	0.08
Dyad Sex Composition	0.08	0.14	0.08	0.14
YS Report of Sibling Intimacy	0.01	0.01	0.00	0.01
YS Differentiation	-0.09	0.11	-0.09	0.12
OS GPA	0.07	0.14	0.05	0.16
YS Modeling	-0.05	0.13	-0.04	0.14
OS GPA X YS Modeling			0.05	0.32
OS GPA X YS Differentiation			-0.07	0.24
<i>N</i> Imputations	50		50	
<i>N</i> Observations	62		62	
<i>R</i> <sup>2</sup>	0.07		0.09	

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

### *Grade Point Average*

Of the 203 families that participated in the original study, 75 younger siblings reported on their final college GPA and analyses were limited to these cases. Complete results are presented in Table 7. Contrary to study hypotheses, in Model 1, none of the covariates or main effects were related to younger siblings' GPA. Further, these findings were not qualified in Model 2 by interactions between sibling modeling and older siblings' GPA ( $b = 0.06$ ,  $SE = 0.31$ ,  $p = .84$ ) or differentiation ( $b = -0.07$ ,  $SE = 0.24$ ,  $p = .76$ ).

For older siblings, analyses focus on 106 older siblings that reported on their final college GPA. In Model 1, as with younger siblings, none of the main effects were significantly related to older siblings' GPA (see Table 8). There was, however,

**Table 4.8:**

*Pooled Results for Ordinary Least Squares Regression Examining Older Sibling's GPA*

Variables	Model 1		Model 2	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Intercept	3.09***	0.29	3.11***	0.32
OS Age	-0.06	0.08	-0.06	0.08
OS Gender	0.10	0.11	0.10	0.12
Parent Education	0.07	0.06	0.06	0.06
Dyad Sex Composition	0.22	0.11	0.21	0.11
OS Report of Sibling Intimacy	-0.00	0.01	-0.00	0.01
OS Differentiation	0.02	0.08	0.12	0.31
YS GPA	0.10	0.12	0.09	0.15
OS Modeling	0.01	0.1	-0.12	0.41
YS GPA X OS Modeling			0.09	0.27
YS GPA X OS Differentiation			-0.06	0.2
<i>N</i> Imputations	50		50	
<i>N</i> Observations	81		81	
<i>R</i> <sup>2</sup>	0.13		0.16	
Adj. <i>R</i> <sup>2</sup>	0.03			

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

a trend level effect for gender composition, such that older siblings that were in mixed-gender dyads reported higher GPAs ( $b = 0.22$ ,  $SE = 0.11$ ,  $p = .053$ ). Contrary to study hypotheses, no association was found between younger and older sibling's GPA, nor was this association qualified by interactions between younger siblings' college GPA and sibling modeling ( $b = 0.11$ ,  $SE = 0.23$ ,  $p = .63$ ) or differentiation ( $b = -0.06$ ,  $SE = 0.18$ ,  $p = .74$ ).

### *Work Prestige*

Turning to work prestige, 114 younger siblings reported on their current job position; therefore, analyses were limited to these cases (see Table 9 for complete results). In Model 1, a significant positive relationship was found between age and

**Table 4.9:**

*Pooled Results for Ordinary Least Squares Regression Examining Younger Sibling's Work Prestige*

Variables	Model 1		Model 2	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Intercept	47.77***	4.68	47.29***	4.71
YS Age	4.64***	1.19	4.56***	1.19
YS Gender	-1.18	2.85	-1.08	2.88
Parent Education	2.22	1.62	2.25	1.62
Dyad Sex Composition	-1.38	2.72	-1.55	2.76
YS Report of Sibling Intimacy	-0.10	0.25	-0.12	0.25
YS Differentiation	-0.79	2.01	-0.85	2.03
OS Work Prestige	-0.12	0.11	-0.13	0.12
YS Modeling	0.68	2.64	0.67	2.91
OS Work Prestige X YS Modeling			0.10	0.21
OS Work Prestige X YS Differentiation			0.22	0.14
<i>N</i> Imputations	50		50	
<i>N</i> Observations	96		96	
<i>R</i> <sup>2</sup>	0.20		0.24	
Adj. <i>R</i> <sup>2</sup>	0.12		0.15	

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

work prestige, such that older individuals were more likely to be employed in a job with more prestige ( $b = 4.64$ ,  $SE = 1.19$ ,  $p < .001$ ). No other covariates or main effects were significant. Additionally, inconsistent with expectations, the association between older and younger siblings' work prestige was not qualified in Model 2 by interactions with younger siblings' reports of modeling ( $b = 0.03$ ,  $SE = 0.18$ ,  $p = .88$ ) or differentiation ( $b = 0.22$ ,  $SE = 0.14$ ,  $p = .13$ ).

For older siblings, 136 individuals reported on their current work position (see Table 10 for complete results). In Model 1, a positive relationship was found between sibling intimacy and work prestige, such that individuals that reported more intimate relationships with their sibling also reported having a job with more prestige ( $b = 0.56$ ,  $SE = 0.28$ ,  $p < .05$ ). However, contrary to study hypotheses, older siblings' work prestige was not related to any other predictor (i.e., sibling

**Table 4.10:**

*Pooled Results for Ordinary Least Squares Regression Examining Older Sibling's Work Prestige*

Variables	Model 1		Model 2	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Intercept	51.87***	4.6	53.03***	4.75
OS Age	0.71	1.8	0.64	1.8
OS Gender	-0.33	2.72	-1.23	2.87
Parent Education	0.73	1.46	0.41	1.54
Dyad Sex Composition	-2.19	2.6	-2.08	2.61
OS Report of Sibling Intimacy	0.56*	0.28	0.59*	0.29
OS Differentiation	-1.05	1.91	-0.78	1.85
YS Work Prestige	-0.03	0.11	-0.01	0.12
OS Modeling	-0.89	1.95	-0.81	1.93
YS Work Prestige X OS Modeling			0.10	0.15
YS Work Prestige X OS Differentiation			0.19	0.16
<i>N</i> Imputations	50		50	
<i>N</i> Observations	100		100	
<i>R</i> <sup>2</sup>	0.08		0.12	

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

differentiation, sibling modeling, or younger sibling's work prestige). Further, the association between younger and older siblings' work prestige was not qualified by interactions with older siblings' reports of modeling ( $b = 0.02$ ,  $SE = 0.12$ ,  $p = .85$ ) or differentiation ( $b = 0.19$ ,  $SE = 0.16$ ,  $p = .26$ ) in Model 2.

### *Romantic Love*

For romantic love, 64 younger siblings reported being in a romantic relationship; therefore, models were limited to those individuals (see Table 11 for full results). Examining the covariates in Model 1, a positive relationship between sibling gender composition and romantic love was found such that individuals that were in a mixed gender sibling dyad reported more romantic love with their partner ( $b = 6.78$ ,  $SE = 2.97$ ,  $p < .05$ ). Individuals that reported more intimate sibling relationships

**Table 4.11:**

*Pooled Results for Ordinary Least Squares Regression Examining Younger Sibling's Romantic Love*

Variables	Model 1		Model 2	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Intercept	68.34***	4.56	68.94***	5.04
YS Age	-0.10	1.61	-0.28	1.76
YS Gender	1.34	2.83	1.00	3.1
SES	2.73	1.8	2.84	1.93
Dyad Sex Composition	6.78*	2.97	6.59	3.25
YS Report of Sibling Intimacy	0.89*	0.35	0.85*	0.38
YS Differentiation	6.46*	2.4	6.67*	2.57
OS Love	0.65**	0.18	0.62**	0.21
YS Modeling	-4.93*	2.35	-4.58	2.64
OS Love X YS Modeling			0.10	0.31
OS Love X YS Differentiation			0.10	0.3
<i>N</i> Imputations	50		50	
<i>N</i> Observations	34		34	
<i>R</i> <sup>2</sup>	0.58		0.58	
Adj. <i>R</i> <sup>2</sup>	0.44		0.39	

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

also reported more romantic love ( $b = 0.89$ ,  $SE = 0.35$ ,  $p < .05$ ). Consistent with hypotheses, a positive relationship was found between older siblings' reports of romantic love and younger siblings' reports of romantic love ( $b = 0.65$ ,  $SE = 0.18$ ,  $p < .01$ ). Further, a negative relationship was found between younger siblings' reports of sibling modeling and romantic love ( $b = -4.93$ ,  $SE = 2.35$ ,  $p < .05$ ). Finally, a positive relationship was found between younger siblings reports of sibling differentiation and romantic love ( $b = 6.46$ ,  $SE = 2.40$ ,  $p < .05$ ). Contrary to study hypotheses, in Model 2, the association between older siblings' romantic love and younger siblings' romantic love was not qualified by interactions with younger siblings' reports of modeling ( $b = 0.10$ ,  $SE = 0.31$ ,  $p = .74$ ) or differentiation ( $b = 0.10$ ,  $SE = 0.30$ ,  $p = .74$ ).

Finally, 99 older siblings reported that they were currently in a romantic

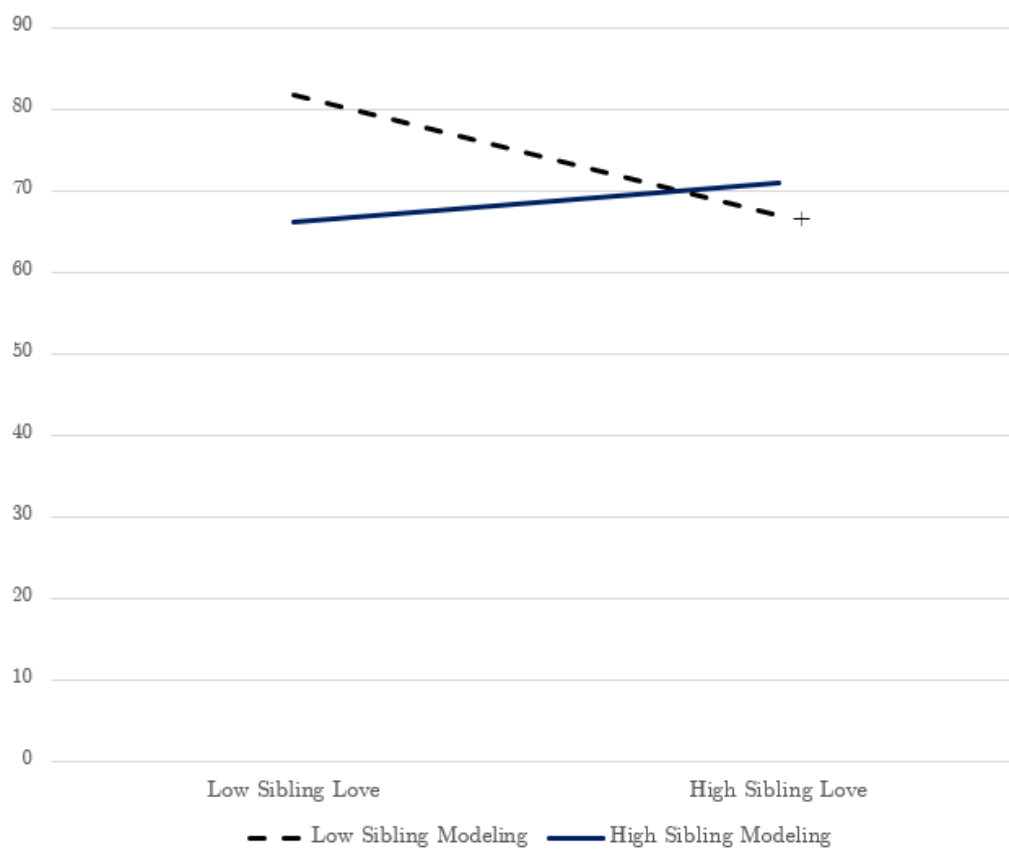
**Table 4.12:**

*Pooled Results for Ordinary Least Squares Regression Examining Older Sibling's Romantic Love*

Variables	Model 1		Model 2	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Intercept	67.11***	5.4	71.42***	5.21
OS Age	1.80	2.07	0.47	2.24
OS Gender	4.80	2.76	2.89	2.59
SES	-0.18	1.62	-1.26	1.52
Dyad Sex Composition	-0.46	3.17	-1.09	2.94
OS Report of Sibling Intimacy	0.76	0.36	0.54	0.35
OS Differentiation	-1.29	2.64	-2.16	2.62
YS Love	0.30	0.16	-0.25	0.25
OS Modeling	-4.98	3.44	-3.68	3.22
YS Love X OS Modeling			0.63*	0.24
YS Love X OS Differentiation			0.41	0.29
<i>N</i> Imputations	50		50	
<i>N</i> Observations	32		32	
<i>R</i> <sup>2</sup>	0.42		0.57	
Adj. <i>R</i> <sup>2</sup>	0.22		0.37	

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

relationship and were included in the analytic model (see Table 12 for complete results). In Model 1, there were no associations between the covariates or main effects and older siblings' romantic love. However, in Model 2, there was a significant interaction between older siblings' modeling and younger siblings' romantic love ( $b = 0.54$ ,  $SE = 0.24$ ,  $p < .05$ ). As can be seen in Figure 1, testing of simple slopes demonstrated that there was no association between younger and older siblings' reports of romantic love in conditions of high modeling (i.e., one standard deviation above the mean;  $b = 0.25$ ,  $SE = 0.18$ ,  $p = .18$ ), and a trend level negative association in conditions of low modeling ( $b = -0.75$ ,  $SE = 0.41$ ,  $p = .08$ ). The association between younger and older siblings' reports of romantic love was not moderated by differentiation ( $b = 0.41$ ,  $SE = 0.29$ ,  $p = .17$ ).



+  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Figure 4.1:**

*The association between older siblings' romantic love and younger siblings' romantic love as a function of sibling modeling*



## Discussion

Previous research has examined the influence of siblings in a variety of domains that are developmentally salient during adolescence (East, 2009; McHale et al., 2012). In general, two opposing dynamics have been investigated as processes that shape sibling similarities and differences: sibling modeling and sibling differentiation. Modeling, which is rooted in Bandura's theory on observational learning (1963), suggests that siblings become more similar based on the extent to which they utilize their brothers/sisters as models for their own behavior. In contrast, differentiation—which is rooted in individual psychology (Adler, 1930)—suggests that individuals become more distinct from their siblings as a way to protect themselves from unfavorable comparisons. To date, the implications of these processes have primarily been examined during adolescence (Feinberg et al., 2003; Osai et al., 2020; e.g., S. D. Whiteman et al., 2007a). This study adds to this work by examining the extent to which these processes continue to shape sibling similarities and differences in domains that are salient during young adulthood (i.e., education and work attainment, and romantic relationships).

Contrary to study hypotheses, siblings' educational performance and job prestige were not predictive of each other's own performance in those same domains. It is possible that associations between siblings' work and educational attainment were not found because these individuals reported on something that was already achieved. Given that the analytic models examined concurrent associations between modeling/differentiation and siblings' past performance in education, perhaps the time lag made their siblings' performance less relevant. Further, given the strong positive relationship between age and work prestige for younger siblings, it is possible that these individuals had selected a career path, but did not yet have the same

degree of prestige that comes as they gain work experience, and advance within their field (Cheng & Furnham, 2012). Indeed, over the past several decades, patterns within careers have shifted; it is common that many young adults will change jobs to gain a better position rather than hoping to be promoted within the same company (Light, 2005). Therefore, it is possible that prestige within their career is dependent more on their work experience and number of years in the field rather than on other influences, such as their siblings' performance and attainment.

It is also possible that sibling differences in educational achievement and work attainment are related to processes other than modeling and differentiation. For example, previous work has demonstrated that within families, siblings may have different experiences due to birth order (Conley et al., 2007), gender (Shanahan et al., 2007), and parental differential treatment (Jensen & McHale, 2015). These differential experiences may be linked with differences in attainment. Specifically, Jensen and McHale (2015) found that parents' beliefs about siblings' academic abilities predicted differences in performance, such that youth performed better when their parents rated them as more competent relative to their sibling. Other research has found that firstborn children tend to outperform their younger siblings on achievement tests, suggesting that older siblings may receive additional resources from their parents that enables greater future success (Conley et al., 2007; Travis & Kohli, 1995). Therefore, it is possible that siblings' differential experiences within families pushes for more divergence within educational and occupational domains.

When examining the influence of siblings on romantic relationships, evidence of sibling influence emerged for both younger and older siblings. For younger siblings, main effects were found for sibling intimacy, sibling modeling and differentiation, and older sibling's romantic love. Congruent with study hypotheses, sibling intimacy was positively related to younger siblings reports of romantic love; a finding shown in other studies as well (McHale et al., 2009). It is possible that young adults learn

skills that are helpful in their romantic relationships via practicing those relational skills in other close personal relationships, including sibling relationships (Brody, 1998; Yu & Gamble, 2008). Interestingly, sibling modeling was negatively related to romantic love. Although specific hypotheses were not included regarding the main effect of modeling (instead, it was proposed to moderate the association between older and younger siblings' reports of romantic love), it is important to note that sibling intimacy and modeling were related to romantic love in opposite directions. Importantly, previous research has utilized sibling intimacy as a proxy for sibling modeling (including Study 1 of this dissertation); however, this finding demonstrates that these are independent constructs, and therefore, future research should consider their effects separately when possible. Finally, I found that differentiation was positively related to sibling love. Again, however, no specific hypotheses regarding the main effects of differentiation were posited (it was expected to moderate the association between older and younger siblings' reports of romantic love), and therefore this finding should be interpreted judiciously.

For older siblings, there was a significant interaction between sibling modeling and younger siblings' reports of love, indicating that similarity between siblings was dependent on the degree to which an individual modeled that sibling in their romantic relationships. However, the probing of the interactions indicated only a trend level effect in conditions of low modeling, such that there was a negative relationship between older and younger siblings report of love. This association may suggest greater differentiation between siblings in conditions of low modeling (however, differentiation did not moderate the association between siblings' reports of romantic love), but does not indicate greater similarity in cases of high modeling as would be expected.

Previous research has demonstrated that siblings may influence romantic relationships in two ways. First, as mentioned earlier, sibling relationships may act

as a training ground for other intimate relationships as siblings provide opportunities to practice relationship skills within their sibling dyads, with direct links between sibling relational qualities, and later qualities in romantic relationships (Brody, 1998; Yu & Gamble, 2008). Second, siblings may influence each other through modeling processes, where individuals may observe how their sibling acts in a romantic relationship and may then emulate that behavior in their own romantic relationships (R. D. Conger et al., 2000)—although this pattern was not supported by the findings in this paper. Given the limited support found in this study, it is important for future work to explore other mechanisms by which sibling relationships may be influential as young adults continue to explore romantic relationships.

### *Limitations and Conclusions*

It is critical to highlight some of the limitations that inhibit the conclusions of this study. First, although data from the Penn State Family Relationships Project have been utilized frequently in the past (e.g., Crouter et al., 1993; Dotterer et al., 2014; McHale & Crouter, 2003) and studies often have successfully examined interactions between siblings' behaviors and accomplishments (Crouter et al., 2001; S. D. Whiteman, McHale, & Crouter, 2011), Wave 11 (which was utilized in this study) experienced higher levels of attrition than previous waves. Additionally, because individuals could only report on domains in which they had experience (e.g., individuals could only report on their college GPA if they had attended college), sample size for analyses was further reduced (most analyses had samples of 100 or fewer). This decrease in sample size across dependent domains resulted in a reduction in power that may have influenced the ability to detect hypothesized interactions between sibling influence processes and siblings' educational/work/romantic qualities. Second, the sample was racially homogenous and resided from one geographic

region and therefore not representative of the United States as a whole. Ideally, future work should examine the associations between young adult siblings' behaviors and sibling influence processes with larger and more diverse samples to enhance the generalizability of the conclusions.

Third, while this study was the first to utilize modeling and differentiation scales that were specific to the domains being studied, these scales were modeled off the Sibling Influence Scale (S. D. Whiteman et al., 2010), which was designed to assess sibling modeling/differentiation during adolescence. It is possible that as sibling relationships shift during young adulthood, the ways that siblings influence each other change. For example, during young adulthood, modeling and differentiation may be dependent on the degree to which siblings have contact with each other or engage in disclosure processes. Therefore, future work should investigate the interactions between sibling influence processes and other sibling relationship qualities during young adulthood. Furthermore, given the potential ways that sibling relationships change during young adulthood, it would be beneficial to examine modeling and differentiation utilizing more diverse analytic methodologies. Specifically, it is possible that during adulthood these processes are less centered around specific developmental outcomes (e.g., education and work attainment) and may instead be more focused on processes (e.g., how to study, or how to ask for a raise). Therefore, future work should consider utilizing qualitative methodologies to more deeply understand how these processes may (or may not) operate during young adulthood.

Fourth, it is possible the measurement of grade point average and work prestige did not accurately capture the influence that siblings have on education and work attainment. For instance, rather than influencing such specific markers of performance and attainment, siblings may instead influence the ways that young adults' approach their educational and work aspirations (e.g., how much time to spend studying, how to build good relationships with managers at work) or their orientation towards

these domains (Cassinat et al., 2019). Therefore, future work should examine more diverse education and work outcomes to understand whether and how siblings may influence each other in these domains.

Despite these limitations, this study contributes to the literature about sibling influence on young adults in developmentally salient domains. The sibling influence scale was created with the assumption that individuals may choose to generally model their sibling across a variety of domains (S. D. Whiteman et al., 2010); however, this study demonstrates that perhaps individuals are more discerning and may instead model their sibling in domains where their sibling demonstrates expertise but not others, or during specific developmental times (i.e., while in school, younger siblings may model their sibling in educational domains, but not in work). More work, however, is needed to understand where and when domain specific modeling and differentiation may occur. Although no evidence for the continued influence of differentiation into young adulthood was found, as with modeling, it is possible that with the achievement of specific developmental milestones (e.g., graduating college, settling into a career) it is no longer necessary to differentiate from a sibling. That is, if differentiation is intended, in part, to help individuals create a niche within their family, perhaps objective differences in education and work diminish the continued desire to be different. Further, since individuals generally hope for happiness, satisfaction, and love in romantic relationships, there may not be variations that individuals pursue (i.e., a sibling would not pursue a worse relationship). Therefore, it is possible that differentiation may be less relevant in this domain. It is also possible that if differentiation was more salient during adolescence, as previous research has suggested (Frances F. Schachter et al., 1976), then the need for differentiating may not be present during young adulthood (i.e., process of differentiating has successfully occurred). Overall, this study demonstrated that sibling influence may only extend into domains where young adults are continuing to develop (such as

romantic relationships), and that modeling (and not differentiation) may continue to be an important influence process.

## CHAPTER 5

## Discussion

The goal of this dissertation was to examine whether processes of sibling influence continued to shape the behaviors, adjustment, and well-being of siblings during young adulthood. Building on previous research in childhood and adolescence (e.g., McHale et al., 2012; Milevsky, 2011; S. D. Whiteman et al., 2007a) and more limited work that examined sibling similarities during young adulthood (Cassinat et al., 2019; Cassinat & Jensen, 2020; Jensen et al., 2013), across three studies, I specifically examined the nature and implications of sibling influence processes (i.e., sibling modeling and sibling differentiation) during young adulthood. Given the developmental changes to sibling relationships during young adulthood, which may result in less hierarchical sibling relationships, I examined the potential for increased bidirectional influence of siblings (i.e., younger-to-older as well as older-to-younger) on young adults' binge drinking, marijuana use, number of sexual partners, and volunteering, specifically examining whether sibling closeness further moderated patterns of sibling similarities (Study 1). I also examined the potential bidirectional influence of domain specific sibling modeling and differentiation on young adults' education and work attainment, and romantic relationships (Study 3). Finally, I investigated if sibling differentiation dynamics continued into young adulthood, specifically utilizing longitudinal data to test the propositions of differentiation theory (i.e., that sibling differentiation would be associated with greater relational harmony between siblings, and in turn, greater overall well-being; Study 2). The following section discusses how the findings from these studies collectively build upon previous literature and highlight new directions for future work.



## **Bidirectional Sibling Influence**

During childhood and adolescence, developmental differences between siblings naturally lead to a hierarchical relationship, wherein older siblings take on the role of teacher, leader, and trainer (Howe et al., 2012; Stewart Jr, 1983). However, in late adolescence and into young adulthood, the developmental differences between siblings diminish and younger siblings may “catch up” to their older brothers and sisters (D. Buhrmester et al., 1992; Stocker et al., 1997). Furthermore, over the past several decades, there have been societal shifts to the meaning of and transition to adulthood as individuals are granted an extended moratorium, and developmental milestones are decoupled (Côté, 2000; Macmillan, 2005; Mitchell, 2006). For example, getting married has been decoupled from having children; graduating from high school is increasingly decoupled from moving away from home. Thus, as individuals take longer to complete developmental milestones (e.g., get married, graduate from college), it seems likely that there is a window of opportunity where older and younger siblings simultaneously experience development within certain domains (e.g., romantic relationships) that may allow them both to influence each other in ways that may not have been afforded in previous decades.

Given this potential for increasing equality in sibling relationships during young adulthood, it is likely that bidirectional influence between siblings (younger-to-older siblings and vice versa), instead of top-down socialization (older-to-younger siblings) only, may be observed (Furman & Buhrmester, 1985, 1992). Across two studies, I found mixed support for this notion. Specifically, utilizing data from the National Longitudinal Study of Adolescent to Adult Health, Study 1 demonstrated that although siblings do not bidirectionally influence each other in every domain, they do nevertheless influence each other longitudinally net of their own previous behaviors.

Specifically, older siblings' earlier risk behaviors were positively related to younger siblings' later risk behaviors (i.e., top-down sibling influence), specifically in terms of binge drinking, marijuana use, and number of sexual partners. Evidence of bidirectional or bottom-up influence (i.e., younger-to-older sibling) emerged for young adults' number of sexual partners and volunteering behaviors. In Study 3, while I did not find evidence of bidirectional influence in terms of young adults' education or work attainment, there was evidence that siblings may bidirectionally influence each other's romantic relationships. Specifically, for older siblings' romantic love, I found a significant interaction between sibling modeling and younger siblings' reports of romantic love; however, probing of the simple slopes failed to find a significant slope. For younger siblings, consistent with top-down influence (but not moderated by modeling), I found that older sibling's romantic love was positively related to younger sibling's romantic love. Below, I offer several potential reasons why evidence was mixed with respect to bidirectional sibling influences.

First, it is possible that bidirectional sibling influence was not evident across all dependent variables because in some domains, there may have still been differences between siblings in terms of their development. For example, previous research has demonstrated that substance use behaviors (examined in Study 1) peak between ages 17-23 (Johnston et al., 2007). In Study 1, for the most part, older siblings were past this peak use period, whereas younger siblings were still within the peak use period. Thus, in Study 1, it is possible that in this domain, older siblings were less influenced by younger siblings because substance use is a less salient behavior. Additionally, it is possible that there was still a developmental difference between older and younger siblings (older siblings' substance use was likely decreasing, whereas younger siblings were likely engaging in high levels of substance use), reducing the likelihood that younger siblings would influence older siblings. Similarly, Study 3 examined educational attainment after participants had already completed college.

Therefore, it is unlikely that younger siblings would influence their older siblings' behaviors following the completion of their development within a domain.

Bidirectional influence may be more prevalent, however, in domains where exploration is ongoing. Specifically, when looking at number of sexual partners that an individual had in Study 1, there was evidence of top-down and bottom-up sibling influence. Given the increasingly delayed age of marriage (Willoughby & James, 2017), it is possible that siblings continue to influence each other as they both continue to make decisions about their romantic and sexual relationships. In fact, in Study 3, there was further (though limited) evidence that siblings bidirectionally influence their romantic relationships. Specifically, results indicated that older siblings' romantic love was associated with younger siblings' romantic love (an association that was not moderated by sibling modeling or differentiation). Further, there was evidence that younger siblings' romantic love was linked to older siblings' romantic love—an association that was moderated by sibling modeling. Therefore, when considering behaviors in which younger siblings may shape their older siblings' behaviors (in addition to the more typical top-down approaches), it is critical to examine domains in which both siblings experience continued development.

### **Diminishing Effect of Sibling Influence Processes**

Although I hypothesized that the implications of sibling modeling and differentiation would continue into young adulthood, I found little evidence that modeling and differentiation predicted sibling similarities and differences. In Study 1, I did not find evidence that sibling closeness (which was utilized as a proxy for sibling modeling) moderated the links between siblings' risky and prosocial behaviors (i.e., binge drinking, marijuana use, number of sexual partners, and volunteering behaviors).

Further, in Study 3, I only found limited support for modeling shaping sibling similarities, in particular for older siblings' romantic love; however, sibling modeling did not moderate the linkages between younger and older siblings' educational performance or work prestige.

Support for the continued influence of sibling differentiation, in contrast, was more mixed. Study 2 found that sibling differentiation longitudinally predicted young adults' sibling relational qualities, albeit in the opposite direction hypothesized. As mentioned earlier, perhaps this reverse pattern reflects the potential ways that differentiation magnifies differences between siblings, and, by so doing, diminishes the avenues through which siblings may connect. However, in Study 3, differentiation failed to moderate the associations between older and younger siblings' educational performance, work prestige, or romantic love.

It is possible that evidence for the continued influence of sibling modeling and differentiation was limited because these sibling influence processes may be less relevant during young adulthood. For example, it is possible that modeling and differentiation may be less relevant because siblings do not spend as much time together in young adulthood as they did during childhood and adolescence. Indeed, during childhood and adolescence, youth spend significant amounts of time together—up to 80% of their discretionary time (Dunifon et al., 2017; McHale & Crouter, 1996). It is natural that by spending so much time together, siblings would turn to each other (and especially younger siblings to older siblings) to learn (in)appropriate behaviors (Bandura & McClelland, 1977). However, during young adulthood, most siblings spend significantly less time together (Jensen et al., 2018) as they move from home to pursue further education, employment, or other opportunities. Therefore, young adult siblings have far fewer opportunities to observe the behavior of their sibling, and modeling in turn, may be a less influential sibling process. Perhaps other sibling relationship processes, such as contact and disclosure, shape the implications

of siblings during young adulthood. As such, future research would benefit from examining how contact and disclosure processes potentially moderate the influence of sibling modeling (and differentiation).

Additionally, differentiation theory suggests that individuals differentiate from each other, in part, as a way to protect themselves from unwanted comparisons from their parents (Frances F. Schachter et al., 1976). However, as young adults move away from home, they likely escape the pressure of unwanted comparisons because their parents do not have the opportunity to directly compare their children to each other as frequently (or young adults are less likely observe their parents' comparisons). Therefore, it is possible that differentiation is a less salient process during young adulthood because young adults feel less urgency to establish themselves as unique individuals. Future work should explore this possibility by testing whether coresidence moderates the implications of sibling differentiation processes on sibling similarities and differences.

It is also possible that modeling and differentiation become less salient during young adulthood because skills (e.g., ability to communicate with others, ability to empathize) and identity are increasingly cemented. During youth and adolescence, individuals learn at a rapid rate [their ability to absorb information frequently compared to a sponge, an unlit match, or a "little scientist"; Gopnik (2010); Jipson et al. (2014); Piaget (1970)] as they rely on many sources of knowledge to help them—including siblings. Although individuals continue to engage in observational learning throughout the life course, it is likely that the way that they engage in observational learning becomes increasingly complex. Individuals learn the basics of relationships and other skills during childhood and adolescence. Young adults may become far more selective in the behaviors that they choose to emulate, which may be more difficult to observe with current measures. Therefore, future work may benefit from qualitative approaches that could better capture nuanced patterns and young adults' selective

use of their siblings as models and foils.

Finally, during young adulthood, individuals' identity is increasingly solidified. Therefore, it is possible that differentiation only extends beyond adolescence into very early adulthood (as may be suggested by the results of Study 2). However, as individuals solidify their identity within specific domains, the need to differentiate also may diminish (which may explain why differentiation was not a salient moderator in Study 3). Further, it is likely that differentiation is a less salient influence process in domains where society generally hopes or pushes for an ideal or optimal outcome. For example, it is preferred to have a higher GPA, more job prestige, and happy romantic relationships. In domains in which individuals have established their identity or hope to achieve the same goals, it is possible that differentiation will not be salient.

### **Increasing Influence of Sibling Relational Qualities**

Given the potentially diminished influence of sibling modeling and differentiation, it is possible that other sibling relational qualities may become more important in young adulthood. Indeed, at a time when sibling relationships become more volitional (V. Cicirelli, 2013; Stocker et al., 1997), it seems likely that the quality of the sibling relationship will play a more important role in young adults' lives and shape the degree of influence siblings have on each other. Specifically, contact, disclosure, and support may become increasingly relevant to siblings.

Although siblings begin to spend less time together during adulthood (L. White, 2001), recent societal changes provide more options to maintain contact with friends and loved ones (e.g., phone calls, video chats, text messaging, social media). Importantly, Jensen and colleagues (2018) suggested that when siblings

no longer live together, they have fewer opportunities for conflict, and their (more limited) contact becomes more positive and is associated with a more intimate relationship (see also V. Cicirelli, 2013). Thus, it is possible that diverse forms of contact—including face-to-face interactions, phone calls, and social media—may help siblings maintain intimacy, but also make certain sibling influence processes (i.e., modeling and differentiation) less influential. Indeed, as non-face-to-face contact increases, it is possible that sibling modeling and differentiation become less salient because siblings do not have opportunities to directly observe each other's behaviors. Therefore, in sibling relationships that experience high levels of contact (including virtual contact), it is possible that siblings may be able to share more intimate experiences, and lend each other advice, support, and friendship (Cahn, 1989; Rittenour et al., 2007), without engaging in modeling or differentiation.

Beyond the importance of sibling contact, sibling disclosure also likely plays a crucial role in shaping sibling influence during young adulthood. Sibling disclosure measures the extent to which siblings share intimate details about their life and is a critical component of close relationships (Myers, 1998). Previous research on sibling disclosure during adolescence demonstrates that siblings share a high level of personal information on a variety of topics (Dolgin & Lindsay, 1999). Given the importance of perceived understanding (i.e., the feeling of being understood) in communication (Cahn, 1990; Reis et al., 2017), it is possible that siblings, who grew up in the same environment and have many shared experiences, may feel a renewed sense of camaraderie with their brothers and sisters as they begin to live on their own for the first time. With a renewed sense of closeness, siblings may be more likely to share problems they are experiencing, as a way to ask for advice, and to teach (Dolgin & Lindsay, 1999). It is likely that sibling disclosure works in concert with sibling contact as a source of influence during young adulthood. As such, future work should explore patterns of sibling disclosure within young adult

sibling relationships to understand how siblings may influence and support each other during the transition into adult roles.

Finally, it is likely that sibling support plays an increasingly important role during young adulthood. Previous research has demonstrated that during adolescence older siblings often act as an important source of support about social and scholastic issues, as well as familial issues (C. J. Tucker et al., 2001), even compensating for difficult family circumstances [e.g., high conflict families; Caya & Liem (1998); Milevsky (2005)]. Importantly, limited work suggests that sibling support from adolescence to young adulthood may remain relatively stable (Guan & Fuligni, 2016). It is possible, however, that the type of support siblings provide each other changes. Whereas during adolescence, siblings have limited resources and may primarily provide emotional support to each other (Branje et al., 2004; C. J. Tucker et al., 2001), during young adulthood individuals have more resources at their disposal as they increasingly find employment and establish their own (semi)autonomous lives (Mulder & Clark, 2002; Xiao et al., 2014). Therefore, it is possible that in addition to providing emotional support, siblings may provide additional forms of instrumental support, including financial assistance, support with odd jobs, and even living together (Knijn & Liefbroer, 2006) during young adulthood. As siblings turn to each other for support (i.e., emotional or instrumental), they likely influence each other in important ways. For example, in the context of seeking out emotional support, an individual may disclose details about their situation, and their sibling may then offer advice, or consolation. Similarly, when seeking instrumental support from a sibling, they may direct their sibling how to act, or may even offer the support conditionally to ensure that their sibling will act in a specific way. Therefore, it is possible that as siblings offer support to each other, they will influence their future behavior and attitudes.



### *Sibling Gender Composition*

Although observational learning and differentiation theory both suggest that sibling gender composition plays a role in the degree to which siblings influence each other, collectively the studies of this dissertation failed to find support for this notion (though, Study 3 did not test such possibilities because of limited power). It is possible that gender composition was not salient because of the implications of gender change during young adulthood. Whereas children and adolescents tend to prefer to spend time with same-gendered peers, [likely as a way to socialize gender; Bukowski et al. (1993); C. L. Martin & Fabes (2001); Lam et al. (2014)], this pattern shifts during late adolescence and into young adulthood. It is possible that as individuals begin to spend increasing time with mixed-gender peers, they likewise spend increased time with mixed-gender siblings (J.-Y. Kim et al., 2006; Lam et al., 2012). Thus, mixed-gender siblings may become more salient models for their sibling and become as influential as same-gender siblings. It also is possible that both mixed- and same-gendered sibling dyads engage in less modeling during young adulthood. While future work should continue to examine whether gender composition shapes various sibling relationship dynamics [e.g., previous work has demonstrated that sisters tend to maintain the most intimacy across the lifespan; V. Cicirelli (2013)], it is possible that it does not have the same importance that it had during youth and adolescence.

### **Future Directions**

In recent years, interest in research on sibling relationships has increased (McHale et al., 2012; Milevsky, 2011). Nevertheless, overall, research in the field of sibling research lags behind other proximal relationships (McHale et al., 2012;

Perez-Brena et al., 2022), and there is still much to be done to understand how siblings influence each other across the life course, and especially during young adulthood. First, most of the research on sibling relationships—including the studies presented here—focuses on the closest aged sibling. Only rarely has work examined sibling triads (Frances F. Schachter et al., 1976) or other larger family systems. Much of the research that has looked at large family systems has focused on why larger families tend to experience higher levels of poverty (Bradshaw & Ellison, 2008; Desai, 1995) or examined the degree to which large families experience other disadvantages (Blackwood et al., 2001; Tener et al., 2020). While it is understandable that this research has lagged behind—it can be costly and complicated to collect and analyze these data—more needs to be done to examine the impact that young adult siblings in large (or even three child) families may have. Specifically, when thinking about domain specific sibling modeling and differentiation in Study 3, it would be beneficial to explore multiple sibling relationships, as an individual may model one sibling’s romantic relationship and another sibling’s educational attainment. Additionally, it is possible that modeling behaviors will continue for younger siblings (i.e., those still in childhood or adolescence) even as their older siblings enter young adulthood.

Second, previous research has demonstrated that sibling relationships may differ based on an individual’s racial, ethnic, or cultural subgroup. For example, previous work found that Mexican American families tend to report higher levels of familism, which was predictive of sibling relationship qualities. Specifically, family’s familism values were positively related to youth’s reports of sibling intimacy, and negatively associated with sibling negativity (Updegraff et al., 2005). Similarly, in a latent profile analysis, Killoren and colleagues (2017) found that sibling dyads within the positive profile reported highest levels of familism values as compared to other sibling relationship profiles. Therefore, future sibling research should continue

to consider the ways that cultural processes may shape patterns of sibling relationships as well as sibling influence. Additionally, it is critical to contextualize the influence of siblings within their larger environment. Indeed, Bronfenbrenner's ecological system theory (Bronfenbrenner & Morris, 2007) suggests that proximal processes that operate within multiple microsystems are not independent, rather each is connected through the mesosystem (Bronfenbrenner, 1992). Therefore, it is important to consider how other close relationships, like parent-child relationships and romantic relationships, may shape siblings' opportunities for influence across the life course. For example, shared parenting may promote sibling similarities in adolescence that are further exacerbated by other sibling influence processes like modeling. Importantly, previous work on sibling influence often demonstrates the importance of siblings above and beyond the effects of parent and peer relationships (e.g., Ardel & Day, 2002; Sherman et al., 2006; Slomkowski et al., 2001). It also is possible that the degree to which young adults turn to their siblings changes over time and they will be influenced by other close personal relationships (e.g., romantic relationships). Therefore, it is essential that future work examine the influence of sibling relationships relative to their other proximal relationships.

Third, more work should examine the ways that sibling relationships shift during young adulthood. Jensen and colleagues (2018) found that while sibling contact decreases, sibling intimacy increases. However, little is understood about how other relational qualities (including disclosure and support) may interact to influence young adults. It is possible that developmental transitions during young adulthood (e.g., moving away from home) may qualitatively change the ways that siblings interact. Indeed, given the limited evidence for the continued influence of modeling and differentiation into young adulthood, it is critical that other influence processes (including relational qualities) be studied in greater detail.

Fourth, theories of sibling influence need to be studied more. Although sibling

deidentification propositions has been around since the 1970's, to my knowledge, this dissertation is the first time that the longitudinal propositions of the theory (i.e., that sibling differentiation would be associated with more harmonious sibling relationships, which would in turn be related to greater well-being) have been tested in a single model. Indeed, numerous papers have demonstrated that when individuals engage in differentiation, they tend to have more conflictual relationships (S. D. Whiteman et al., 2009; S. D. Whiteman & Christiansen, 2008). In the past, these findings (which contradict theory) have been attributed to the ongoing process of differentiation and suggested that conflict would eventually decrease, or that differentiation is non-linearly related to more positive sibling relationships (S. D. Whiteman et al., 2009). Therefore, future work should continue to longitudinally examine how differentiation influences sibling relational qualities (either linearly or non-linearly) and determine the degree to which differentiation is a protective versus antagonistic process.

## **Conclusion**

Despite the limitations contained herein, this dissertation builds on previous work on sibling relationships. First, although there was mixed support for the bidirectional influence of siblings during young adulthood, it is likely that in domains that remain developmentally salient (e.g., romantic relationships) older and younger siblings both influence each other as developmental differences between siblings diminish. Second, while this dissertation focused on two specific sibling influence processes (i.e., modeling and differentiation), it is possible that the ways that siblings influence each other shifts as individuals transition through young adulthood. Specifically, during young adulthood, siblings may have fewer opportunities to directly observe and learn from each other because they spend less time together. It is also possible

that the ways that young adults model or differentiate from each other shifts from global dimensions, to more specific, complex behaviors that current measures (which were created to measure global domains of modeling and differentiation during adolescence) may not capture. It is also possible that other sibling relational qualities (e.g., sibling contact, disclosure, and support) have increasing relevance. As sibling relationships become volitional, it is possible that the degree to which siblings choose to maintain a close personal relationship also depends on the quality of their relationship. Therefore, to understand sibling influence, it is critical to consider the relative strength of the sibling relationship. Future work should continue to examine the influences of sibling relationships during young adulthood, paying particular attention to ways that sibling relationships differ from adolescence.

## CHAPTER 6

## Curriculum vitae

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## Education

**Utah State University**, Logan, Utah

Human Development and Family Studies

Ph.D. Human Development and Family Studies (expected May 2022)

**Brigham Young University**, Provo, Utah

School of Family Life

B.S. with Honors, Family Studies (August 2017)

## Honors & Awards

2017-2018; 2019 – 2020

Graduate Student Representative, Utah State University

2020-2021

Dale & Adele Young Scholarship, Utah State University, \$975

2020-2021

Family Life Alumni Scholarship, Utah State University, \$1,000

2019-2020

Phyllis R. Snow Graduate Scholarship, Utah State University, \$2,500

2018-2019

Research Grant from the Graduate Research and Creative Opportunities, Utah State University, \$1,000.

November 2018

Religion, Spirituality and Family Student and New Professional Outstanding Paper Award, National Council on Family Relations, \$200.

2020-2021

CEHS HDFS Don C. Carter Graduate Scholarship, \$2,000

2019-2020

Dale & Adele Young Scholarship, \$1,000

2019-2020

FCHD Graduate Family Life Alumni Scholarship, \$1,000

2018-2019

Phyllis R. Snow Graduate Scholarship, Utah State University, \$2,500

2017-2018

Stella Young Griffiths Scholarship, Utah State University, \$2,000.

2016-2017

Research Grant from the Office of Research and Creative Activities, Brigham Young University, \$1,500.

## **Professional Experience**

March 2022 – Current

**Researcher 2**, FTE, The Church of Jesus Christ of Latter-Day Saints. Conduct research within the Strategic Division of the Correlation Research Division. Projects focus on long-term challenges faced by church members, and how the church can more positively engage individuals.

February 2022 – March 2022

**Researcher 2**, OASIS Contingent Position for The Church of Jesus Christ of Latter-Day Saints. Assist with a variety of projects within the Area Research division of the Correlation Research Division. Projects focused on area-specific issues, with a primary emphasis on research within the Philippines.

June 2021 – February 2022

**Paid Research Intern**, The Church of Jesus Christ of Latter-Day Saints. Assisted in a variety of projects, including data cleaning and management, literature reviews, and coding across multiple departments within the Church.

August 2017 – Current

**Graduate Research Assistant**, Parent, Adolescent, and Sibling Study (Shawn D. Whiteman, PI; NIH/NIAAA R01AA025331), Utah State University. Assisted in protocol development, data management and coding, and survey programming, for study of 600 adolescent sibling dyads and their parents.

August 2018 – May 2020

**Graduate Instructor**, HDFS 2400, Marriage and Family Relationships, Utah State University. Instructor of record for roughly 150 students per class, prepare and present lecture two to three times weekly, train teaching assistants in grading protocol and provide mentorship.

August 2017 – December 2017

**Graduate Teaching Assistant**, Human Development (HDFS 1500, Jessica Weyerman, Graduate Instructor), Utah State University. Assisted in evaluation and grading of approximately 50 students and delivered lectures on behalf of instructor at multiple points during semester.

August 2015 – August 2017

**Undergraduate Research Assistant**, Meta-analysis on Parental Differential



Treatment (Alexander C. Jensen, PI; Internal Funds). Developed training protocol and trained 15 undergraduate research assistants, worked as an expert coder, assisted in data cleaning and management using both SPSS and SAS for over 100 articles on parental differential treatment.

August 2016 – August 2017

**Undergraduate Research Assistant**, Sibling Influence on Becoming Adults Study (Alexander C. Jensen, PI; Mentored Environment Grant), Brigham Young University. Assisted in protocol development, data management and coding, survey programming, data cleaning, analysis, and dissemination of findings, for study of 1,750 young adults and their siblings.

August 2016 – April 2017

**Undergraduate Research Assistant**, Media and Body Image (Sarah Coyne, PI), Brigham Young University. Assisted in protocol development for meta-analysis on media use and sleep. Worked as lead RA for project analyzing the influence of music lyrics on adolescents and assisted in observational experiment on the influence of media on body image.

August 2016 – August 2017

**Undergraduate Teaching Assistant**, Introduction to Family Processes (SFL 160, Dr. Brian Willoughby), Brigham Young University. Evaluated the work of approximately 35 students and provided feedback on assignments. Regularly communicated with professor about student needs.

August 2016 – August 2017

**Undergraduate Teaching Assistant**, Honors Intro: Great Questions (HNRS 120, Dr. Joseph Parry), Brigham Young University. Evaluated the work of 20 – 30 students and led weekly large group discussions that were focused on the development of critical and interdisciplinary thinking.

January 2016 – December 2016

**Undergraduate Research Assistant**, Shifting marital paradigms of emerging adults (Brian J. Willoughby, PI), Brigham Young University. Worked as an editor assessing the readability and conceptual scope of every chapter of book publication on emerging adults' marital paradigms.

January 2016 – December 2016

**Senior Writing Fellow**, Brigham Young University. Worked individually with students in a variety of classes to provide constructive criticism and commentary on writing. Also served as a supervisor for other junior writing fellows, giving them feedback and suggestions for student interactions.

## Ad Hoc Reviewer

*Journal of Family and Economic Issues*

## Publications

*Peer Reviewed*

Maiya, S., Whiteman, S.D., **Cassinat, J.R.**, Serang S., Maggs, J., Kelly, B., Mustillo, S., (Revise and Resubmit). Direct and Indirect Effects of Maternal and Sibling Intimacy on Adolescents' Volunteering via Social Responsibility Values: A Longitudinal Study. *Journal of Social and Personal Relationships*.

Jensen, A. C., Jorgensen-Wells, M. A., Andrus, L. E., Pickett, J. M., Leiter. V. K., Hadlock M. E., and **Cassinat, J. R.**, (Under Review). Sibling Differences and Parents' Differential Treatment of Siblings: A Multilevel Meta-Analysis. *Development and Psychopathology*.

Whiteman, S.D., Maiya, S., **Cassinat, J.R.**, Serang S., Maggs, J., Kelly, B., Mustillo, S., (Revise & Resubmit). Sibling Influences on Adolescent Alcohol Use during the Spring 2020 COVID-19 Pandemic Shutdown. *Psychology of Addictive Behaviors*.

Fleming D. J., Dorsch, T. E., **Cassinat, J. R.**, (in press). The mediating effect of parental warmth on the association of parent pressure and athlete perfectionism in youth soccer. *Sport, Exercise, and Performance Psychology*.

**Cassinat, J.R.**, Whiteman. S.D., Serang, S., Dotterer, A.M., Mustillo, S.A., Maggs, J.L., Kelly, B.C., (2021). Changes in family relationships during the coronavirus pandemic: Evidence from a longitudinal study. *Developmental Psychology*.  
<http://dx.doi.org/10.1037/dev0001217>

Maggs, J. L., **Cassinat, J. R.**, Kelly, B. C., Mustillo, S. A., & Whiteman, S. D. (2021). Parents who first allowed adolescents to drink alcohol in a family context during coronavirus emergency shutdowns. *Journal of Adolescent Health*. Advance

online publication.

<https://doi.org/10.1016/j.jadohealth.2021.01.010>

Whiteman, S. D., **Cassinat, J. R.**, Serang, S., Maiya, S., Kelly, B. C., Mustillo, S. A., & Maggs, J. L. (2021, June). Adolescent's Drinking During the COVID-19 Pandemic Shutdowns: Increased Influence of Siblings? *Alcoholism-Clinical and Experimental Research* (Vol. 45, pp. 234A-234A). 111 River St, Hoboken 07030-5774, NJ, USA: Wiley.

**Cassinat, J. R.**, & Jensen, A. C. (2019). Following in your sibling's steps: Sibling influence and young adults' marital attitudes. *Journal of Social and Personal Relationships*, 37, 885-905. doi:10.1177/0265407519881511

**Cassinat, J. R.**, Whiteman, S. D., & Jensen, A. C. (2019). Associations between perceptions about siblings' development and emerging adults' adulthood attainment. *Personal Relationships*, 26, 694-712.

<https://doi.org/10.1111/pere.12300>

Jensen, A. C., Apsley, H. B., Rolan, E. P., **Cassinat, J. R.**, & Whiteman, S. D. (2019). Parental differential treatment of siblings and adolescents' health-related behaviors: The moderating role of personality. *Journal of Youth and Adolescence*, 1-12.

*In Preparation & Unpublished Manuscripts*

**Cassinat, J. R.**, Clayton, E., Sun, X., (in preparation). How Siblings Communicate on Twitter.

Jensen, A. C., Hamwey, M. K., Whiteman, S.D., Parkinson, C., **Cassinat, J. R.**, (in preparation) The Emerging Adults' Relationships with Siblings Scale: Development and Validation.

Maiya, S., Whiteman, S.D., Serang, S., **Cassinat, J.R.**, Maggs, J., Kelly, B., Mustillo, S., (in preparation). The Influence of Sibling Intentions to Use Substances in Adolescence.

**Cassinat, J. R.**, Whiteman, S. D., & Jensen, A. C. (in preparation). "Why I am Not Like My Sister": Sibling Differentiation and Young Adults' Well-Being.

**Cassinat, J. R.** (2017, April). The Influence of Siblings on Emerging Adults Perception of Marriage. (Unpublished honors thesis). Brigham Young University, Provo, Utah.

## Conferences

Maiya, S., Whiteman, S. D., **Dayley, J. C.**, Serang, S., Kelly, B. C., Maggs, J. L., & Mustillo, S. A. (2022, March 3-5). Direct and indirect effects of maternal and sibling intimacy on adolescents' volunteering via social responsibility values: A longitudinal study [Poster Presentation]. Biennial meeting of the Society for Research on Adolescence, New Orleans, LA.

Whiteman, S. D., Maiya, S., **Dayley, J. C.**, Serang, S., Kelly, B. C., Mustillo, S. A., & Maggs, J. L. (2022, March 3-5). Associations between older siblings' substance use and younger siblings' substance use intentions: Indirect effects via substance use expectations [Poster Presentation]. Biennial meeting of the Society for Research on Adolescence, New Orleans, LA.

Whiteman, S. D., **Cassinat, J. R.**, Serang, S., Maiya, S., Kelly, B. C., Mustillo, S. A., & Maggs, J. L. (2021, June). Adolescents' drinking during the COVID-19 pandemic shutdowns: Increased influence of siblings? [Poster Presentation]. Annual Scientific Meeting of the Research Society on Alcoholism. (Online due to COVID-19 pandemic)

Maggs, J. L., **Cassinat, J. R.**, Maiya, S., Kelly, B. C., Mustillo, S. A., & Whiteman, S. D. (2021, June). Parents who newly allowed adolescents to drink alcohol in a family context during the Spring 2020 COVID-19 emergency shutdown [Poster Presentation]. Annual Scientific Meeting of the Research Society on Alcoholism. (Online due to COVID-19 pandemic)

Whiteman, S. D., **Cassinat, J. R.**, Maggs, J. L., Kelly, B. C., & Mustillo, S. A. (2021, April 7-9). Changes in youth's substance use during the COVID-19 pandemic [Poster Presentation]. Biennial meeting of the Society for Research on Child Development. (Online due to the COVID-19 pandemic).

**Cassinat, J. R.**, Maggs, J. L., Whiteman, S. D., Kelly, B. C., & Mustillo, S. A. (2021, April 7-9). Parents allowing adolescents to drink alcohol: Increases during

the COVID-19 pandemic shutdown [Poster Presentation]. Biennial meeting of the Society for Research on Child Development. (Online due to the COVID-19 pandemic).

**Cassinat, J. R.**, Whiteman, S. D., Serang, S., Dotterer, A. M., Mustillo, S. A., Maggs, J. L., & Kelly, B. C. (2021, April 7-9). Changes in family relationships during the Coronavirus pandemic: Evidence from a longitudinal study [Poster Presentation]. Annual meeting of the National Council on Family Relations. (Online due to COVID-19 pandemic).

**Cassinat, J. R.**, Harris, A., Whiteman, S. D., Maggs, J. L., Kelly, B. C., Mustillo, S. A., (November 2020). Sibling Influences on Adolescents' Substance Use Outcome Expectancies. Poster to be virtually presented at the National Council on Family Relations, St. Louis, MO.

Harris, A., **Cassinat, J. R.**, Whiteman, S. D., Kelly, B. C., Maggs, J. L., Mustillo, S. A., (November 2020). Sibling Socialization of Civic Attitudes and Behaviors in Adolescence. Poster presented virtually at the National Council on Family Relations, St. Louis, MO.

**Cassinat, J. R.**, Sun, X., Flint, R. E., Clayton. E., (November 2020). A Love-Hate relationship? Examining Sibling Interactions on Twitter. Paper included in symposium presented at the National Council on Family Relations, virtual conference.

**Cassinat, J. R.**, Harris, A., Whiteman, S. D. (2020, March). Marijuana Use in Adolescence: How Sibling Influence is Moderated by Rurality [Poster session]. SRA Conference, San Diego, CA, United States

<https://convention2.allacademic.com/one/sra/sra20/> (Conference canceled)

**Cassinat, J. R.**, Harris, A., Whiteman, S. D. (2020, March). Sibling Influence on Emerging Adults' Prosocial and Antisocial Behaviors. [Poster session]. SRA Conference, San Diego, CA, United States

<https://convention2.allacademic.com/one/sra/sra20/> (Conference canceled)

**Cassinat, J. R.**, (2020, January). Invited speaker, Women in Academia Conference, Brigham Young University, Provo, UT.

- Cassinat, J. R.**, Whiteman, S. D., & Jensen, A. C. (2019, November). "Why I am Not Like My Sister": Sibling Differentiation and Young Adults' Well-Being. Paper presented at the National Council on Family Relations, Fort Worth, TX.
- Cassinat, J. R.**, Whiteman, S. D., & Jensen, A. C. (2019, March). To be or not be like my sibling: The antecedents of sibling modeling and differentiation. Poster presented at the International Convention of Psychological Science, Paris, France.
- Cassinat, J. R.**, (2019, March). Replication, Reproducibility, and Research Accumulation in Developmental Science. Chair of invited address by Dr. Noel Card at the biennial meeting of the Society for Research in Child Development, Baltimore, MD.
- Meter, D. J., **Cassinat, J. R.**, Whiteman, S. D., & Coyne, S. (2019, March). Peer and sibling aggression involvement across adolescence: Effects on adjustment. Paper presented to the biennial meeting of the Society for Research in Child Development, Baltimore, MD.
- Cassinat, J. R.**, Galovan, A. M., & Schramm, D. G. (2018, November). Couples that pray together...are better parents? Exploring mindfulness as a mediator between couple prayer and parenting behavior. Paper presentation to be given at the annual meeting of the National Council on Family Relations, San Diego, CA.
- Cassinat, J. R.**, Whiteman, S. D., & Jensen, A. C. (2018, November). Do siblings matter anymore? Sibling influence on emerging adults' attainment of adulthood. Poster presentation to be given at the annual meeting of the National Council on Family Relations, San Diego, CA.
- Cassinat, J. R.**, & Jensen, A.C. (2018, April). Following in your sibling's steps: Sibling influence and young adults' marital attitudes. Poster presentation given at the biennial meeting of the Society for Research on Adolescence, Minneapolis, MI.
- Jensen, A. C., Whiteman, S. D., Loeser, M. K., & **Cassinat, J. R.** (2018, April). A modern measure of sibling relationships in young adulthood. Poster presentation

given at the biennial meeting of the Society for Research on Adolescence, Minneapolis, MI.

**Cassinat, J. R., & Jensen, A. C.** (2018, March). Sibling influence on emerging adults' emotional autonomy, work and education orientations. Paper presentation given at the annual meeting of the Utah Council on Family Relations, Provo, UT.

**Cassinat, J. R., & Jensen, A. C.** (2017, April). "When are you going to get married?": The role of siblings and marital timing expectations. Poster presentation given at the Mary Lou Fulton Mentored Research Conference, Provo, UT.

**Cassinat, J. R.** (2016, November). The Importance of body language. Poster presentation given at the Writing in the Disciplines Conference, Provo, UT.

**Cassinat, J. R., Fluckiger, K., Steenbakkens, A., Carey, K., & Miles, S.** (2015, April). Emerging adults' perception on premarital counseling. Paper presented at the Mary Lou Fulton Research Conference, Provo, UT.

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