IN WHOSE WORDS? EXPERIENCES AT PUBERTY SITUATED IN

INDIVIDUAL, SOCIAL, AND CULTURAL CONTEXTS

A Dissertation

Presented to the Faculty of the Graduate School

of Cornell University

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

by

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May 2022

IN WHOSE WORDS? EXPERIENCES AT PUBERTY SITUATED IN INDIVIDUAL, SOCIAL, AND CULTURAL CONTEXTS

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Cornell University 2022

Puberty is a critical developmental period of change during which cognitive, social, and hallmark physical changes co-occur across early adolescence. This period of change has been robustly linked to psychological distress, including depressive symptoms, increased contact with the juvenile justice system, and the intensified reliance on gender stereotypes. This dissertation spans developmental psychology, computational text analysis, and feminist philosophy to examine the individual, social, and cultural contexts in which girls process puberty and the transition into adolescence.

The first chapter uses narrative identity and topic modeling methods to examine how girls make meaning of physical and social changes associated with puberty and how the ways in which girls make meaning map onto depressive symptoms. Results indicate that early-maturing girls who attempt to make more meaning out of changes are more vulnerable to subsequent depressive symptoms, and that focusing on menstruation-related changes may be more psychologically distressing than other changes.

The second chapter employs an experimental paradigm to demonstrate potential biases that the visible physical maturation, race, and gender of youth may

induce on juvenile justice decision-making. Findings evidence a complex pattern of maturation, race, and gender effects that preliminarily suggest that high maturation Black males may be most at-risk for having biases enacted against them during juvenile justice decision-making.

Finally, the third chapter examines how American television shows represent puberty across changes and sentiment and investigates gender stereotypes in American coming-of-age novels via computational text analysis methods. I find robust evidence of gendered stereotypes such that female characters are more semantically similar to home, social, and weaker word categories. I also discuss potential effects of overtly sexualized depictions of puberty in American television shows.

I discuss implications across studies for girls' experiences at puberty including highlighting the overlaps and discrepancies between methods to derive new insights about what girls may want or need to navigate puberty with less risk of psychological distress.

BIOGRAPHICAL SKETCH

Mary Kate Koch earned her bachelor's degree with a double major in Psychology and History from Gonzaga University in 2015. After completing an undergraduate thesis on the stories emerging adults told of their worst failures, she became interested in both the salience of adolescence as a developmental period and how people try to make sense of their lives. She joined the Department of Human Development (now known as Psychology) at Cornell University in 2016 and earned her master's degree in Developmental Psychology in 2018. During her time at Cornell, Mary Kate primarily worked with Dr. Jane Mendle in the Adolescent Transitions Lab, and also worked with Dr. Anthony Burrow in the Purpose and Identity Processes Lab and with Dr. Qi Wang in the Culture and Cognition Lab.

Mary Kate's research explores the intersections of gender, development, and how stories shape our lives. She is also interested in finding ways to meaningfully integrate computational test analysis methods into psychological research to better understand what words can tell us. Upon completion of her doctorate, Mary Kate will start an NIH-funded post-doctoral research fellowship at the University of Florida with Drs. Susan Bluck and Carma Bylund.

"It is a kind of love, is it not? How the cup holds the tea."

– Pat Schneider, "The Patience of Ordinary Things"

For everyone who has patiently held space for my ideas to swirl and steep, for lukewarm periods, for boiling points.

ACKNOWLEDGMENTS

Last, but never least, thank you to my amazing friends and Ithaca community who made this adventure fun even on the days my academic work wasn't. Thank you to Rachel Evanowski, Sam Hempel, Sarah Beno, and all of the fur friends of 819 who first made Ithaca feel like home. Thank you to Cat Stevens and Stevie Nicks, both the human musicians and the cats who have enriched my life. Thank you to all the members of the Food Fighters (formerly Wiedmann Booriers) soccer team and the women of Ithaca Women's Basketball for giving me much needed athletic outlets and comradery. Thank you to Haily Merritt, Zoe Finiasz, Tess Flanagan, and Alyssa Varhol who made enduring the heights of the pandemic possible. And finally, thank you to my parents who fielded my calls, my highs and lows, my changes in plan. My mom would be the first to tell you that she is the one who encouraged me to apply to Cornell, so it is important to acknowledge that, in so many ways, none of this would have been possible if it wasn't for her.

TABLE OF CONTENTS

Introduction   **1**

Chapter 1: Meaning-making in Girls' Narratives of Puberty   **7**

**Chapter 2: Same Crime, Same Time? Effects of Maturation Level, Race, and
 Gender in Ambiguous Legal Scenarios**   **56**

**Chapter 3: What's on the Menu? A Preliminary Investigation of Media
 Representations of Puberty and Coming-of-Age Narratives**   **104**

General Discussion   **134**

Appendix A to Chapter 1

Appendix B to Chapter 2

LIST OF TABLES

PREFACE

"I came to explore the wreck.
The words are purposes.
The words are maps."

– Adrienne Rich, "Diving into the Wreck"

Puberty is a marquis issue in feminist thought. From the philosopher Simone de Beauvoir (1949/2011) to psychologists Brown and Gilligan (1992), feminist scholars have long argued that puberty, and the broader adolescent transition, constitute crisis for girls. However, the importance of this developmental period is not necessarily reflected in the broader field of psychology. A brief survey of several of the most cited psychology journals revealed that articles explicitly studying adolescent girls are comparatively underrepresented such that, from 2005 to 2020, *Psychological Science* published 23 articles, *Psychological Bulletin* published eight articles, and *Current Directions in Psychological Science* published eight articles with adolescent girls as a focus. This relative dearth of studies illustrates a crucial point of the crisis of puberty articulated by prior feminist work: a lack of voice.

Issues of voice and gender are not a recent phenomenon. The first recorded instance in Western literature of a woman being told to shut up dates back almost 3,000 years to Homer's *Odyssey* in which Penelope's son, Telemachus, tells her that speech is men's business (Beard, 2017). Centuries later, Brown and Gilligan (1992) followed girls through puberty and adolescence as they left childhood to encounter their first major demands of patriarchal society. What they found was that girls engaged in the practice of saying "I don't know" to cover knowledge they had that they believed to be dangerous or othering to their social position. This work

contributed to much debate about whether adolescence and puberty are development periods during which girls are silenced, which culminated in a special feature series in *Feminism and Psychology* in 1994. However, perhaps the more apt question is not whether girls are silenced during this developmental period, but rather how silencing is enacted and what is being silenced during this developmental period that is similar to and unique from other developmental periods.

Feminist theories have a tendency to focus exclusively on adult women, often at the expense of other developmental periods from infant girls to adolescent girls to elderly women. This myopia that collapses adult women into the category into the general category of 20 to 60 years of age results in perspectives that take a "view from nowhere" (Greene, 2003). A more expansive perspective may consider that each developmental phase contributes to an individual's social location through which their experiences are filtered. This kind of perspective understands the body as a surface of social inscription and as the locus of lived experience rather than subject to biological determinism. Each developmental phase opens up new possibilities of experiences, denies access to other experiences, and constrains how experiences are understood. This is in part because people enter different social institutions and cultural discourses during each developmental phase. More broadly, patriarchy has different effects on girls and women at different developmental periods and this results in different issues, needs, and perspectives that need to be addressed.

The present text centers on girls at puberty and early adolescence for two primary reasons: (1) First, a central concept in many feminist theories is the notion of intersectionality, or interlocking oppressions due to gender, race, class, and other

social categories (Crenshaw, 1991). Intersectionality encourages the interrogation of existing power structures and categories of marginalization in order to determine who is visible and who is heard. When feminist theory focuses on adult women, this mutes the narratives of infant girls, older girls, adolescent girls, and elderly women, and age becomes a site of oppression and power. Accordingly, adolescent girls fall into a space where they may be marginalized in society both within the category of gender and within the category of being children not yet adults (Taefi, 2009). This translates to greater attention being paid to the ways in which *women* or *children* may be marginalized as categories than is paid to the issues particular to adolescent girls as a social category.

(2) Second, puberty represents one of the few developmental processes through which individuals "transition" into a new category. Although boys and girls may not be treated exactly equal during childhood, the physical changes associated with puberty and early adolescence mark an abrupt transition in how they are treated by broader society. Boys enter the category of men and girls enter the category women rather than both being categorized as children. This makes puberty a partially salient period to study the perceived boundaries and pervasiveness of gender. The ideas and assumptions that girls have about the category of "women" may change as they enter this category themselves and/or girls may change their perceptions about and hopes for themselves to match their assumptions about "being a woman." The Antiguan-American author Jamaica Kincaid concisely captures this tension between girls at puberty and women in her novel *Annie John* (1985, pg. 133):

The bitter thing about it is that they have stayed the same and it is I who have

changed, so that all the things I used to be and all the things I used to feel are as false as the teeth in my father's head. So now I, too, have hypocrisy, and breasts (small ones), and hair growing in the appropriate places, and sharp eyes, and I have made a vow never to be fooled again.

Although girls and women may be aligned in that their gender is marginalized under a patriarchal society, this does not necessarily mean that they share perspectives, goals, or even feelings.

The present text attempts to bring voice to issues particular to adolescent girls at puberty through girls' own words and through critical examination of the words that adults in the surrounding social environment and culture enact upon girls. Taking for granted that language is metaphor for lived experience, then amplifying girls' words and scrutinizing the words embedded in girls' broader social contexts may capture what is being inscribed and instilled by society onto girls' lived experiences and gendered bodies. The following chapters are situated in an American context, one that examines these themes largely in White samples and in samples that lack gender diversity beyond girls and boys, men and women. While perceptions of boys according to gender and maturation are examined in Chapter 2 and stereotypes of maleness in media are explored in Chapter 3, this is not a document that wrestles with the experience of boys at puberty. Examinations of boys at puberty and gender non-conforming youth are critical components of future investigation and highlight the importance of integrating an intersectional lens into developmental psychology.

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INTRODUCTION

Theories on why pubertal change and psychological distress seem to be entangled date back almost as far in Western literature as Homer's *Odyssey* to a Hippocratic text from third or second century BC entitled "Diseases of Young Girls." In this text, Hippocrates speculated that women's nature is "more depressed and sorrowful" in part because menstrual blood fills, desensitizes, and numbs the heart and diaphragm when "the mouth of the exit does not create an opening" from which the blood can flow (Flemming & Hanson, 1998). Although this theory of blood flow has been medically debunked today, depression at puberty remains a salient issue for girls in particular. First onset of psychological difficulties is most common at adolescence and the onset of puberty corresponds to a doubling in rates of depression in girls as compared to boys (Andrade et al., 2003; Kessler et al., 2005). As Hippocrates demonstrated, it is deceptively easy to generate theories as to why this relationship between puberty and psychological distress may be the case while also making girls and women the victims of their anatomy or biology. This dissertation is concerned with identifying the ways in which girls describe their own experiences of puberty and how the social and cultural contexts in which they are embedded may affect their psychosocial outcomes. A primary emphasis across each of the three chapters is on the value and predictive power of words. Whether it is the words that girls choose from themselves or the words that adults and media use to represent these youth at puberty and adolescence, empirical investigation of these words may lead to new insights in connecting lived experience to gendered disparities in psychological distress at puberty.

Integral to the connective tissue through these chapters are theoretical underpinnings that illuminate how puberty may interact with the social and cultural environments in which youth are embedded. Stattin and Magnusson (1990) argued that the peer, family, social community, and cultural contexts in which youth are embedded are critical because the norms and values of these contexts are transformed into the demands and expectations placed upon them during puberty. Consequently, understanding the interconnected ways in which other people (e.g., peers, parents, teachers) and broader society influence, perceive, and react to youth at puberty are essential interpersonal components of understanding developmental trajectories at this time (see Figure 1 for visual translation of this idea). These ideas also correspond to work from Bronfenbrenner (1977) on the ecological systems that influence child development and the work of Hill and Lynch (1983) on gender intensification which can be distilled from the social and cultural expectations placed upon youth.

I provide a deeper exploration of the theoretical history of these ideas in Chapter 2, but I address different layers of context in each of the three chapters. In Chapter 1, I center on the individual and her experience amid pubertal change. In the narratives girls tell, they describe the relative weight of the directional arrows from peers, parents, and broader culture in their own words. Although change can be disruptive, not all girls experience all change as distressing (e.g., Koch et al., 2020). Capturing girls' experiences of change at puberty may further provide clarity on what content and relationships are most salient and distressing at puberty.
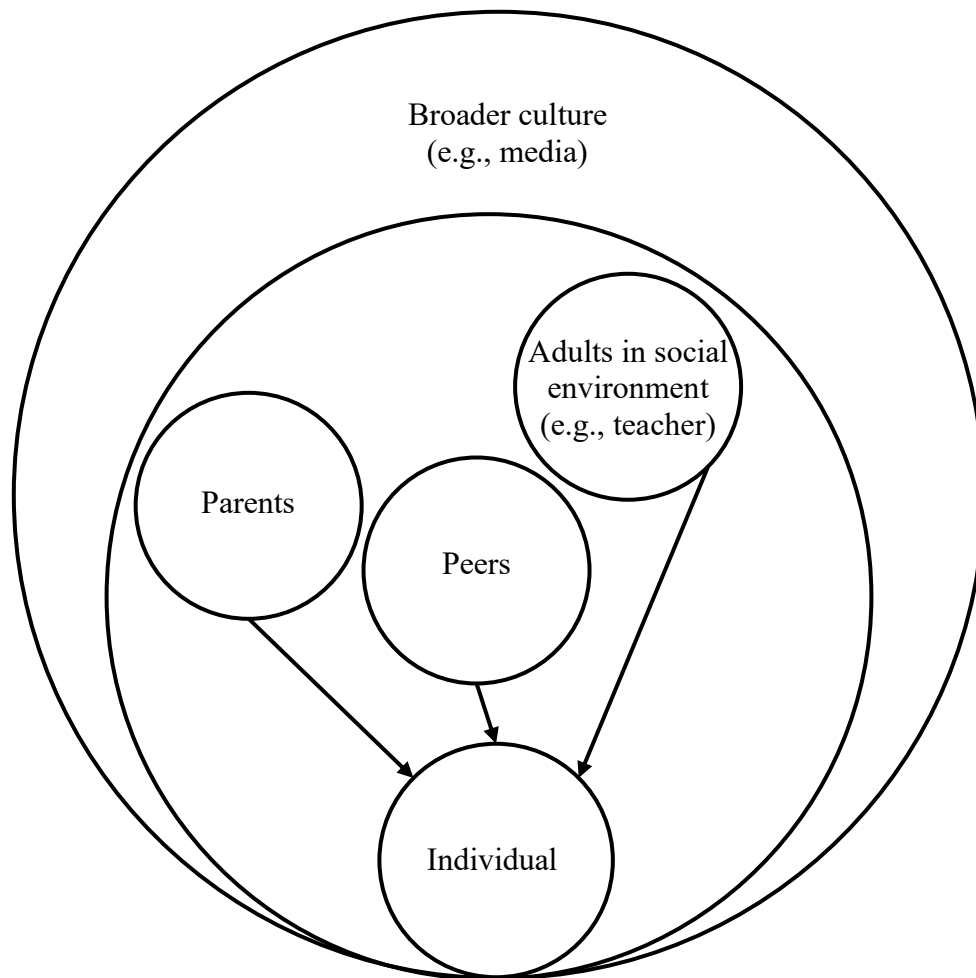
Figure 1. This diagram depicts proposed influences on youth at puberty from the peer, family, social, and cultural contexts in which they are embedded (Stattin & Magnusson, 1990). Broader circles can also be interpreted as adaptations of Bronfenbrenner's (1977) individual, microsystem, and macrosystem. Directional arrows are partially derived from Hill and Lynch (1983), particularly the close directional arrow from peer to individual since peers were proposed to be the primary agent of socialization of expectations. Contexts are arranged in space corresponding to how overtly they may affect youth during puberty and adolescence (e.g., more direct effects are closer to the Individual layer).

In Chapter 2, I critically examine the role that other adults may play in the

social environment of youth (see Figure 1). I review literature that shows that

unrelated adults can and do perceive youth as older than they actually are and that

these perceptions have real-world consequences for academic and social outcomes

(e.g., Carter et al., 2017; Silbereisen & Kracke, 1993; Simmons & Blyth, 1987*).* I use this empirical foundation as a basis for examining how other adults may influence the relationship between youth and the juvenile justice process.

Finally, I examine the broader culture level of influence by employing text analysis methods to analyze the content and messaging provided to youth about pubertal change and broader gender expectations in a range of American media. I contextualize the findings of this study not only in terms of how individual girls and adolescents may receive this messaging, but also how this may affect peers and adults given that they are all embedded in this layer of broader culture.

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CHAPTER 1

MEANING-MAKING IN GIRLS' NARRATIVES OF PUBERTY

Substantial empirical evidence has characterized puberty as a critical time of change during which cognitive, social, and hallmark physical changes co-occur across early adolescence. In addition to these changes, puberty has been robustly linked to psychological distress, particularly for girls, in both the short- and long-term (e.g., Caspi & Moffit, 1991; Mendle et al., 2018). Traditional research methodologies have typically emphasized survey approaches to understanding the psychology of puberty. However, we know considerably less about how girls describe their own experiences of puberty and how they attempt to make meaning from these experiences. This is notable because the ways in which girls perceive and react to the changes that accompany puberty may shape psychosocial consequences of the broader developmental transition (e.g., Moore et al., 2016). Indeed, findings from the narrative literature suggest that early adolescence represents a period during which youth experience a concert of cognitive and social changes that prompt more engagement in meaning-making (e.g., Habermas & de Silveira, 2008; McAdams, 2001), as well as a period during which more attempts at meaning-making may be linked to psychological distress (McLean & Breen, 2009).

Accordingly, prime questions in current developmental research on puberty and the life story are how do girls describe their experiences of puberty and what implications do these narratives have for their psychological well-being, specifically in terms of depressive symptoms? The present study addresses these questions with two complementary analytical approaches, meaning-making and topic modeling, to

understand how the narratives of girls' experiences of puberty connect to depressive symptoms. While puberty holds challenges for all youth, the research literature consistently suggests it is disproportionately harder for girls, with striking gender disparities in the severity and prevalence of psychopathology and correlated mental health risks (Salk et al., 2017). We focus on depressive symptoms due to the especially pronounced spike in depression that begins in girls at puberty such that girls are more than twice as likely as boys to receive a depression diagnosis by the age of 12 years (Salk et al., 2017).

Puberty and individual differences

Puberty is a universal developmental transition, yet girls' experiences of its physical changes are highly individual. Although myriad quantitative literature links the changes associated with puberty to changes in girls' psychological distress and perceived disruption to daily life, not all girls experience these negative outcomes (e.g., Alloy et al., 2016; Koch et al., 2020). Experiences of puberty may be affected by individual factors such as the extent to which girls are physically developed (i.e., pubertal status) and the timing of their physical changes in relation to peers (i.e., pubertal timing). Studying pubertal status allows us to investigate typical psychological experiences that occur as girls progress through physical maturation while studying pubertal timing allows us to investigate whether individual differences in the timing of that maturation produce different psychological experiences. Particularly relevant for the present study is research showing the importance of both pubertal status and timing for depressive symptoms. Girls who mature earlier than peers tend to experience greater levels of psychosocial distress, but depressive

symptoms also tend to increase as girls advance in pubertal status (Alloy et al., 2016).

Whether puberty is accompanied by negative psychological effects like depression may depend on several factors. First, girls' ethnicity and social context matter. Who girls perceive as comparison targets for their own physical changes may affect psychological outcomes either more positively or more negatively (e.g., Seaton & Carter, 2018). Relevant to the predominantly White sample in the present study, early research suggests that early maturation and more advanced pubertal status are linked with greater depressive symptoms and body image dissatisfaction in White girls, at least in part because of prominent sociocultural messaging of thin body ideals for White women (e.g., Stice 2003). Further, girls' peer experiences and contexts may amplify psychological distress at this time. Girls who report spending more time with mixed-sex friend groups, engaged in romantic relationships, and perceived lower relationship quality with their peers also tend to report greater depressive symptoms and distress (reviewed in Rudolph, 2014). Finally, girls' reactions to change are important. Girls who perceive more disruption to their lives during this developmental period report greater depressive symptoms than their peers (Koch et al., 2020). Taken together, these findings suggest that how girls try to make sense of changes during puberty plays a significant role in shaping psychological distress beyond the actual changes themselves.

Findings from across the quantitative and qualitative literatures support that perceptions of physical change, social contexts of change, and perceptions of preparation may significantly contribute to mental health during puberty. Early qualitative work by Brown and Gilligan (1993), which documented the experiences of

puberty and adolescence in a cohort of 100 girls over the course of five years, revealed that girls were acutely aware of how physical changes affected their interactions with their social worlds. Further, some girls articulated feeling a sense of loss and trauma as they moved from childhood to adolescence. Although qualitative work within the past two decades has been limited (reviewed in Herbert et al., 2017), a recent qualitative study indicated that youth continue to have gaps in their understanding about puberty and reproductive changes (Hurwitz et al., 2017), and that these gaps in knowledge may affect attitudes and perceptions of physical changes that older studies have linked to psychological distress (e.g., Lee, 2008; Stubbs et al., 1989). This trend corresponds with quantitative findings that girls who self-reported maturing earlier than their peers were more anxious about menarche than peers (Natsuaki et al., 2011).

The present study aims to contribute to existing literature by examining not only the topics that girls write about when reflecting on change at puberty, but also the proportion to which they write about those topics to understand whether attending more to certain physical or social changes maps onto depressive symptoms. Given reviewed literature about puberty, we may expect that girls who write proportionally more about certain changes like menarche or romantic relationships to correspond with depressive symptoms. For example, while feeling unprepared for menarche has been linked to confusion and negative emotions (Brooks-Gunn and Ruble, 1983), it is less clear if reflecting more on the change of menarche in general is linked to psychological distress for girls. Similarly, given that girls who date at an earlier age and spend more time in mixed-sex friend groups are more likely to experience depressive symptoms (Rudolph, 2014), it may be that girls who spend proportionally

10

more time reflecting on changes with boys also experience negative psychological outcomes. We posit that this quantitative rendering of the narratives that girls tell of change at puberty may help illuminate particular topics of concern beyond qualitative capabilities because topic proportions can be examined in relation to self-reported depressive symptoms.

In order to capture the topics that girls write about and the proportion to which they focus on them, the present study used an analytic approach known as topic modeling. Topic models transform a collection of text into a smaller number of word clusters (i.e., topics) that provide an interpretable summary of the broader collection much like a principal component analysis transforms a large set of variables into a smaller set (Blei et al., 2003; Tabachnick & Fidell, 2007). We chose topic model analysis for three key reasons: (1) Unlike close-ended text analysis approaches that use *a priori* assumptions about word categories, such as Linguistic Inquiry and Word Count (LIWC), topic models derive categories from the words generated by participants. This provided us with a data-driven method for analyzing the text that girls wrote without imposing our own assumptions about the words girls would use. (2) Topic models provide an estimate of how much participants proportionally write about each topic. These proportions can be used to explore relationships between topics and variables of interest (e.g., Resnik et al., 2013), which allowed us to examine how the topics that girls wrote about corresponded with depressive symptoms. (3) Previous research has established that topic model results correspond well with human-coded grounded theory approaches to the same data (Baumer et al., 2017). Taken together, our use of topic model analysis supports our research questions of

understanding what girls write about when asked about change during puberty and also how the topics that girls write about may map onto depressive symptoms.

Narrative, meaning-making, and developmental age

In addition to understanding what girls wrote about when narrating changes at puberty, we were also interested in examining whether girls tried to make meaning out of these changes. We operationalized meaning-making within the framework of narrative identity. Narrative identity is an act of personal storytelling that allows individuals to construct an integrative life story from their experiences, goals, and desires (McAdams & McLean, 2013). Within this framework, meaning-making is defined as the ability to explain how past events influenced other events or aspects of the self (Habermas & Bluck, 2000). Prior research indicates that not only is meaning-making a developmental concern during early adolescence, but that meaning-making is also significantly related to psychological distress.

The transition from early adolescence to mid-adolescence is a critical milestone in the development of narrative identity. During the broader period of adolescence, identity formation is a central developmental task and the capabilities to construct a coherent life story begin to emerge (Erikson, 1968; Habermas & Bluck, 2000). Youth demonstrate more causal coherence (i.e., accounting for how earlier events cause later events) and thematic coherence (i.e., deriving an organized set of meanings around life events) in their narratives as they move from late childhood through adolescence (Habermas & de Silveira, 2008). Further, youth provide increasingly more interpretive information in their narratives and build more long-term conceptions of the self in their narratives across adolescence (Pasupathi &

Wainryb, 2010). There are age-related increases across adolescence in meaning-making ability, with older adolescents capable of more complex meaning-making in personal narratives (McLean, 2005; McLean & Breen, 2009; McLean et al., 2010).

In concert with cognitive and neurological changes, this developmental trend may also be explained by sociocultural factors. Specifically, individuals may first need to learn how to share stories from their culture and social groups (i.e., families, peers, media etc.) before a narrative identity can be developed (McLean et al., 2007). A range of studies examining parent-child dyads support this sociocultural explanation of developmental change in narrative identity. In particular, parent-child conversations serve as scaffolding to help youth learn how to construct a narrative and make meaning from personal events. Youth tend to engage in more meaning-making in mother-child conversations about personally salient memories and experience greater well-being when there is maternal expression and explanation of emotion within family narratives (Bohanek et al., 2008; McLean & Jennings, 2012).

While prior literature has well-established that adults who narrate their lives in richer detail and with greater coherency and emotional expression also report fewer symptoms of depression and anxiety, and lower levels of stress (reviewed in Adler et al., 2015), this pattern of results does not directly correspond to findings with adolescents. Rather, more attempts at meaning-making in early adolescence may be linked to greater psychological distress. For example, youth between the ages 8 and 12 years who engaged in more attempts of explanation and resolution when narrating difficult personal experiences report increased levels of anxiety (Fivush et al., 2007). This pattern of results seems to hold until around the age of 16 years such that younger

adolescents (i.e., younger than 16 years) who engage in more narrative meaning-making show lower levels of well-being, including greater depressive symptoms, whereas older adolescents (i.e., older than 16 years) who engage in more narrative meaning-making show greater levels of well-being, including lower depressive symptoms (McLean & Breen, 2009; McLean et al., 2010). As previously noted, youth depend on adults to help construct meaningful narratives while they develop their own capacities for narrative construction (e.g., Bohanek et al., 2009). Accordingly, it may be that without an adult present to help scaffold the narrative, younger adolescents may not have the emotional regulation skills necessary to use narrative meaning-making to successfully manage and resolve their experiences in a way that is conducive to growth (Fivush, 2019). It may also be that narrative meaning-making is more salient for individuals whose time horizon on events is longer. In this case, the act of drawing meaning from distressing events may be less intuitive in childhood and, in turn, linked to unsuccessful efforts and lower well-being (Wainryb et al., 2018).

Despite the salience of studying narrative identity construction and psychological distress during adolescence, particularly early adolescence, puberty has received little to no empirical attention in this context. This is striking given that critical cognitive milestones in the development of autobiographical memory and narrative identity are reached during this time (Habermas & Bluck, 2000). However, not only are the timing and tempo of puberty variable across youth, but cognitive and physical development are not necessarily synchronous. Thus, youth experiencing greater physical maturation may not have the resources of greater cognitive maturation to navigate meaning-making during this developmental shift. In the present study, we

examine whether pubertal timing, pubertal status, and chronological age relate to meaning-making uniquely in girls narratives of change at puberty. While early maturing girls may be most poised to attempt meaning-making in their narratives of change at puberty given that they are experiencing physical changes out of concert with their peers, it may benefit early maturers if they attempt meaning-making *less* given the negative relationship between attempted meaning-making and depressive symptoms during early adolescence.

Further, narrative identity literature indicates that the events least likely to be discussed with others are those associated with self-conscious emotions (Pasupathi et al., 2008). Because self-conscious emotions may be heightened at puberty and during early adolescence, girls may not seek or receive parental scaffolding to effectively make sense of some or all of the physical changes associated with puberty (Simmons et al., 1973). Research on mother-daughter communication surrounding puberty suggests that it is common for daughters to both discuss and not discuss physical changes with their mothers and that individual differences in emotional connection with mothers can reduce self-consciousness associated with discussing menstruation (Costos et al., 2002; Lee, 2008). It is also possible that parents discuss some changes openly with girls but not others given that cultural messaging around girls' physical changes is often prescribed differently depending on the change (e.g., menstruation with shame, breast development with sexualization; Johnston-Robledo & Chrisler, 2013). Accordingly, girls may attempt to make meaning of different changes at different rates, and these attempts at meaning-making may correspond to depressive symptoms differently based on level of parental scaffolding.

15

The present study

The central aims of the present study were to understand how girls described and made meaning of their experiences of puberty and to investigate the links between their narratives and depressive symptoms using both meaning making and topic modeling analyses. Four main research questions were addressed:

(R1) *Does pubertal development moderate the relationship between meaning-making and depressive symptoms?* Girls who have more advanced pubertal status or earlier pubertal timing may attempt more meaning-making than peers to make sense of the many life changes, but – in line with prior research – we hypothesized that these meaning-making attempts would be positively related to depressive symptoms.

(R2) *Does meaning making vary across different aspects of change during this developmental period?* The physical changes of puberty are accompanied by powerful changes in social roles and relationships. I investigated if girls included more meaning making in narratives specifically about physical changes versus narratives that focused on general changes or changes in interpersonal relationships.

(R3) *What topics do girls choose to include in their narratives of puberty?* Given the exploratory nature of topic models, I did not have a priori assumptions about what topics would emerge. However, given our broader study goals, we did intend to specify a topic model that yielded distinct topics about different changes associated with puberty as opposed to collapsing changes into one topic.

(R4) *How do emergent topics relate to depressive symptoms, relationship conflict, and pubertal development?* Since previous research emphasizes the unique mood and interpersonal challenges faced by early maturing girls, it was of particular

interest to explore whether pubertal timing was associated with writing about any specific topics.

Method

Participants

The sample included 125 girls (M_{age} = 11.61 years, SD = .98, Range = 10-14 years) recruited through a research partnership with [STATE AND PROGRAM NAME BLINDED FOR REVIEW] between 2014-2018. Girls were recruited through summer youth activity programs. Recruitment was facilitated through parents at activity drop-off. Girls were determined eligible if they were enrolled in programs for youth aged 10-13 years old at baseline. One girl was aged 14 years and enrolled in the 10-13 age group activities and was included in the present analyses. Participating girls self-identified as 90.40% European American; 1.60% American Indian/Native; 1.60% East Asian/Pacific Islander, 6.40% biracial or another race. Parental education was collected from consenting parents such that 28% reported having an associate degree or below, 28% reported having a master's degree, 24% reported having a bachelor's degree, and 20% reported having a doctoral or professional degree. Participants attended several schools across [STATE BLINDED FOR REVIEW] and represented a cross-section of middle school grades. The study was approved by the Institutional Review Board at [UNIVERSITY AND PROJECT TITLE BLINDED FOR REVIEW, Protocol # 1207003173].

Procedure

Girls participated in two waves of data collection spaced approximately four months apart. Baseline measurement corresponded with the summer and follow-up

measurement corresponded with the fall of the school year. Parents or legal guardians provided informed consent prior to study participation and all girls provided assent at both measurement occasions.

At baseline measurement, girls completed four consecutive days of journal-style expressive writing focused on their experiences of and feelings about puberty as part of a study to see if writing about changes during puberty was helpful to girls (see Appendix A for complete prompt instructions). The prompts cued participants for changes (i.e. social, family, and physical) associated with the pubertal transition. There was no intent to prompt order aside from moving from general to specific. Each day focused on a different aspect of change. On the first day, girls were prompted to write about a specific experience they had surrounding puberty. On the second day, girls were prompted to write about recent changes they noticed in relationships with other kids their age. On the third day, girls were prompted to write about changes they noticed in their relationships with their parents or guardians. On the fourth day, girls were prompted to write about a recent physical change in their body or change in the way they felt about their body. Girls were asked to spend 20 uninterrupted minutes thinking and writing on each prompt.

Girls also completed pen-and-paper self-report questionnaires in a quiet space monitored by the researchers. The self-report questionnaires were administered on the first day of baseline measurement and took approximately 45-60 minutes to complete. The questionnaires assessed girls' reports of their pubertal development and depressive symptoms. At follow-up measurement, girls completed the same pen-and-paper self-report questionnaires at home after the questionnaires were distributed to

participant addresses via mail. Participants were compensated with a gift card upon completion of the self-report questionnaires.

Measures

  Pubertal development. The Pubertal Development Scale (PDS; Petersen et al., 1988) is a self-report scale that assesses changes in body hair, skin, height, and breast development to measure physical maturation. Items on the PDS are measured using a 4-point scale, where 1 = *no changes yet* and 4 = *seems completed*. Menarche is also assessed on the PDS and coded where 1 = *I have not yet begun to menstruate* and 4 = *I have begun to menstruate*. At baseline measurement, 32% of girls (n= 40) reported having begun menstruation and 68% of girls (n=85) reported having not yet begun. For the present analyses, menarche was used as an independent indicator of pubertal development. The summed PDS score of changes in hair, skin, height and breast size was used as an indicator of pubertal status, with higher scores indicating greater levels of pubertal development. Pubertal timing was operationalized as the deviation from a girl's actual PDS sum score from her predicted PDS sum score at her age of measurement (Dorn et al., 2006). Accordingly, greater residualized scores indicate greater pubertal development than the average development reported by girls of the same chronological age (i.e. earlier maturation than same-aged peers), and lower residualized scores indicate less pubertal development than the average development reported by girls of the same chronological age (i.e. later maturation than same-aged peers). Pubertal status scores at baseline measurement ranged from 3 to 15 (M = 9.34, SD = 2.61). Internal reliability was α=.80 at Time 1.

  Peer conflict. The Index of Peer Relations was used to assess peer problems at

Time 1 (IPR; Hudson, 1982; Forte & Green, 1994). The IPR is a 25-item measure

designed to assess the severity of problems in peer relationships and frequency of peer

conflict. Each item is scored on a 7-point scale where 1 = *none of the time* and 7 = *all*

of the time. Items were modified to ask about "kids my age" rather than "my peers."

For instance, the item "I get along very well with my peers" was modified to "I get

along very well with kids my age." Total scores are calculated by taking the sum score

of all items and subtracting from this value the number of total items answered. This

value is then multiplied by 100 and divided by the product of total items answered

multiplied by six. Total scores range from 0 to 100 where higher scores indicate

greater problems with peers. Scores at baseline measurement ranged from 0 to 88 (M

= 28.57, SD = 19.57). Internal consistency in this sample was α = .96 at Time 1.

Parent conflict. Conflict with parents was assessed using the Parental Conflict

Scale (PCS; Lucas-Thompson, 2009), which was adapted from the Conflict subscale

of the Braiker-Kelly Partnership Questionnaire (Braiker & Kelly, 1979). The PCS is a

self-report scale that measures the frequency and intensity of conflict with parents.

Conflict with mother and father were individually assessed with the same five items

for a total of a 10-item scale. Items include "How often do you and your parent argue

with one another?" and "When you and your parent argue, how serious are the

problems or arguments?" Each item is scored on a 9-point scale where 1 = *not at all*

and 9 = *very much* and sum scores for both conflict with mother and father were

calculated from corresponding item responses. Summed scores ranged from 5 to 38 (*M*

= 14.78, SD = 7.01) for the conflict with mother subscale and from 5 to 38 (M =

11.81, SD = 6.41) for the conflict with father subscale. Internal consistency in this

sample was α = .82 for the conflict with mother subscale and α = .82 for the conflict with father subscale.

Depressive symptoms. The Center for Epidemiological Studies Depression Scale for Children (CES-DC; Weissman et al., 1980) is a 20-item self-report measure developed for studying depressive symptomology in the general population. Items include "In the past week, I felt that everything I did was an effort" and "In the past week, I felt lonely." All items are scored on a 4-point scale where 0 = *rarely or none of the time* and 3 = *most or all of the time* and a sum score was calculated from item responses with higher sum scores indicating greater depressive symptoms. In this sample, baseline scores ranged from 0-56 (M = 14.01, SD= 11.65). Depressive symptom scores at four-month follow-up ranged from 1-51 (M = 15.30, (SD=12.21). Internal reliability was α=.92 at Time 1 and α=.94 at Time 2.

Meaning-making

Meaning-making is a function of narrative memory that youth may use to integrate experiences with causal coherence and explain how past events influenced other events or aspects of the self (Habermas & Bluck, 2000). Present analyses coded for *lesson learning* and *gaining insight*. Lessons tend to be considered less developmentally complex than insights (McLean, 2005). Given the developmental nature of the present study, analyzing narratives for complexity of meaning in addition to overall meaning-making was of interest. A response was coded as lesson learning if there was reference to having learned a specific lesson from the event that had implications for behavior in similar situations (e.g., "I learned that I could talk about my problems with my parents"). A response was coded for gaining insight if meaning

was inferred that applied to broader life (e.g., "My experience through puberty will prepare me for helping others, like my future daughters."). Gaining insight was considered superordinate to lesson learning such that if a response contained both lesson learning and gaining insight, then the response was coded as gaining insight. Overall meaning-making was considered the sum of lessons and insights across all days. All responses were initially coded by the first author. An independent reliability coder blind to the hypotheses of the study also coded all narratives. Acceptable levels of reliability were achieved for *lesson learning* (κ = .76), *gaining insight* (κ = .79), and *overall meaning-making* (κ =.78).

Moderation analysis. To answer R1, I tested the moderating effect of pubertal status, pubertal timing, and age on the relationship between meaning-making and Time 2 depressive symptoms in three separate moderation analyses (see Figure 1.1). Due to the developmental significance of pubertal status, pubertal timing, and age, I wanted to examine if these constructs had distinct moderating effects from each other. I probed simple slopes for significant interactions (Aiken & West, 1991). Time 1 depressive symptoms was entered as a covariate in all models. Age was entered as a covariate in the pubertal status model but not the pubertal timing model given that age is already accounted for in the construction of pubertal timing.
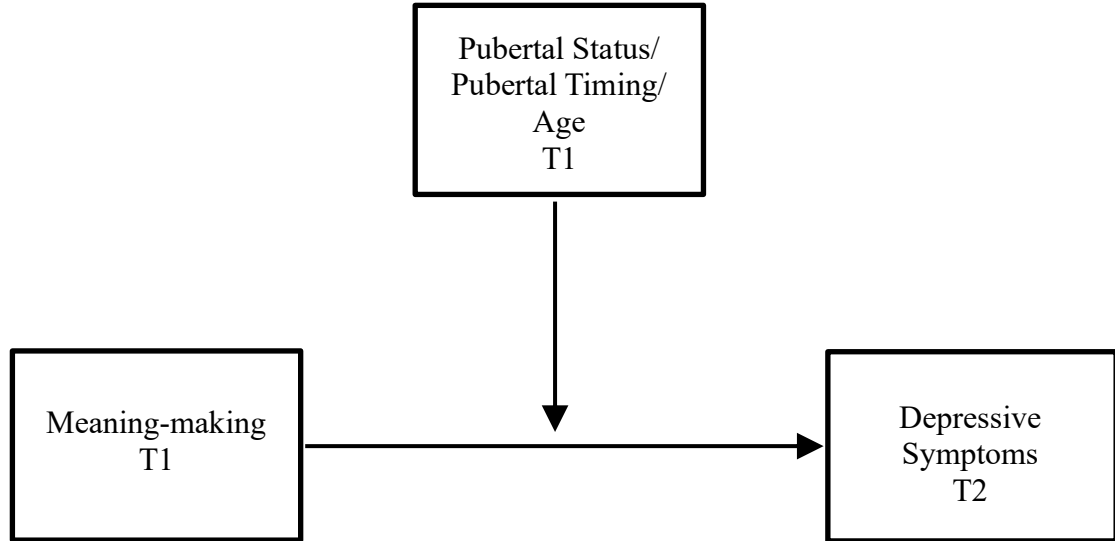
Figure 1.1. General moderation model for the interaction between meaning-making and pubertal status, pubertal timing, and age on the prediction of Time 2 depressive symptoms.

Intraindividual variation. To answer R2, we examined intraindividual variation in meaning-making across prompt theme. Since girls provided responses for each of the four prompts, we employed multilevel modeling (MLM) to address the nested response data using proc MIXED in SAS. All pairwise comparisons were corrected with Tukey's adjustment. Prompt theme (dummy coded with the prompt about physical changes as the reference category), age, and pubertal status were included in the model as fixed effects. To meet the assumptions of a categorical X continuous interaction, age was categorized into four age groups according to year of chronological age: 10, 11, 12, and 13 years (reference) to examine interactions of age with prompt theme on meaning making. Note that there was one 14-year-old in the sample. We allocated her to the 13-year-old age group rather than remove her or increase pairwise testing. Models were specified using full-information maximum likelihood (FIML). We present results from main effect and interaction models for

23

each prompt in addition to selected excerpts from girls' responses to illustrate variation in meaning-making.

Topic modeling

Word count and word frequency of the responses were examined to provide a preliminary description of the responses. To answer R3 and R4, we fit the topic model using latent Dirichlet allocation (LDA; Blei et al., 2003). LDA processes a collection of text into a smaller number of topics to provide an interpretable summary of the data. I transformed our corpus of narratives into a document-term-matrix in which each row represented one response and each column represented the text of that response. The text was pre-processed before fitting the model in order to facilitate interpretability of the model. Pre-processing steps included removing punctuation, transforming all words to lower case, and removing a set of common English stop words. We used an adaptive density-based method for LDA, which facilitates finding a topic solution for which topics are least likely to overlap with each other, and researcher assessment of topic coherence in order to estimate how many topics to retain in the model (Cao et al., 2009).

The topic model was fit with Gibbs sampling in R using the topicmodels package (Grün & Hornik, 2011). Reliability was assessed by running the model run 10 times with independent random initializations to test whether the same topics reliably repeated with small variations in each iteration (Baumer et al., 2017). Topics were interpreted by their top-10 terms, which were ranked based on the marginal probability of that term appearing in that topic (Blei et al., 2003). Resulting topics from the selected model were labeled based on informed interpretation of relevant words in

each topic and quotes from responses that highly corresponded with the topic.

We used the posterior topic distribution, which reports which responses exhibit which topics and to what proportion, to explore relationships between study variables and topic proportions. Previous topic model research has leveraged the posterior topic distribution to predict depression from essays by a sample of college students (Resnik et al., 2013). Consistent with this prior research, our exploratory analyses were geared toward describing potential relationships between writing topics and depressive symptoms using correlation and path analysis. we selected path analysis because this method allowed us to explore both direct and indirect effects. Note that the path analyses are exploratory in nature because we could not predict which topics would be derived *a priori* given the bottom-up approach of topic modeling.

Path models were fit in M*Plus* 7.4 using FIML with robust standard errors to account for missing data (Muthén & Muthén, 1998-2017). There were no significant differences in pubertal development or depressive symptoms at baseline across participants with complete data at all time points versus those missing depressive symptoms at follow-up. This suggests that the data satisfy the conditions of missing at random (MAR), which assumes that the probability of missingness on outcome variables is uncorrelated with the values of the outcome variables themselves. FIML is preferred to listwise deletion under conditions of MAR (Enders, 2010).

Results

Descriptive summary

The mean overall word count across all prompts was 578 words (SD = 288.28, Range 58-1,291). Mean overall word count was correlated with age ($r = .21, p < .05$)

and more advanced pubertal status ($r = .22$, $p < .05$), but not early pubertal timing. The five most frequent words in the corpus were: "like" (712 instances), "friends" (557 instances), "really" (400 instances), "mom" (348 instances), "puberty" (338 instances), "get" (334 instances). The high frequency of "friends" indicates not only that girls focused on their relationships with peers, but also that they were more likely to talk about groups of peers rather than a singular friend. Given the high frequency of "mom," we also note that "dad" was used at a lower frequency of 124 instances.

Meaning-making

Across all prompts, 44% of the sample (n = 55 girls) included some kind of meaning. More girls described lesson learning (39.20%, $M = .57$, $SD = .83$, Range = 0-3) than gaining insight (11.20%, $M = .14$, $SD = .41$, Range 0-2) in their responses ($p < .001$, $d = .48$). Age was positively associated with overall meaning-making ($r = .22$, $p < .05$) and overall insight gaining ($r = .23$, $p < .01$), but not overall lesson-learning. Meaning-making, lesson-learning, and insight-gaining were not significantly correlated with pubertal status or pubertal timing, and were also not correlated with depressive symptoms, peer conflict, or parent conflict. The remainder of analyses were conducted with the sum total of meaning-making rather than breaking it into lessons and insights. Given that 78.57% of girls who included insight in their responses were 12 years of age or older, it was unclear if doing two sets of analyses would contribute to the research questions beyond highlighting effects of age.

(R1) Does pubertal development moderate the relationship between meaning-making and depressive symptoms?

Moderation by pubertal status. There were main effects of meaning-making

26

[$b = 9.39$, 95% CI [2.60, 16.19], $p < .01$, $d = .32$] and pubertal status ($b = 1.28$, 95% CI [.23, 2.33], $p < .05$, $d = .28$) on Time 2 depressive symptoms. Counter to hypothesis, pubertal status moderated the relationship between meaning-making and depressive symptoms such that more meaning-making at greater levels of pubertal status was negatively related to depressive symptoms [$b = -1.07$, 95% CI [-1.75, -.39], $p < .01$], $d = .36$. Simple slope analyses indicated that more meaning-making for girls with greater pubertal status (+1 *SD*; $b = -3.35$, $p < .01$, $d = .32$) resulted in decreases of Time 2 depressive symptoms (Figure 1.2).

Moderation by pubertal timing. There was a main effect of pubertal timing ($b = 3.87$, 95% CI [.97, 6.77], $p < .05$, $d = .31$) on Time 2 depressive symptoms. In line with our hypothesis, pubertal timing moderated the relationship between meaning-making and depressive symptoms such that more meaning-making at earlier pubertal timing was positively related to depressive symptoms [$b = -3.33$, 95% CI [-5.79, -.87], $p < .01$, $d = .31$]. Simple slope analyses indicated that more meaning-making for earlier maturing girls (-1 *SD*; $b = 3.60$, $p < .05$, $d = .26$) resulted in increases of Time 2 depressive symptoms but decreases in depressive symptoms for later maturing girls (+1 *SD*; $b = -3.06$, $p < .05$, $d = .23$).

Moderation by age. There was a main effect of age ($b = 4.47$, 95% CI [1.89, 7.06], $p < .001$, $d = .40$) on Time 2 depressive symptoms. The interaction between age and meaning-making on Time 2 depressive symptoms was not significant. Rather, older age was predictive of Time 2 depressive symptoms regardless of meaning-making levels. This result does not replicate prior findings that age may moderate the relationship between meaning-making and depressive symptoms.
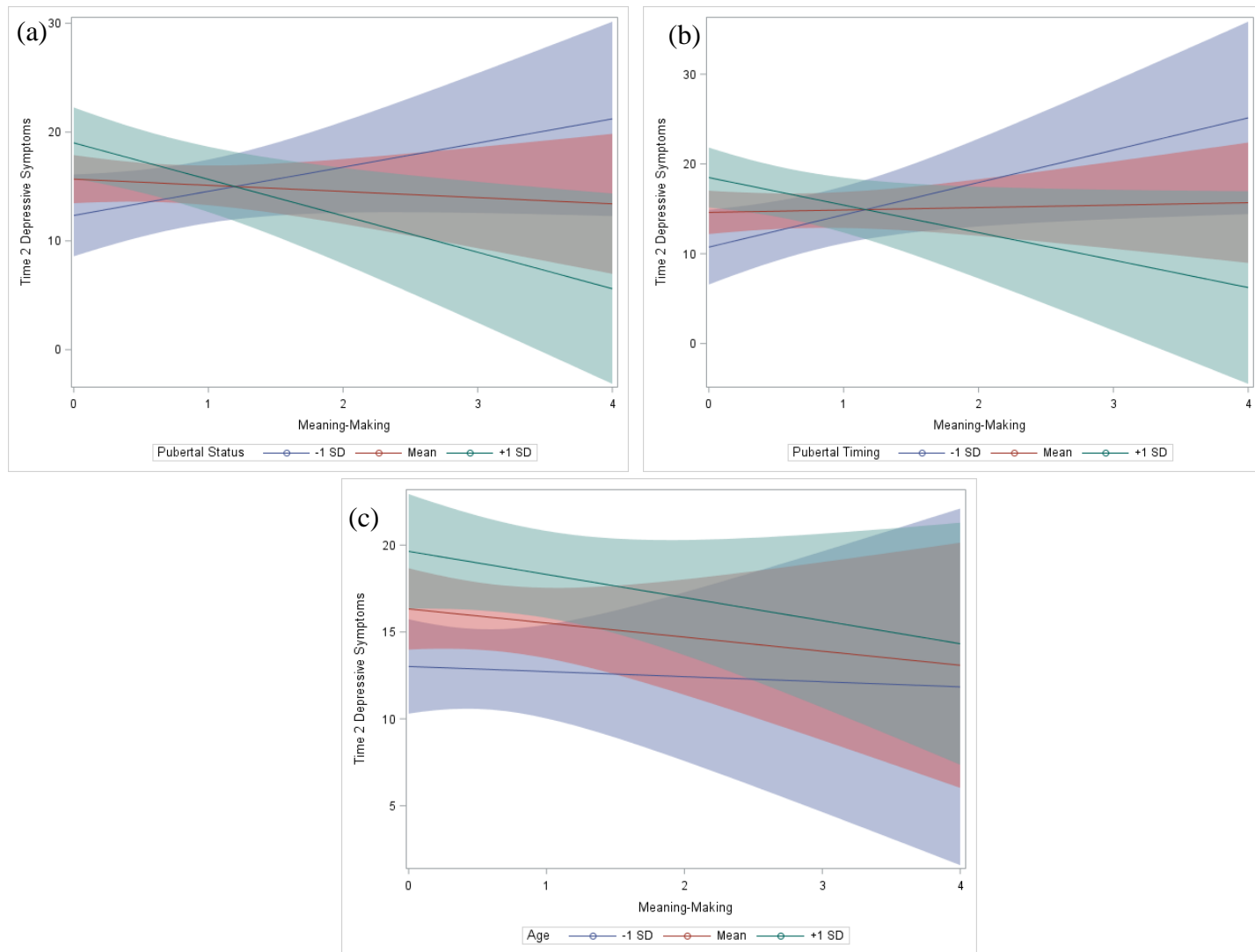
Figure 1.2. Fit plots with 95% confidence intervals and prediction limits of the interaction between meaning-making and (a) pubertal status, (b) pubertal timing, and (c) age predicting Time 2 depressive symptom

(R2) Does meaning making vary across different aspects of change during this developmental period?

In the main effects model, Type 3 tests of fixed effects indicated that age group ($F(3,123 = 5.39, p < .01$) and prompt theme ($F(3,369 = 5.98, p < .001$) were associated with meaning-making but not pubertal status. Pairwise comparisons indicated that girls included more meaning in the physical change prompt than the general change prompt ($d = .16, p < .05$) and prompt about changes with parents ($d = .20, p < .01$). Girls also included more meaning in the changes with peers prompt than the changes with parents prompt ($d = .14, p < .05$).

In the interaction model, Type 3 tests of fixed effects indicated that age group ($F(3,123 = 5.39, p < .01$), prompt theme ($F(3,369 = 6.00, p < .001$), and their interaction ($F(9,369 = 1.96, p < .05$) were associated with meaning-making. Neither pubertal status nor its interaction with prompt theme were significantly related to meaning-making. Pairwise comparisons indicated that 11-year-old girls included more meaning in the physical change prompt than they did in the general change prompt ($d = .19, p < .05$). Girls in the 13-year-old age group included more meaning in the changes with peers prompt than 10-year-old girls ($d = .20, p < .01$), 11-year-old girls ($d = .22, p < .01$), and 12-year-old girls ($d = .19, p < .01$). These results partially supported our hypothesis that girls would engage in more meaning-making about physical changes than other prompts. However, results indicated that this was dependent on girls' age (see Figure 1.3).
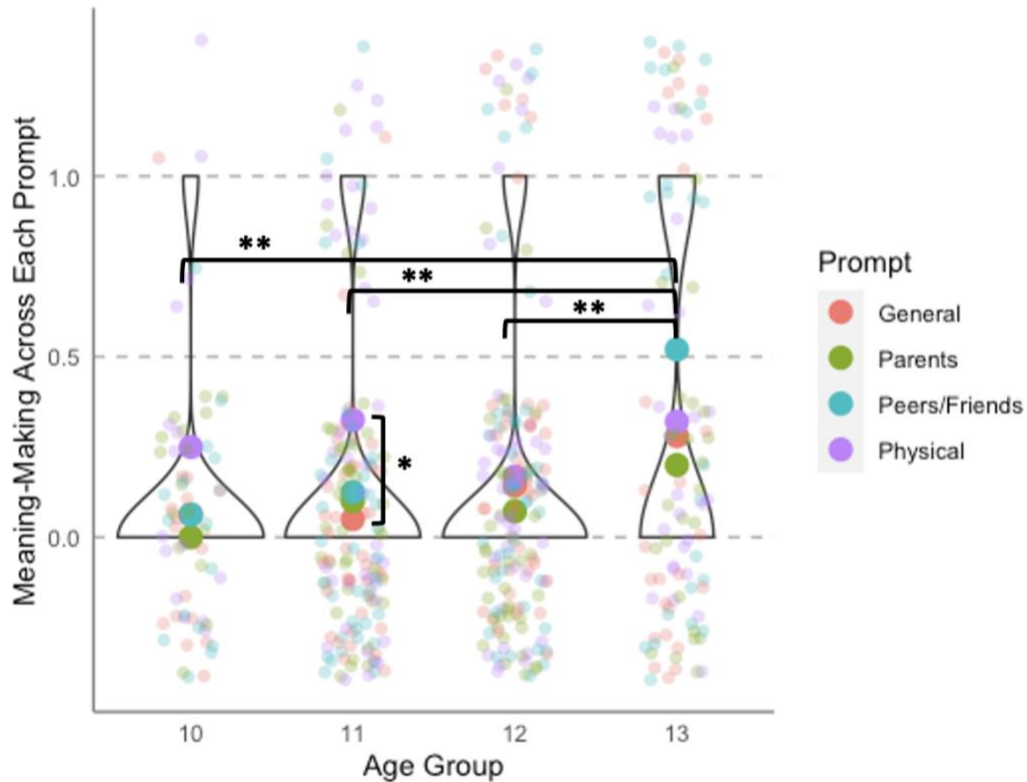
Figure 1.3. Comparison of mean level of meaning-making for each prompt theme according to age group. Bolded dots represent means and opaque dots represent individual meaning-making scores. $p < .05^*$, $p < .01^{**}$; $p < .001^{**}$

Meaning-making in responses to the prompt about changes with peers was positively correlated with depressive symptoms ($r_{pb} = .21$, $p < .05$) and peer conflict ($r_{pb} = .21$, $p < .05$). The following excerpt illustrates a lesson learned about dating male peers:

> I realized when you rush in a relationship it does not last long. So when you are dating never rush or say yes to a boy you do not like. What you need to do is say yes to who you want to date and not others you do not want to date. If you get in a relationship keep it slow and simple.

Meaning-making in responses to the prompt about changes with parents reported was negatively associated with depressive symptoms ($r_{pb} = -.19$, $p < .05$) and maternal conflict ($r_{pb} = -.21$, $p < .05$), but not paternal conflict. The following excerpt

illustrates a lesson learned about interacting with parents:

> Now I know that I should respect my parents more often than I did. Now that I am older, can talk to my mom more about boys and puberty and stuff like that. I can really trust my mom more now than when I was younger. My mom has been giving me advice about my friends and how to deal with some of the situations the next time I have the same situation or have to deal with it the next day. My mom tells me that I am going to meet difficult people but that is part of life. And I am going to have to deal with it.

Topic modeling

(R3) What topics do girls choose to include in their narratives of puberty?

After evaluating selection statistics and topic coherence, the LDA model included 21 topics. The model was specified such that topics captured the different physical changes associated with puberty (i.e., menstruation, breast development, changes in height, skin changes) as individual topics rather than packaging them as a single topic about physical development. Of the 21 topics, five topics were not relevant to presented analyses (e.g., characterized conjunctive statements) and were not reported. The presented 16 topics include content such as changes related to boys and peer groups, changes related to breast development, changes related to menstruation, and the experience of noticing bodily changes (see Table 1.1 for keywords and topic labels and exemplary excerpts from each topic).

Table 1.1. *Summary of topic words, topic themes, and illustrative quotes in girls' narratives of puberty.*

Topic	Top-10 topic words	Description of topic themes	Illustrative quote
1	like, mom, dad, lot, nice, mean, help, say, try, make	reflection on relationship with parents	I have not really noticed a change in my relationships with my parents. They say that I am acting like a teenager. They say that when I am being moody. I guess that can be an effect of puberty. They say I am becoming a teenager. Other than that, I have not really noticed a change. Sometimes, I feel like my parents can be unfair, but they really are. I feel like they are against me when they really are not.
3	really, relationship, changed, another, got, parents, annoying, talking, nothing, still	changes related to relationships	My relationship with kids my age did not really change we just have our ups and downs sometimes, and that is really it. Speaking of puberty, nothing has really change with attitude wise and again nothing has change with my relationships with girls my age or my attitude when I am with girls my age and, when I am talking to my family, other people such as school, at restaurants, and also on the streets when people say hi! to me.
4	feel, sometimes, getting, kind, talk, now, happy, much, makes, weird	feelings about changes	A change I have experienced is I get more tired faster then I usually do. I do not like it that much because it can distracting and it would be hard to concentrate on what I am doing. I think others have noticed because I may look tired or may seem more distracted than usual. I have told parents and a friend of mine about it and they all seem to understand. Another change is I have noticed I have more body hair in uncomfortable places. I feel uncomfortable about it because I feel like people could see it but I tell my mom and she says she cannot see all of it.
5	started, now, hair, changing, growing, parents, got, well, one, said	changes since pubertal onset	One more change I noticed was ever since I started puberty my friends would think I was way ahead of puberty and growth. I think that was because you have to change for P.E. So when I was changing one of my friends saw my armpit and said "Do you have armpit hair" I did not want to tell them but I did and they thought I was hairy and way ahead on puberty. I just said sometimes people can be ahead of others in puberty everyone grows at a different speed.

32

6	period, first, even, though, around, class, care, pimples, thought, hope	changes related to menstruation	During puberty, I sometimes think that I have no control over my body. For example, women can never control when they do or do not get a period. Even though periods are around the same time every month, does not mean that's always the case. Around the time a period begins, a woman is often aggravated, confused, even dimwitted an occasions. My family commented that it was fairly obvious when I was going to get my period. Mostly because I, personally, get very aggravated and even very annoyed easily the week before my period. One of the only things I am not looking forward too during puberty while growing up is cramps.
8	grade, best, people, kids, going, girls, school, parents, fifth, like	school-related	When I was in fifth grade we were going to gym one day and my teacher split us into lines, one for girls and one for boys. The boys went down to the gym and the girls went to the fitness lab. When we got there they gave us a multiple choice test on what we already knew. Then we watched a video about what is going to happen to the girls. After the video we took another test about what we had learned... So many questions were asked and answered that there wasn't enough time to finish them all. When we left they gave us all kits with things in them like pamphlets with the answers to questions that kids might have.
9	mom, told, got, brother, went, wanted, day, happened, sister, play	changes in the context of family dynamics	I have had brothers tease me about using six different face washes, that is when I started staying quiet in my family. Also when my mom or step-mom tries to talk to me about getting face-wipes; or shaving cream; or anything like that, it feels weird to me. I now just avoid talking about. I just write it down and put it in an envelope. I am also told I get really crabby to my Dad when he talks to me. I do not think I do, but yet again I black out. When I was 10 my mom tried to talk to me about it but I only told her I do not remember it. It was all I kept on repeating. She let me slide because I seemed to be good at her house.

10	friends, new, made, better, make, lot, when, used, taller, old	change in reference to friends	I liked getting taller because most of my friends were taller than me. My hair also got longer and started changing color. It got darker in the winter and lighter in the summer because of the sun. I liked being taller because my friends were taller than me therefore I could be as tall as my friends. When I was shorter than my friends I often felt short when I stood next to my friend outside or sitting next to my friends at lunch.
11	puberty, friends, yet, think, get, older, little, different, gotten, still	puberty not yet started	I haven't been through a lot of experience in puberty, but I have gone through grows spurts. In my time through a little bit of puberty I have learned a lot of things from other people such as, how to go through it or what to expect when I go through it. Also some other things I learned were from my friends. The way I think I learned from my friends is because a couple of them have already gotten it or are starting to get symptoms from it.
12	will, get, know, always, time, just, normal, sister, now, breasts	learning about puberty	One day I was in gym and somebody elbowed me in the breast when we were running and that is when I first realized that my breast was hurting. Then when I got home I dragged my mom into the bathroom because I knew I needed to talk with her. (She had told me a little about puberty but not a lot.) When I finally got her into the bathroom and told her what happened she explained everything!
13	boys, one, everyone, girls, never, started, boy, mad, went, think	changes related to boys and peer groups	I have noticed that you can't just be friends with boys. Other people, apparently, think you are dating if you hang with a boy. This makes friendships with boys extremely hard because people will always ask are you dating? When we were younger, nobody even thought of dating and everyone could just hug each other if you were good friends. Everything has changed and I feel a tiny bit sad that people would be so judgmental and stick their nose where it doesn't belong.
14	friend, said, like, time, day, year, last, one, asked, next	friendships	When I was younger I didn't make that much friends and no one liked me they said get away from me you little snob! You are so gross you have cooties and germs and what I said was I don't have cooties boys do and everyone has germs! But they said I know boys have cooties but you are a boy so you have cooties and I don't have germs boys do and so you are a boy you have germs! And I said if I give you candy would you be nice to me? So she said maybe it depends on the candy.

34

15	changes, think, body, different, people, time, noticed, parents, felt, talk	reflecting on change over time	I think my body changes over time a lot. My body changes all of the time. Sometimes I cannot swim when my body has changes. My mom talked to me about what might happen to my body changes. My emotions change over time when I have body changes. I have mixed emotions over time.
18	people, know, just, four, two, dad, back, tall, feet, grow	changes related to height	Well I'm tallish now I guess because everybody in my family is like you're so tall now than you were last summer so yeah. I will give a definition of Tallish: oh you're tall but you're short. I'm tallish and my friends are extremely tall five feet two inches even. I'm four feet four inches yeah since I'm tallish people think I'm eight and cause I don't look ten so one person actually said I look like I'm six. So I guess I'm short.
19	noticed, change, school, family, age, awkward, growing, something, become, younger	noticing changes	Other people have noticed these changes. They have noticed in themselves, others, and me. I have barely started and people notice that, but I think they notice it more when I am with other girls my age. I think my body's changes overtime will definitely effect the way I act, feel, and look. About once or twice a year my mom will bring something up. She will say something like my breasts are pretty big, you know yours will get big too.
21	bra, started, wear, little, wearing, also, start, much, bras, girls	changes related to breast development	I noticed that my breasts were growing and I had to start wearing bras. Now most girls I think would love to wear bras but me I'm in love with sports and bras are uncomfortable. Not only I had to start wearing bras I also started gaining weight. Usually I was the fastest girl on my lacrosse team and loved to run but soon I thought I weighed a lot more. That also scared me. The timing was not great either it was at a lacrosse.

(R4) How do emergent topics relate to depressive symptoms, relationship conflict, and pubertal development?

Correlation analyses were used to explore relationships between topic proportions and study variables (see Table 1.2). Time 2 depressive symptoms ($r = .28$, $p < .05$) and pubertal status ($r = .27$, $p < .01$) were both positively correlated with the topic about changes related to menstruation. Baseline depressive symptoms were negatively correlated with the topic about not having started puberty yet ($r = -.26$, $p < .01$). Peer conflict at baseline was positively correlated with both the topic about changes related to boys ($r = .25$, $p < .01$) and negatively correlated with the topic about breast development ($r = -.20$, $p < .05$).

Table 1.2. *Correlation matrix of topics and study variables*

	Pubertal Development Scale	T1 Depressive Symptoms	T2 Depressive Symptoms	Mother conflict	Father conflict	Peer conflict
Pubertal Development Scale	–					
T1 Depressive Symptoms	.12	–				
T2 Depressive Symptoms	.27*	.69***	–			
Mother conflict	.33***	.34***	.26*	–		
Father conflict	.14	.25**	.20	.58***	–	
Peer conflict	.18*	.60***	.45***	.45***	.37***	–
Topic 1	.06	.18*	.30**	.03	-.03	.10
Topic 3	.06	-.06	.05	-.09	.001	-.12
Topic 4	-.05	-.003	-.07	.11	.05	-.09
Topic 5	.15	.06	-.02	-.04	.08	-.04
Topic 6	.27**	.03	.28*	.07	-.04	0.1
Topic 8	-.03	-.03	-.09	-.09	.09	-.17

Topic 9	.03	.16	.17	.14	.26**	.12
Topic 10	.04	-.02	-.05	-.13	-.06	-.10
Topic 11	-.10	-.26**	-.21	-.07	.12	-.16
Topic 12	.02	.005	-.03	.17	.09	.04
Topic 13	.03	.07	.18	.13	.14	.25**
Topic 14	-.03	.05	-.12	-.03	.06	.05
Topic 15	-.03	-.10	-.11	-.09	-.07	-.10
Topic 18	-.07	.003	-.02	-.09	-.14	.17
Topic 19	.10	-.03	-.12	-.09	-.17	-.18*
Topic 21	-.03	-.15	-.05	-.03	-.09	-.20*

Note. Only correlations between topics and study variables are presented; $p < .05*$, $p < .01**$; $p < .001**$

Exploratory path analyses. Given that changes related to menstruation emerged as a topic associated with both pubertal development and depressive symptoms, path analysis was conducted to explore the prospective nature of these emergent relationships. Specifically, we explored whether the changes related to menstruation topic predicted subsequent depressive symptoms when controlling for pubertal development and baseline depressive symptoms. In addition, we examined the indirect effect of pubertal development on subsequent depressive symptoms in order to determine whether any effect of the changes related to menstruation topic on depressive symptoms could be driven by the greater physical development of the girls writing about that topic. Both pubertal timing and pubertal status were assessed as independent models (see Figure 1.4). Both models were saturated ($\chi2 = 0.00$, comparative fit index $= 1.00$, root mean square error of approximation $= .00$, standardized root mean square residual $= .00$) and fully identified with perfect fit. Parental education, race, age, and menarche were covaried in the models.
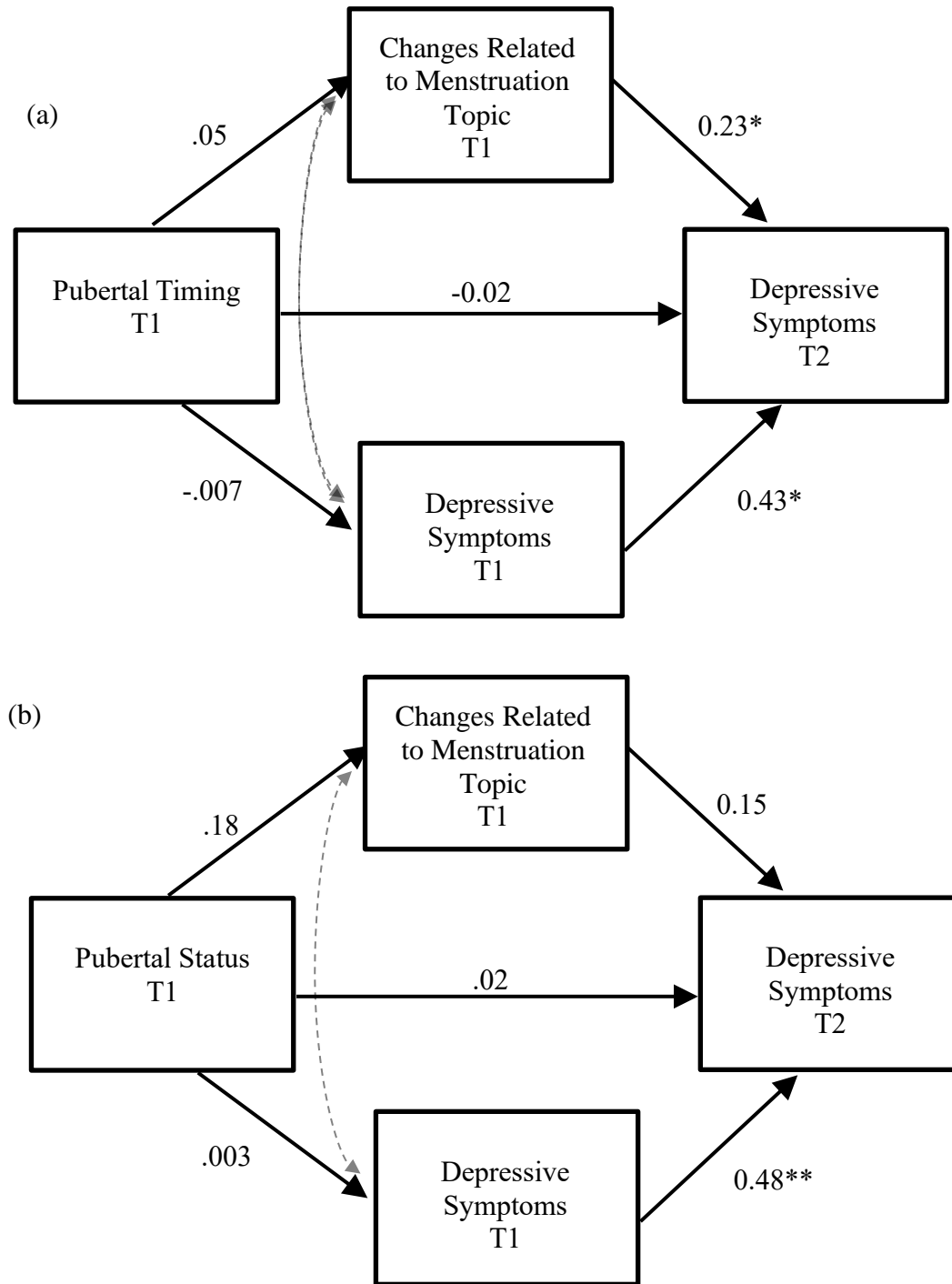
Figure 1.4. Pubertal timing (a) and pubertal status (b) predicting depressive symptoms and predicted proportion of writing about the changes related to menstruation topic. Solid lines represent primary paths of the model and dotted lines represent nonprimary paths. Parental education, race, age, and menarche were also covaried but were not included in the figure for ease of interpretation. Coefficients are standardized. $p <$ .05*, $p < .01$**; $p < .001$**

Results for the pubertal timing path model indicated that writing about menstruation-focused physical changes positively predicted depressive symptoms at follow-up (B = .23, SE = .11, 95% CI = [.01, .46], p < .05). Cohen's f^2 test indicated a small effect size (f^2 = .12). This effect was not explained by indirect effects of pubertal timing or menarche on subsequent depressive symptoms; that is, the association of writing about menstruation and depression was not explained by a greater tendency of early maturing girls to write on this topic. Results from the pubertal status model did not indicate that the menstruation-focused physical changes topic significantly predicted subsequent depressive symptoms.

Discussion

It has been several decades since early qualitative work on girls' experiences of early adolescence highlighted the psychological salience of puberty (e.g., Brown & Gilligan, 1993; Ruble & Brooks-Gunn, 1982). The field's early emphasis on having girls describe their maturational experiences has dwindled as survey methods have become more complex and copious. The present study blends this early prioritizing of girls' voices and individual stories with newly developed methods for the computational text analysis of narratives in order to understand how girls described and made meaning from their experiences of puberty, and how to situate well-being in the context of these experiences.

Meaning-making and puberty

Puberty is a sweeping period of change that signals the start of adolescence and, with it, the mounting importance of identity and developing capacity for

meaning-making. Given the narrative identity literature indicates that age tends to moderate the relationship between meaning-making and depressive symptoms in adolescence (McLean & Breen, 2009), we anticipated that pubertal development might also moderate the relationship between meaning making and depressive symptoms. We found that more meaning-making by girls with early pubertal timing was associated with increased depressive symptoms four months later. However, in girls with later pubertal timing or more advanced pubertal status, more meaning-making was associated with decreased depressive symptoms. These findings suggest that the relationship between meaning-making and depressive symptoms during adolescence is not merely a matter of getting older. Rather, it may be that experiencing the many physical and social changes associated with puberty offers opportunities for girl to make meaning. Being older when these changes occur may offer a buffer from psychological distress perhaps because there may be greater socialization around changes later in early adolescence as changes have already happened to peers. It is also possible that girls with more advanced pubertal status have a longer time horizon since their initial pubertal onset than girls with early pubertal timing, which may explain their opposite relationship moderating meaning-making and depressive symptoms. Early pubertal timing captures the girls who are experiencing more physical changes than their age-graded peers at the time of the study whereas more advanced pubertal status more broadly captures how much physical change girls have experienced without accounting for age. Therefore, early-maturing girls may be going through more physical change *right now* than girls with more advanced pubertal status. The coding scheme in the present study allowed for meaning-making that was

not explicitly positive in content or tone (e.g., some girls described learning the lesson that they could not control the duration, timing, or pain of their period but all they could do is be prepared). Being in the throes of change may drive early-maturing girls to search for meaning but not necessarily in ways that are adaptive in content such as applying lessons about not having bodily control. In contrast, girls with more advanced pubertal status may not necessarily be going through as much concurrent physical change and, accordingly, may have a longer time horizon from the onset of physical changes that allows them more space from initial negative emotions about changes and a broader perspective on the changes.

Girls tended to include more meaning-making when writing about changes with peers and physical changes than they did when writing about changes with parents or general change. Further, while older girls (13 years and older) tended to include more meaning overall, they specifically included more meaning when writing about changes with peers compared to younger girls. In contrast, younger girls (11 years old) tended to concentrate meaning-making when writing about physical changes. These variations were not moderated or explained by pubertal development, so it is not the case that the younger girls engaging in meaning-making about physical change were experiencing more concurrent physical change. Rather, it seems to be the case that physical changes are the wrinkle that needs to be smoothed in girls' stories at age 11; by age 13, girls turn their attention to the growing wrinkle of navigating peers and friends. Another possibility is that girls may receive social scaffolding for making meaning out of physical change starting around age 11. Upon examining narrative content for the physical change prompt, many girls described events in school focused

41

on puberty education or conversations they had with mothers or peers. These results suggest that scaffolding about physical changes may be related to a variety of social factors, such as school policies on puberty education, as opposed to being in reaction to girls' level of physical development or chronological age. Although there are did not appear to be immediate benefits to mitigating psychological distress when engaging in meaning-making about physical changes, future work should examine potential longitudinal benefits. Prior narrative research has found that adolescents who engage in more narrative meaning-making may experience more positive benefits to well-being later on than peers who do not attempt meaning-making, but that it may take practice before these benefits pay out (Borelli et al., 2019; Tavernier & Willoughby, 2012).

Key topics for girls during puberty

Findings from the topic model characterized girls' descriptions of specific topics and changes associated with puberty. In particular, menstruation was characterized as confusing, uncomfortable, and distressing relative to how girls qualitatively described other physical changes. Exploratory analyses indicated that writing about changes related to menstruation was positively related to greater pubertal development and subsequent depressive symptoms. Further, path analyses showed that writing about changes related to menstruation was predictive of depressive symptoms at follow-up measurement, even when controlling for pubertal timing and baseline depressive symptoms and taking into account potential indirect effects of pubertal timing. This is notable not only because early pubertal timing is robustly associated with risk for depressive symptoms, but also because the effect of

writing proportionally more about changes related to menstruation was not just driven by girls' physical development or personal experiences with menstruation. It was not the case that girls who were more developed or who had reached menarche wrote more about this topic and, in turn, created an artificial relationship with depressive symptoms. Rather, some girls were more prone to writing about changes related to menstruation regardless of physical development, and these girls were also more prone to depressive symptoms.

These findings support the idea that the psychological experience of menarche may be different than other physical changes associated with puberty. As noted by Brooks-Gunn and Ruble (1983), menarche is unique from other changes in that it is a discrete event embedded in a broader, more gradual process of puberty. Accordingly, menarche may be especially salient to girls as an indicator of development and womanhood. In addition, menarche is a relatively private change. While physical changes in height or breast development are typically visible, menarcheal status is not usually readily visible. On one hand, this may be a relief to girls, who often experience unwanted commentary on changes in their breasts and body shape. On the other hand, the more covert nature of menarche may contribute to girls feeling less prepared for menarche or more isolated by its experience. Finally, menstruation may be a source of social stigma and shame for girls, as it is often depicted as a "taboo" topic in American sociocultural messaging in a way that other physical changes for girls are not (Johnston-Robledo & Chrisler, 2013). Therefore, spending more time thinking about menstruation changes may result in greater exposure to stigma and shame that elevates psychological distress.

Limitations and Future Directions

      The paired approaches of narrative meaning-making and topic modeling are a strength of the present study as these findings build from each other. While computational text analysis is a relatively novel methodology for developmentalists, it is important to note that results are driven by the given corpus. There are two important points to note about the corpus in this study. First, it was generated by a sample of predominantly White girls. While consistent with the geographic region in which the data were collected, the psychological effects associated with puberty may vary by race and social context. For example, the finding that early pubertal timing is linked with increased depression risk does not reliably replicate in samples with Black girls, which may be due in part to differing body ideals (Carter et al., 2011). Accordingly, girls with different racial and ethnic backgrounds than the present sample may characterize their experiences of puberty differently, focus on different changes, and different patterns of well-being may emerge.

      In addition, the present study included only girls in its analyses. As noted, girls are at increased risk for negative outcomes associated with the challenges of puberty as compared to boys (e.g., Rood et al., 2009), and present analyses prioritized understanding how girls' narratives of puberty experiences may contribute to this elevated psychological risk. With that said, gender differences are likely to emerge in future work with boys given that boys experience different physical changes and different levels of psychological risk associated with pubertal changes, and boys tend to engage in less elaboration, emotional expression, and self-reflection in their narratives than girls during adolescence (Grysman & Hudson, 2013; Rood et al.,

2009). Likewise, youth who are not gender conforming represent a growing population and I expect that the way they characterize their experiences of puberty and attempt to make meaning from these changes will be different from gender conforming youth. The fact that there are so many questions about other samples underscores the importance of collecting data like this. While the present study cannot contribute to representing experiences of puberty from historically understudied groups, the hope is that it provides a foundation for utilizing tools like topic models as tractable approaches to characterizing a broader array of narratives.

The second important fact about the corpus in this study is that our research protocol asked girls to write about pubertal changes that are well-documented in the research literature. Responses were open-ended, and girls were free to respond that they had not yet experienced any changes for any given prompt. (Indeed, topic model results yielded a topic specific to physical changes having not yet started.) However, cuing girls to think and write about change, as opposed to stability, likely shaped their narratives. It may be beneficial to know whether girls who spontaneously discuss change versus girls who do not are more at-risk for depressive symptoms. Likewise, it would be interesting to know how youth reflect on stability during a time of sweeping developmental change that includes increasing salience of gender role identity, sexual identity, and identity exploration (e.g., Natsuaki et al., 2015). How do youth make sense of stability in personal identity during a time of significant physical change? Does perceiving stability provide psychological benefits? These are important questions for future studies.

Finally, how girls reflect on and make meaning from puberty and its associated

changes may be related to cognitive development, verbal intelligence, and previous experience with reflective writing via journaling or on social storytelling platforms. While these factors cannot be controlled in the present study, I do note that girls' self-reported grade achievement was not related to overall word count or meaning-making, nor did including grade achievement in our models yield significant changes in results. Of course, academic achievement and verbal intelligence are related but not synonymous (e.g., Ekinci, 2014), and future research may want to consider verbal abilities and writing history as moderators of effects. However, in the present study, it seemed to be the case that when the topic was personally relevant, girls wrote more.

Conclusions. The act of writing is an act of thinking, self-expression, and voice. When people are asked to write, what comes out is a reflection of who they are and what is on their minds. In the present study, I found that girls were concerned with a broad range of topics and changes during puberty. They may struggle to make meaning of their experiences and to develop insights into their changing peer and parent relationships. As the first empirical investigation examining the pattern between narrative meaning-making and puberty in early adolescence, I propose that pubertal development may be an important consideration when evaluating developmental trends of meaning-making and psychological well-being.

In addition, although researchers tend to operationalize puberty as a single process, girls unsurprisingly think about and respond to the diverse changes of puberty in different ways. Those girls who chose to describe changes related to menstruation were more psychologically vulnerable than those who considered other physical changes, and these results highlight the importance of thinking about adolescent

46

menstruation. Accordingly, the ways in which girls describe and come to terms with their experiences during puberty holds significant relevance for understanding their psychological well-being. Collectively, these findings underscore the value of girls' individual stories to guide empirical work, and the enduring challenge of how best to capture and represent girls' voices across diverse methodological approaches.

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CHAPTER 2

SAME CRIME, SAME TIME? EFFECTS OF MATURATION LEVEL, RACE, AND

GENDER IN AMBIGUOUS LEGAL SCENARIOS

First contact experiences with the juvenile justice system begin to increase during early adolescence. Prior work indicates that first arrest rates increase around 12 years of age, and that rates are affected by multiple layers of identity, which include higher first arrest rates for males versus females and higher first arrest rates for Black youth versus White youth (Lau et al., 2018). This timing corresponds with the onset of puberty, a developmental transition that creates a period of contrast in which youth of the same age can look extremely different from each other depending on the relative timing of their pubertal changes. Notably, early pubertal maturation is correlated with increased delinquency and contact with the juvenile justice system (Leve & Chamberlain, 2004; Negriff et al., 2011). This relationship has been examined in concert with family environment, neighborhood effects, and peer influences (Negriff & Susman, 2011). However, given the potential for extreme visual differences between youth during puberty, it is also possible that more visible maturation induces a bias such that early-maturers are held to different standards of legal responsibility because they appear physically older than their chronological age. Further, such a bias may interact with race and gender due to differences in pubertal timing and social perceptions based on these factors. The present studies explore potential evidence for a maturation bias and whether maturation level interacts with race and sex to influence how youth are perceived during different stages of the juvenile justice process.

The case for maturation bias

Youth who experience the onset of puberty earlier than same-age peers are considered to be early-maturers. Since early-maturers look more physically developed than same-age peers, they may appear older than their actual chronological age. The discrepancy between chronological age and visible physical maturity can create opportunities for early-maturers to experience mismatched expectations from adults due to their visual appearance (Ge et al., 2002; Reynolds & Juvonen, 2011). Prior findings point to multiple social domains that could be affected by the mismatched expectations pubertal timing may create, including relationships with parents and expectations from teachers (Carter et al., 2017; Savin-Williams & Small, 1986). In the present article, we focus on how these mismatched expectations may contribute to the greater contact rates early-maturers experience with the juvenile justice system.

Although the notion that adults may perceive more visibly mature youth as older than their chronological age or hold them to different expectations is rarely tested in existing literature, the foundation of this idea can be traced throughout the last several decades of research. Early empirical work suggests that more mature-looking youth may be perceived differently by peers, parents, familiar adults, and unfamiliar adults, and that parents respond to puberty by treating adolescents in a more adultlike manner. For instance, Johnson and Collins (1988) found that teachers and parents were more synchronous in how they rated the physical and social maturity of adolescents whom they already knew. However, adults were more likely to estimate that more mature-looking youth were older than they actually were when they rated adolescents with whom they were not previously familiar. Further, parents tended to report greater perceptions of difficulty in their relationships with early maturing

children compared to on-time or late-maturing children (Savin-Williams & Small, 1986). Steinberg (1987) found that pubertal maturation, not pubertal timing, was associated with increased behavioral autonomy from parents, which suggests that, regardless of when it happens, pubertal maturation may be connected to parents perceiving youth as more mature and independent. In a retrospective study of how 18-year-old males perceived their early and late maturing classmates during early adolescence, participants indicated that they perceived early maturers as more adult-like in their interpersonal behaviors and interests (Ewert, 1984). In a review of this of early research, Silbereisen and Kracke (1993) concluded that off-time maturers were more likely to incur demands and experiences that were mismatched to their actual social maturity. There is also evidence to suggest that early maturing adolescents are aware of these heightened expectations as girls who reported earlier menarche were also more likely to report that adults expected older behavior from them (Simmons & Blyth, 1987).

More recently, Carter and colleagues (2017) employed an experimental paradigm to explore whether greater physical maturation, in addition to race, influenced teachers' perceptions and expectations of girls. When teachers were presented with drawings of 4th grade girls varying in their level of physical maturation, they were more likely to report expecting early maturing girls to have more academic and social problems than their later maturing peers. This outcome was further exacerbated by race as teachers reported expecting early maturing Black girls to have more academic and social problems relative to early maturing White girls. These findings illuminate prior work by Eccles and colleagues (1975) that found that early

maturing girls in the 7th grade reported diminished opportunity to participate in classroom decision making across the school year while later maturing girls reported an increase in decision making opportunities over the course of the school year. In interpreting their findings, the authors speculated as to whether teachers treat early maturing girls in their classrooms differently (i.e., with more controlling behavior) or if early maturing girls may perceive their environment differently such that the same level of adult control is perceived as more restrictive than to later maturing peers. Evidence from Carter et al. (2017) suggests that teachers may be treating early maturing girls differently in the classroom and that this may significantly impact early maturing girls' classroom experiences as teacher expectations can both directly and indirectly impact the academic and social outcomes of students (Jussim & Harber, 2005). Given that adult perceptions and expectations of youth may significantly affect their outcomes in domains other than school, additional research employing experimental paradigms is needed in order to explore potential effects.

Theoretical work corresponds with empirical support for the influence of greater apparent physical maturation on others' perceptions. Eichorn (1975) proposed that asynchronies in physical development may create different academic and social experiences for early maturing youth, such as being perceived as more socially mature by peers than is warranted by their chronological age, given that their cognitive and emotional levels of maturity do not necessarily correspond with their physical development. Drawing on similar ideas of the effects of asynchrony on development, Moffitt (1993) hypothesized that this mismatch between biological age and social age functioned as a maturity gap that may contribute to adolescents engaging in antisocial

behavior. While this maturity gap may affect early maturers' own perceptions of themselves and reactions in their social environments, it may also influence how others in their social environments interact with them. In explaining girls' delinquency in early adolescence, Caspi and colleagues (1993) argued that puberty may operate as a stimulus to others in the social environment that may contribute to greater contact with older, delinquent peers who perceive early maturing girls to be older than they actually are. Due to the potential effects of these mismatched social expectations, they argued that biological age, or visible pubertal maturation, may be more useful than chronological age in understanding adolescent delinquency.

In addition, there are theoretical underpinnings for how puberty interacts with the social and cultural environments in which youth are embedded. During puberty, youth refine themselves in the contexts of peers, families, communities, and larger cultural systems. Stattin and Magnusson (1990) suggested that these contexts are critical as societal norms, values, and customs are transformed into the demands and expectations of the environment during puberty. Accordingly, puberty is not only about how youth cope with their physical and sexual maturation, but also how they adjust to the demands and expectations made on their physical development from their social and cultural environments. In order to understand this interplay, Stattin and Magnusson (1990) proposed an integrative theoretical model that specifically examined the interconnectedness of physical, social, emotional, and behavioral factors, including understanding the effect of other persons' reactions to physical development. They argued that other people and broader society were an essential interpersonal component that could determine the developmental trajectory of early

maturing youth in terms of attitudes, expectations, and reactions. In this way,

biological processes may interact with sociocultural context and expectations to shape

outcomes for youth at puberty.

Although a majority of empirical has focused on the interpersonal components

of parents and peers in understanding reactions to physical development, theoretical

work like the gender intensification hypothesis and the integrative model for the

developmental competencies of minority children describe the ways in which

encounters with parents, peers, *and* other adults in the broader social environment may

shape and influence roles and perceptions at puberty. The gender intensification

hypothesis posits that youth experience increased pressure during puberty and

adolescence to conform to traditional, culturally sanctioned gender roles due in part to

greater bodily dimorphism and immersion in the local community and broader society

(Hill & Lynch, 1983). Further study is needed to understand how this greater

immersion in the local community may affect youth outcomes during this period.

According to the integrative model for the developmental competencies of minority

children, adolescents' social categories (e.g., race and gender) shape their encounters

with adults and peers in the larger social environment (Garcia Coll et al., 1996).

Experiences within the larger social environment can affect developmental processes

and competencies depending on an adolescent's social category. For instance,

adolescents' social categories may influence how adults perceive and react to them in

legal situations. Taken together, these theoretical perspectives offer a foundation for

understanding the importance of adults' roles in youth social environment.

Finally, precedent for testing a maturation bias in the juvenile justice process

can be derived from the psycholegal literature on facial maturity bias. Facial maturity

bias, or baby-face bias, describes how adults with more baby-like features (i.e., large

eyes, high eyebrows, small chins) are perceived to have more childlike qualities like

kindness and honesty (Berry & Zebrowitz-McArthur, 1988). Facial maturity bias has

been shown to influence criminal justice decisions and can lead to biased decisions

about punishment severity in adult courts. Adults with more baby-faced features are

perceived as less responsible for their actions and less malicious in intent depending

on the crime (Zebrowitz & McDonald, 1991) Given the influence of facial maturity

bias in adult courts, there is precedent to predict that appearing more physically

mature relative to chronological age may similarly influence criminal justice decisions

in the juvenile system. In order to differentiate a potential physical maturation bias

from existing facial maturity bias research, the present study obscured the faces of

youth presented in the stimuli. Increased facial maturity might certainly play a role in

a physical maturation bias during puberty. However, we posit that a more visible

appearance of secondary sex characteristics and adult-like body have a distinct effect

from facial maturity during adolescence on adults' perceptions and did not want facial

maturity to confound the study.

Pubertal timing, delinquency, and the juvenile justice system

The present study does not examine whether looking older "causes" youth to

engage in more delinquent behavior but rather if looking older creates potential for

differential treatment such that, when put in the same legal situation, more mature

looking youth may be more likely to be held accountable or viewed as blameworthy.

Beyond adding understanding to the existing theoretical and empirical work on

62

mismatched expectations during pubertal development, this is important given the role that delinquency and the juvenile justice system play during adolescence. Contact with the juvenile justice system increases in early adolescence and continues to peak through late adolescence (Lau et al., 2018; Sweeten et al., 2013). Pubertal timing has been consistently implicated in understanding which youth are at greater vulnerability to delinquency and contact with the juvenile justice system during adolescence. This greater vulnerability is significant because first arrests in earlier life are linked to greater risk of recidivism and consequences of recidivism during adolescence, such as cumulative incarceration, have been prospectively linked to worse physical and mental health in adulthood (Barnert et al., 2017; Moffit, 1993).

Understanding this risk has been a major focus of developmental researchers and several theoretical perspectives have been proposed to explain why pubertal timing would exert influence on delinquency. Among these theoretical perspectives, the maturational deviance hypothesis and developmental readiness hypothesis are prominently invoked in empirical literature on adjustment problems and delinquency during puberty. According to the maturational deviance hypothesis, which is also known as the off-time hypothesis, any deviation from typical development is stressful for youth and increases the likelihood of youth engaging in behavior problems (Peterson & Taylor, 1980; Simmons & Blyth, 1987). Accordingly, early-maturing youth and late-maturing youth would be expected to experience the greatest vulnerability for adjustment problems and delinquency. The developmental readiness hypothesis, or maturation disparity hypothesis, posits that early-maturing girls are at the greatest risk for behavior problems due to asynchrony between their physical

63

development and cognitive, social, and emotional development (Ge et al., 2002).

Conversely, later maturing youth would have the lowest vulnerability to behavior

problems under this hypothesis.

However, a review by Negriff and Susman (2011) concluded that these

hypotheses were insufficient to fully explain differences in risk by pubertal timing.

While they noted that externalizing behaviors like delinquency tended to be better

explained by the developmental readiness hypothesis, they also recommended that

future research incorporate contexts and risks into their perspectives to improve

understanding. This recommendation dovetails with suggestions by Ge and Natsuaki

(2009) who noted that understanding context and its potential to amplify problems and

behaviors is important. However, teasing apart stressful life experiences, parental

relationships, deviant peers, and school and neighborhood conditions is complex since

these effects are all intertwined. The present study attempts to tease apart whether the

potential effect of how adults in adolescents' social contexts may contribute to this

relationship and thus operates at the moderating level of context in the contextual

amplification hypothesis.

Race, maturation bias, and the juvenile justice system

Given that timing of pubertal development itself varies by race and gender, and

adults' social perceptions and expectations may vary by the race and gender of youth,

a maturation bias may likely interact with race and gender. In terms of race, patterns of

empirical findings across the puberty literature and social psychology literatures

suggest that Black youth may be at an increased risk compared to White youth for

mismatched expectations to their chronological age. Both Black girls and boys tend to

enter puberty earlier than their same-sex White peers, which may translate to adults

perceiving Black youth to be older or more adult-like than is appropriate for their

chorological age (Susman et al., 2010). Indeed, prior findings suggest that Black boys

are perceived as older and more likely to be guilty than White boys by the age of 10

(Goff et al., 2014). Black girls between the ages of 10-14 are perceived as particularly

more adult, in less need of protection, and as less innocent than same-aged White girls

(Epstein et al., 2017).

These perceptions correspond to greater contact with the juvenile justice

system. Black youth experience a disproportionately greater first arrest rate than White

peers by the age of 12 (Lau et al., 2018). Regardless of their self-reported delinquent

behaviors, Black youth are more likely than White youth to have had police contact by

the eighth grade and this early contact contributes to even greater racial disparities in

contact with the juvenile justice system by the 10th grade (Crutchfield et al. 2009;

Crutchfield et al. 2012). In part, these early phases of the juvenile justice process (e.g.,

school discipline and arrests) allow adult decision makers more discretion in referral

and punishment, which may drive this early racial disparity. The consequences of this

greater discretion are exemplified by prior findings such that schools tend to

administer the highest rate of punitive school discipline with Black male students and

Black girls are more likely to be disciplined for subjective infractions (Epstein et al.,

2017; Losen & Martinez, 2013). Black youth continue to be overrepresented at each

stage of the juvenile justice system relative to White youth and tend to receive harsher

treatment (Abrams et al., 2021; Peck & Jennings, 2016).

Additional research suggests that this greater contact is, in part, a product of

the perceptions and decisions of the adults in their surrounding social environment. Neighborhood racial composition was found to account for the Black-White gap in rates of juvenile arrests in the National Longitudinal Study of Adolescent to Adult Health beyond self-reported delinquent behavior (Gase et al. 2016). While it is possible that youth may be unreliable reporters of their own delinquent behavior, it is also possible that differences in adult surveillance of youth significantly contributes to the disparity in arrest rates for Black youth in the US. Since Black youth may already be already perceived as older than same-age White peers, Black youth who experience early pubertal maturation may be at exacerbated risk for bias at multiple stages of the juvenile justice process due to the double burden of being perceived as both older and less innocent. Given inconsistent effects of race on juvenile justice decision making based on stage and offense (e.g., Freiburger & Jordan, 2011; Tracy, 2005), it is also possible that these race effects in the present study will depend on the stage (referral or adjudication) and perceived severity of the offense.

Gender, maturation bias, and the juvenile justice system

The effects of a maturation bias according to gender may greatly depend on the context. From a pubertal timing lens, both Black and White girls tend to enter puberty earlier than their male peers (Susman et al., 2010). Much of the pubertal timing literature has focused on explaining why early maturing girls may be at increased risk for delinquent behavior, which may give the impression that girls may be more likely to be penalized for more mature physical appearance. However, first contact rates are higher for boys than girls at puberty and throughout adolescence (Lau et al., 2018). Therefore, it is possible that the girls who do experience contact may be the early

maturers, but gender effects may supersede maturation effects.

Patterns of gender and juvenile justice decisions have been mixed in the psycholegal literature and two conceptions of how adults may treat girls in the juvenile justice system have been proposed. While some studies have found that girls are treated more leniently than boys, other studies have found no gender differences or even that girls are treated more harshly than boys (e.g., Bishop & Frazier, 1992; Carr et al., 2008; Odem, 1995). These discrepant results have been explained by theories proposing that juvenile justice officials may treat females more harshly than males in an attempt to enforce stereotypical notions of proper female behavior and also theories that propose a chivalry explanation such that juvenile justice officials, especially male officials, may believe they need to protect women or have a hard time imaging omen committing crime due to stereotypical beliefs (reviewed in Carr et al., 2008). It is also possible that inconsistent patterns may be explained by the stage of the juvenile justice process and confounding influences of race (Horowitz & Pottieger, 1991). For instance, girls tend to be more harshly punished for status offenses (i.e., activities that would not be illegal if they were of a certain age such as curfew) than boys (e.g., Spivak et al., 2014).

Gender effects may also vary according to race. For instance, Guevara et al., (2006) found racialized gender expectations that White girls tended to not more lenient sentences than non-White girls and White girls tended to be sentenced to out-of-home rehabilitation as compared to non-White females. This may be because court officials may perceive White girls' delinquency as a stronger violation of sex-role expectations and punish them more harshly than non-White girls. Accordingly,

67

paternalism or chivalry explanations may only be appropriate for White girls in instances of less serious criminal offenses rather than for all girls across all kinds of status offenses. It is unclear how this might interact with maturation because research indicates that girls who engage in "troublesome" behavior at younger ages tend to be considered more difficult than boys similarly situated (e.g., Belknap & Holsinger, 2006), which may result in harsher justice treatment.

Why look at different stages?

Given the mixed and complex findings for both race and gender across juvenile justice studies depending on context, it is important to examine the effect of a maturation bias at different stages of the juvenile justice process. Different stages of the juvenile justice process have different concerns and have different individuals responsible for decision-making at each stage (Bishop et al., 2010). Accordingly, effects of race or gender at one stage should not be expected to be identical to effects at another stage. Stages that allow for greater discretion, like intake, may increase the likelihood that decision makers rely on more heavily on stereotypes. In contrast, stages like adjudication involve more constraint on individual discretion, which may result in any reliance on stereotyping being negated by a greater reliance on legal criteria, like crime severity. In turn, this would result in greater disparity in outcomes for similarly situated youth at stages with greater discretion and more similar outcomes for similarly situated youth in stages with less discretion. When justice officials have incomplete information about youth, they may use race- and gender-linked stereotypes of dangerousness and blameworthiness to determine outcomes.

While stereotypes are often communicated and perpetuated in subtle and

indirect ways, individuals may also draw on overt stereotypes in thinking about

judicial decisions. Findings across media content analysis demonstrates that media

often uses the term "thug" to negatively depict Black males and that negative

misperceptions associated with this terminology have contributed to the

criminalization of Black males (Smiley & Fakunle, 2016). Further, White individuals

are often overrepresented as victims in the news as compared to Black individuals and

White females are more likely than any group to be depicted as victims in the news

(Callanan & Rosenberger, 2015; Dixon, 2015). Accordingly, we also implemented a

text analysis method to capture potential implicit or explicit stereotypes or associations

that are attributed to youth across race, gender, and maturation that may affect juvenile

justice decisions.

The present study

We examined whether decisions at the referral and sentencing stages of the

juvenile justice process were influenced by variations in race, maturation, and gender

in a series of four samples drawn from university students and Amazon's Mechanical

Turk (MTurk; N = 755). We manipulated the race, gender, and maturation level of a

target youth in two experimental vignettes across referral and sentencing stages. In

addition, we included a measure of retributive justice endorsement in each sample due

to prior findings that, particularly for White individuals, holding more punitive

attitudes toward juvenile offenders is related to racialized views of youth crime

(Pickett & Chiricos, 2012). We addressed three primary research questions:

(1) *Does appearing more or less physically mature affect referral and*

sentencing decisions for youth? In addition to analyzing the direct effect of maturation

level, we were also interested in the direct effects of race and gender condition. We predicted that youth who appeared more physically mature and Black youth would be more penalized during the juvenile justice process. Given that our experimental vignettes did not pertain to status offenses, we predicted that male youth conditions would be more penalized than female youth conditions.

(2) *How do the effects of physical maturation level, race, and gender interact to affect referral and sentencing decisions?* Given that a complex pattern of race and gender has been evidenced in existing psycholegal research, we predicted that maturation would intersect with these identities such that more mature appearing Black males would receive the harshest outcomes.

(3) *Is there a difference in how youth behavior is described based on maturation level, race, and gender?* We predicted that male conditions would be described more aggressively than female conditions. We also predicted that female conditions would be depicted as less agentic in the scenario in line with chivalry or paternalism perspectives.

Study 1

Method

Participants.

College sample. Participants were N = 201 university students (M_{age} = 19.76 years, SD = 1.37, Range = 18-27) who participated for course credit. Participants were 81.50% female. Participants self-reported their race and ethnicity as 39.80% White; 6.97% Black or African American; 38.31% Asian; 3.48% Latino; 10.97% biracial, and one participant declined to answer.

MTurk sample. Participants were N = 195 adults (M_{age} = 37.59 years, SD = 10.22, Range = 21-70) recruited via Amazon's Mechanical Turk (MTurk). Participants were 61.03% male. Participants self-reported their race and ethnicity as 73.85% White; 10.77% Black or African American; 8.21% Asian; 2.56 % Latino; 4.10% biracial, and 0.51% American Indian or Alaska Native. Participants self-reported their highest level of education attained and the sample comprised of 48.85% bachelor's degree, 24.23% high school, 17.53% associate's degree, 8.76% graduate or professional degree, .52% some high school, and one declined to answer.

Participants were paid $1.00 in exchange for their responses. Participants needed to be located within the United States, be 18 years or older, and English speaking. Participants needed to have completed more than 5,000 HITs and have a HIT approval rating of 95% or greater as a protection against non-human workers and poor quality work. Research suggests that samples from MTurk meet common psychometric standards and experimental results for framing effects, decision-making biases have been replicated with MTurk samples (Buhrmester et al., 2011; Goodman et al., 2013; Weinberg et al., 2014).

Materials.

Developmental age baseline. In order to make sure that all participants had a baseline knowledge of what a typical middle school student might look and what level of reasoning they might be capable of, we had participants review a scenario that represented average cognitive and physical development of 12-year-olds. We determined that this was necessary given that prior literature suggests adults may overestimate the age of adolescents with whom they are not familiar (e.g., Johnson &

Collins, 1988), and because participants varied in their closeness in chronological age (i.e., college students may have an easier time remembering what a typical 12-year-old may look and act like, but this may be more difficult for older adults). The developmental age baseline consisted of a transcript of closing arguments from an academic debate on the influence of television on healthy habits that was adapted from a real middle school debate to demonstrate cognitive complexity at this age. The debate transcript was accompanied by a stock photo of Black and White middle school students to demonstrate typical physical development. Participants reviewed the debate transcript to determine the winner (see Appendix B for full materials). The winner of the debate was not considered relevant to the results of present study and was not included in analyses.

The developmental age basline was piloted prior to use in the present study to determine that participants perceived the depicted youth as middle school students. A sample of N = 118 adults (M_{age} = 36.14 years) recruited from MTurk were presented with the debate transcript and asked to indicate what grade they believed the students were in based on the cognitive complexity of the transcript. Pilot results indicated that participants perceived the median grade of the debate students was the 7th grade (M_{grade} = 7.58), which was deemed acceptable representation of our target grade in the study.

Retributive justice endorsement. We used the 5-item retribution subscale from the Sentencing Goals Scale (McKee, 2005) to assess participant goals and strategies when making judgments about punishment for criminal offenders. Participants responded on a Likert scale ranging from 1 (disagree) to 7 (agree) to items such as "The purpose of punishment should be to make offenders pay for the wrongs that they have done." In the

university sample, scores ranged 5 to 35 (M = 21.89, SD = 5.80). Range was 5 to 35 and

M = 21.89, SD = 5.80. There was no relationship between retributive justice endorsement

and participant sex in the university sample. However, participants who were White had

lower rates of endorsed retributive justice (M = 20.78, SD = 5.58) than participants who

did not self-report as White (M = 22.89, SD = 5.85) when compared via ANOVA ($F_{1, 200}$ =

6.82, p < .05). The internal reliability for the university sample was good (α = .83). In the

MTurk sample, scores ranged from 5 to 35 (M = 21.89, SD = 5.80). There was no

relationship between retributive justice endorsement and participant sex in the university

sample. However, participants who were White had lower rates of endorsed retributive

justice (M = 22.15, SD = 7.02) than participants who did not self-report as White (M =

25.27, SD = 7.40) when compared via ANOVA ($F_{1, 194}$ = 6.59, p < .05). The internal

reliability for the MTurk sample was good (α = .83).

Procedure

      Participants reviewed a scenario in which they heard a loud noise and

witnessed a youth walking away from a car with a smashed windshield. However,

participants did not witness how the windshield came to be smashed. In the scenario,

youth varied by race (Black or White), gender (male or female), and physical

maturation (high or low), but were always described as students in the 7th grade. Each

participant was randomly shown only one version of the scenario (full scenario in

Appendix B). After reviewing the scenario, participants were asked whether or not

they would call the police (binary choice of yes or no). In addition, participants were

asked how blameworthy they perceived the youth to be (7-point Likert-type scale

where 1 = very non-blameworthy and 7 = very blameworthy) and whether they think

the youth will engage in criminal activity in the future (5-point Likert-type scale where

1 = *definitely not* and 5 = *definitely yes).* Participants were also asked to generate

explanations for the behavior of the youth in the scenario in open-ended text response.

We piloted the images of youth in the visual stimuli prior to conducting both

Study 1 and 2 to determine that participants perceived that the depicted youth were

feasibly middle school students. A convenience sample of undergraduates (N = 45,

M_{age} = 20.00 years) were shown the eight variations of youth in the study (varying on

race, gender, and maturation level) and asked to indicate what range of ages they

perceived the youth to be. All youth were scored as middle school aged between the ages

of 10.82 years old to 14.27 years old, and all youth were scored such that they could be as

young as 11 years old.

Data analysis

We conducted a logistic regression to examine the main effects of race, sex,

and maturation level on participants likelihood to call the police. In addition, we

conducted OLS regression analyses to examine the main effects of race, sex, and

maturation level on how blameworthy participants perceived the youth to be and how

likely it was the youth would offend again in the future. We used OLS regression

analysis rather than ANOVA due to unequal cell sizes of conditions. We used

hierarchical linear modeling (HLM) in order to examine the main effects of race,

gender, and maturation level condition as well as their interaction effects. We

conducted main effects models first, then examined a model containing all two-way

interactions between race, gender, and maturation level, and finally examined a model

containing the three-way interaction between race, gender, and maturation level. This

hierarchical approach is often employed in intersectional analyses to account for the effects of multiple identities at one time (e.g., Veenstra, 2013). We used marginal means to decompose any significant interactions using Tukey's method to adjust for multiple testing (Aiken & West, 1991). All regressions included participant sex, race, and sense of retributive justice, and education as covariates.

In order to assess any condition differences in the behavior explanations generated by participants, we used a computational text analysis method known as term frequency-inverse document frequency (tf-idf) to investigate which words were most distinctive of each stimulus condition (Monroe et al., 2008). This is a commonly used computational text analysis method in the social sciences that functions on the premise that the words that are most informative about a particular document are the words that appear many times in that document but relatively few times in others. The tf-idf score is calculated using the proportion of term frequency in one document relative to the term frequency across all documents in the dataset. We considered a document to be all the participant explanations for a given stimulus condition (e.g., all explanations for the low maturation white female condition were collated as one document rather than considering each participant explanation as its own document). This allowed us to calculate tf-idf scores across stimulus conditions rather than across participants. We selected five target words to compare across conditions: *accident* (including *accidental*), *anger* (including *angry*, *mad*), afraid (including *fear, scared*), friends/peers (*friend*, *peer*, *pressure*, *boyfriend*, *girlfriend*) , revenge. These words were selected to correspond with stereotypes about how youth are perceived based on race and gender reviewed in the introduction (e.g., girls may be more likely to be

75

perceived as needing protection in the justice system, which might correspond to

afraid words being more distinctive of female condition explanations).

Study 1 Results

University sample

Results indicated that 67.67% of participants reported that they would call the

police in the experimental vignette. A logistic regression indicated that the odds of

calling the police were not significantly different based on the conditions of race,

gender, or maturation level, Wald's χ^2(5, 201) = 5.24, $p = ns$ (see Figure 2.1).

Figure 2.1. Percentage of participants that indicated they would call the police in the
university sample by condition, bmh = Black male high, wmh = White male high, bfh
= Black female high, bml = Black male low, wfh = White female high, wfl = White
female low, wml = White male low, bfl = Black female low.

When assessing if youth were perceived to be more blameworthy or more

likely to offend in the future, significant effects of condition did not emerge.

Text analysis results suggested that a limited range of explanations was offered

for the high maturation Black male condition from the selected target words (see

Figure 2.2). The high maturation Black male condition was more distinctively

characterized by explanations including *anger* than any other condition and the only

other target explanation distinctively offered for them was *revenge*. The White female

conditions were more distinctively characterized by explanations including

friends/peers than other conditions, particularly the high maturation White female

condition. In comparison to the White female conditions, the Black female conditions

were more distinctively characterized by explanations including *anger*. Finally,

explanations including *afraid* tended to be more distinctive for the low maturation

conditions as compared to the high maturation conditions.

Figure 2.2. Comparison of tf-idf values for target words across conditions in the university sample; bmh = Black male high, wmh = White male high, bfh = Black female high, bml = Black male low, wfh = White female high, wfl = White female low, wml = White male low, bfl = Black female low.

MTurk sample

Results indicated that 56.92% of participants reported that they would call the police in the experimental vignette. A logistic regression indicated that the odds of calling the police were not significantly different based on the condition of race, gender, or maturation level, Wald's $\chi^2(5, 195) = 4.75$, $p = ns$ (see Figure 2.3).
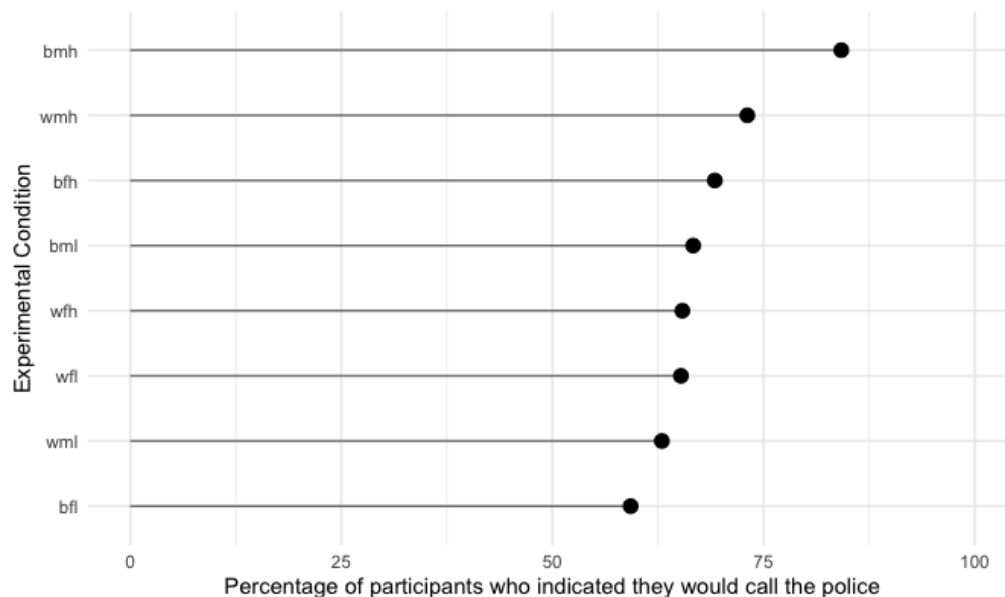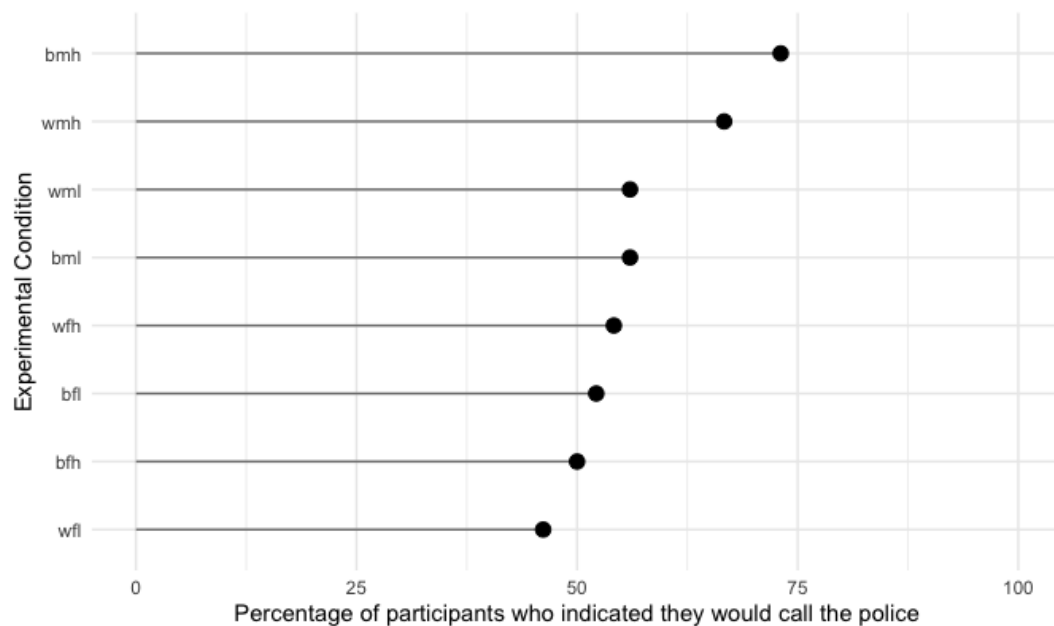

Figure 2.3. Percentage of participants that indicated they would call the police in the MTurk sample by condition; bmh = Black male high, wmh = White male high, bfh = Black female high, bml = Black male low, wfh = White female high, wfl = White female low, wml = White male low, bfl = Black female low.

When assessing if youth were perceived to be more blameworthy or more likely to offend in the future, significant effects of condition did not emerge.

Similar to the university sample, text analysis results indicated the high maturation Black male condition included a limited range of explanations from the selected target words (see Figure 2.4). However, the two distinctive explanations offered in the MTurk sample were *afraid* and *revenge*. The low maturation Black

female condition was most distinctively characterized by explanations including *anger*. In addition, both the Black and White low maturation male conditions were more distinctively characterized by explanations including *anger* than any other conditions. Explanations including *friends/peers* were more distinctive of both the Black and White female conditions than for any other condition except for the high maturation White male condition. Finally, explanations including *afraid* tended to be more distinctive for the low maturation White female condition as compared to other conditions, but the low maturation conditions in general were not more distinctively characterized by *afraid* explanations.
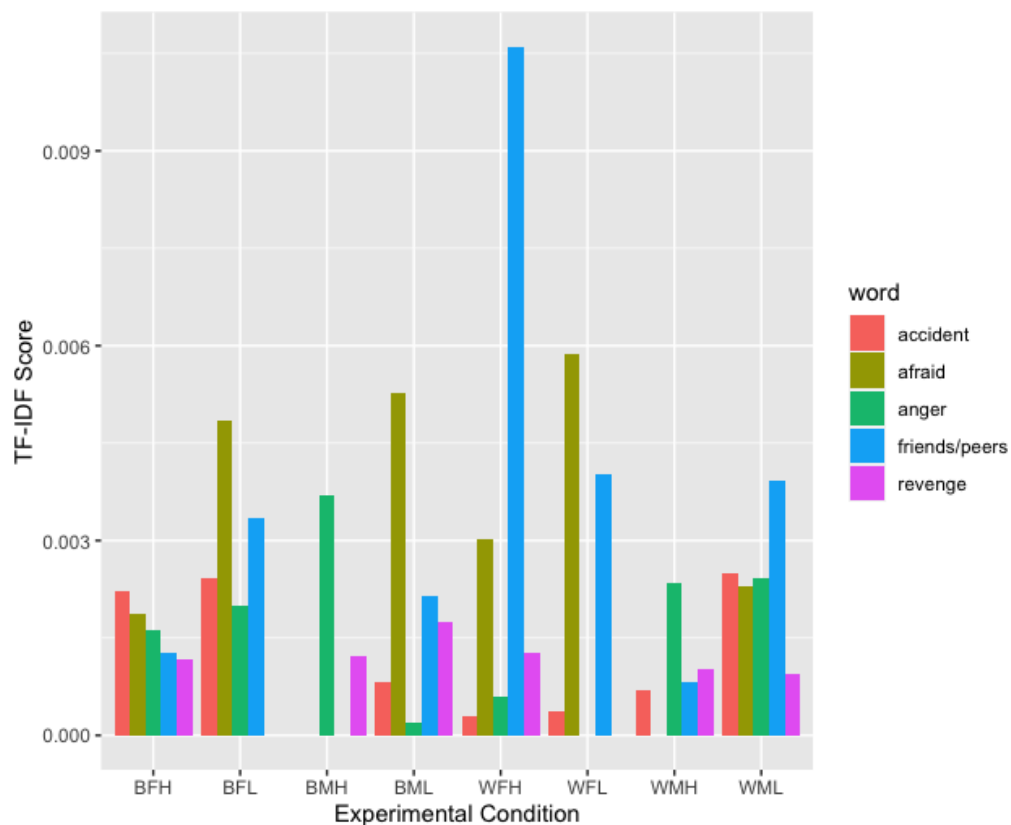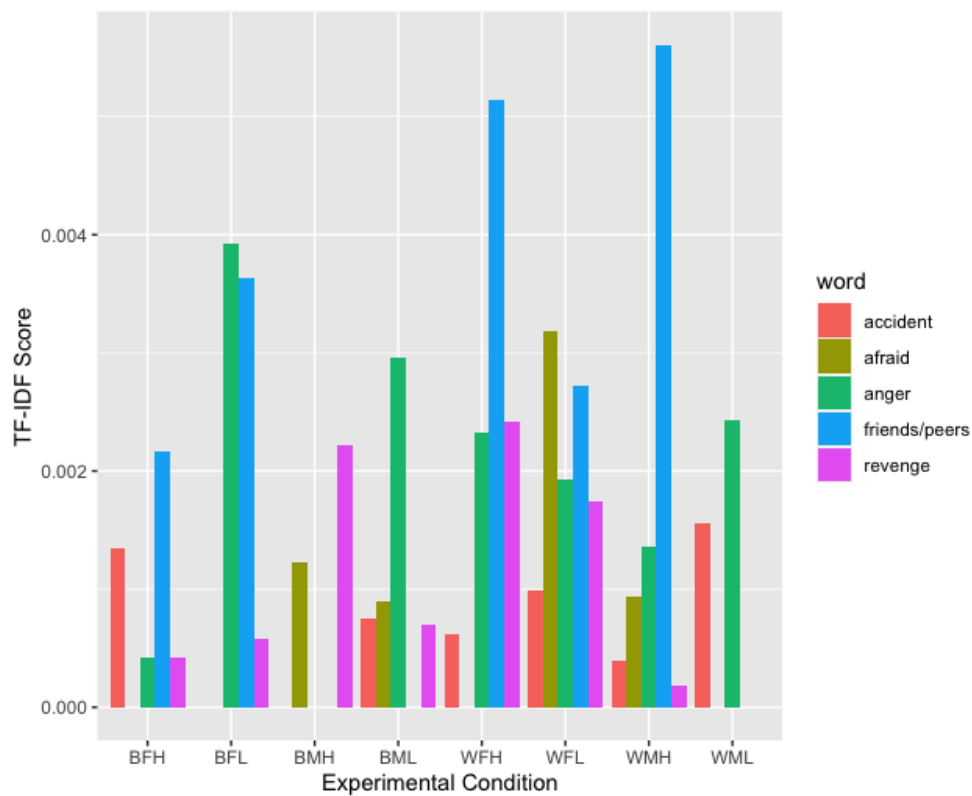

Figure 2.4. Comparison of tf-idf values for target words across conditions in the MTurk sample; bmh = Black male high, wmh = White male high, bfh = Black female high, bml = Black male low, wfh = White female high, wfl = White female low, wml = White male low, bfl = Black female low.

Study 2

Method

Participants.

College sample. Participants were N = 217 university students (M_{age} = 20.07 years, SD = 1.23 years, Range = 18-24) who participated for course credit. Participants were 74.65% female. Participants self-reported their race and ethnicity as 20.28% White; 24.42% Black or African American; 39.11% Asian; 3.35% Latino; 11.17% biracial, and one participant declined to answer.

MTurk sample. Participants were N = 196 adults (M_{age} = 37.48 years, SD = 10.02 years, Range = 21-77) recruited via Amazon's Mechanical Turk (MTurk). Participants were 58.97% male. Participants self-reported their race and ethnicity as 78.06% White; 9.18% Black or African American; 3.06% Asian; 2.04 % Latino; 4.10% biracial, 1.02% American Indian or Alaska Native, 0.51% Native Hawaiian or Pacific Islander, and one participant declined to answer. Participants self-reported their highest level of education attained and the sample comprised of 47.42% bachelor's degree, 23.20% high school, 15.46% associate's degree, 12.37% graduate or professional degree, and 1.55% some high school.

Participants were paid $1.00 in exchange for their responses. In addition, to participation requirements from Study 1 (i.e., located within the United States, 18 years of age or older, English speaking, 5,000 HITs, 95% HIT approval rating) participants were only eligible to enroll in Study 2 if they had not already participated in Study 1.

Materials.

Developmental age baseline. We used the same developmental age baseline as in Study 1 in order to provide participants with a scenario that represented average cognitive and physical development of 12-year-olds.

Retributive justice endorsement. We used the same 5-item retribution subscale from the Sentencing Goals Scale (McKee, 2005) to assess participant goals and strategies when making judgments about punishment for offenders as Study 1. In the university sample, scores ranged from 5 to 34 ($M = 21.06$, $SD = 5.92$). There was no relationship between retributive justice endorsement and participant sex in the university sample. However, participants who were White had lower rates of endorsed retributive justice ($M = 20.11$, $SD = 5.79$) than participants who did not self-report as White ($M = 22.29$, $SD = 6.48$) when compared via ANOVA ($F_{1, 215} = 7.34$, p < .05). The internal reliability for the university sample was good ($\alpha = .85$). In the MTurk sample, scores ranged from 5 to 35 ($M = 23.90$, $SD = 5.92$). There was no relationship between retributive justice endorsement and participant sex or race in the MTurk sample.

Procedure

Participants reviewed a scenario in which they were presented security camera evidence of a crime committed by a youth. In the scenario, the implicated youth was caught vandalizing a clothing store in the local mall, which resulted in $1,200 of property damage. The depicted youth was varied by race (Black or White), gender (male or female), and physical maturation (high or low), but were always described in the 7th grade. Each participant was randomly shown only one version of the scenario (full scenario in Appendix B). After reviewing the scenario, participants were asked to recommend hours of community service for the implicated youth (on a sliding scale of

0 to 200 hours) and were informed that the typical punishment for this offense is 100 hours of community service. Participants were also asked what kind of punishment they thought would be most appropriate for the youth (response options included: a warning, community service, monetary fine, or detention at a juvenile offender facility). In addition, participants were asked how blameworthy they perceived the youth to be (7-point Likert-type scale where 1 = *very non-blameworthy* and 7 = *very blameworthy*) and whether they think the youth will engage in criminal activity in the future (5-point Likert-type scale where 1 = *definitely not* and 5 = *definitely yes*).

Data analysis

We conducted OLS regression analyses to examine the main effects of race, sex, and maturation level on how many hours of community service youth were sentenced to, and how blameworthy participants perceived the youth to be and how likely it was the youth would offend again in the future. We used regression analysis rather than ANOVA due to unequal cell sizes of conditions. We used hierarchical linear modeling (HLM) in order to examine the main effects of race, gender, and maturation level condition as well as their interaction effects. We conducted main effects models first, then examined a model containing all two-way interactions between race, gender, and maturation level, and finally examined a model containing the three-way interaction between race, gender, and maturation level. This hierarchical approach is often employed in intersectional analyses to account for the effects of multiple identities at one time (e.g., Veenstra, 2013). We used marginal means to decompose any significant interactions using Tukey's method to adjust for multiple testing (Aiken & West, 1991). All regressions included participant sex, race, sense of

retributive justice, and education as covariates.

Study 2 Results

University sample

Across conditions, the mean level of hours sentenced was similar to the anchor value of 100 hours in the vignette (visualized in Figure 2.5). There was a significant difference in how many hours of community service were sentenced according to the race condition.

Figure 2.5. Hours of community service sentenced across conditions in the university sample. Bolded dots represent means and opaque dots represent individual hours sentenced.

Regression results indicated that this difference consisted of a main effect of the race condition such that White youth were more likely to be assigned more

community service hours than Black youth. The two-way interaction and three-way

interactions were not significant (see Table 2.1).

Table 2.1. Community service hours sentenced predicted by condition in the university
sample.

Variable	Main Effects Model		
	B	95% CI	*SE*
Maturation Condition			
Low	.95	(-6.18, 8.08)	3.62
Race Condition			
White	**7.82**	(.64, 15.00)	3.64
Gender Condition			
Female	2.30	(-4.86, 9.45)	3.63
Intercept	**78.48**	(64.02, 92.94)	7.33
R²		.12	

Note. $F_{7, 214} = 3.93$, $p < .05$, CI = confidence interval, SE = standard error. Values in
bold are statistically significant based on a 95% CI.

Results indicated that odds did not differ for other punishment type according

to condition maturation level, race, or gender as to whether participants indicated that

a warning (lighter sentence) or detention (heavier sentence) were more fitting for the

youth. However, a logistic regression indicated that the odds of participants assigning

a monetary fine to the youth were significantly different based on the condition of

race, Wald's $\chi^2(4, 192) = 10.72$, $p < .05$. The odds of being assigned a monetary fine

increased by 99.60% (95% CI [1.09, 3.67]) for White youth conditions compared to

Black youth conditions while holding gender condition at female and maturation level

at low and holding retributive justice endorsement constant. The odds of being

assigned a monetary fine were highest for the White female conditions with low

maturation White girls at 2.27 times the odds and high maturation White girls at 2.18

times the odds of the other youth conditions to be assigned a monetary fine.

When assessing if youth were perceived to be more blameworthy, a main

effect of gender emerged such that the female condition was perceived as more

blameworthy ($M = 5.86$) than the male conditions ($M = 5.59$). The two-way interaction

and three-way interactions were not significant (see Table 2.2). Significant effects

across conditions did not emerge when examining if youth were perceived to be likely

to offend in the future.

Table 2.2. Perceived blameworthiness predicted by condition in the university sample.

Variable	Main Effects Model		
	B	95% CI	SE
Maturation Condition			
Low	-.02	(-.25, .21)	.23
Race Condition			
White	.11	(-.11, .34)	.12
Gender Condition			
Female	**.26**	(.04, .49)	.13
Intercept	**5.08**	(4.62, 5.54)	.23
R^2	.08		

Note. $F_{7, 213} = 2.61$, $p < .05$. CI = confidence interval, SE = standard error. Values in bold are statistically significant based on a 95% CI.

MTurk sample

Across conditions, the mean level of hours sentenced was similar to the anchor

value of 100 hours in the vignette (visualized in Figure 2.6). A main effect of gender

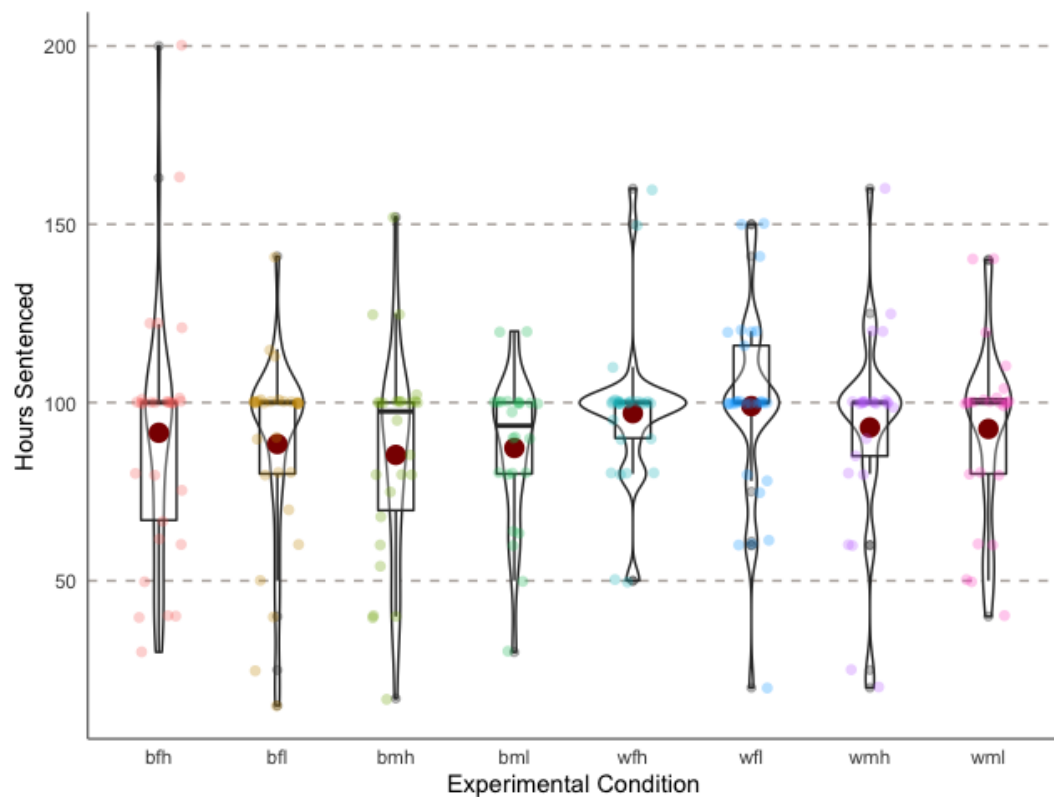emerged in predicting in the mean number of community service hours sentenced.
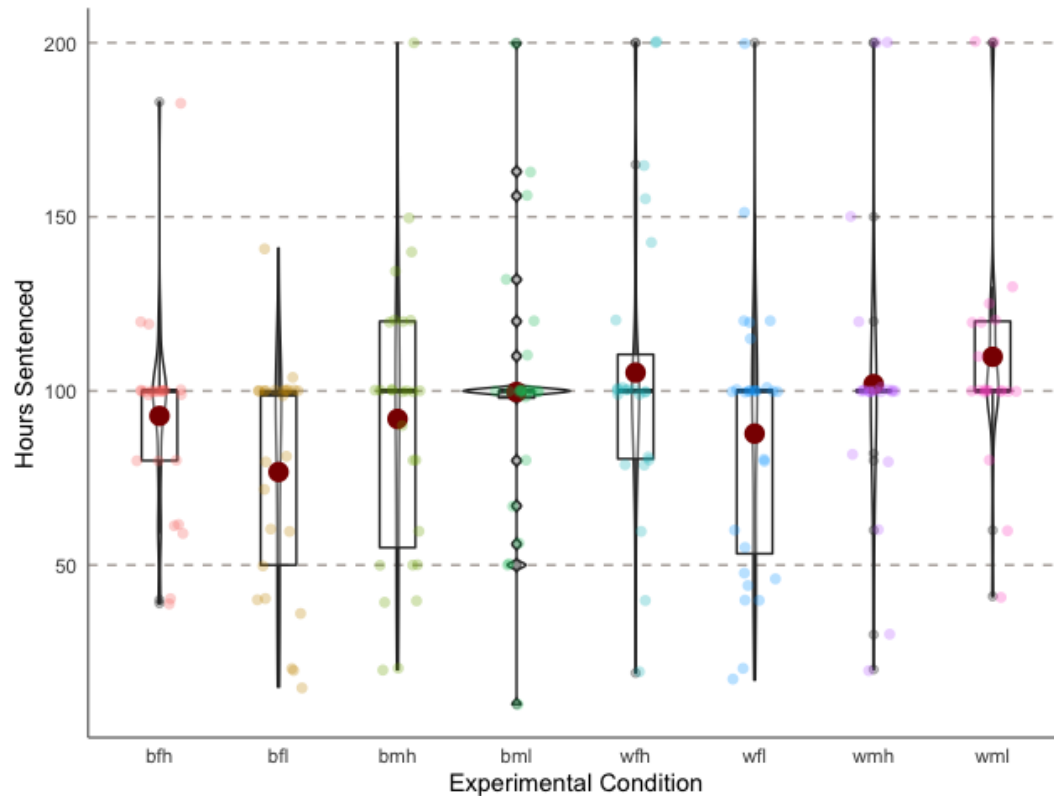
Figure 2.6. Hours of community service sentenced across conditions in the MTurk sample. Bolded dots represent means and opaque dots represent individual hours sentenced.

Regression results indicated a main effect of the gender condition such that male youth were more likely to be sentenced to more community service hours than female youth (see Table 2.3). In the two-way interaction model, an interaction between maturation level and gender condition emerged such that low maturation female youth were more likely to be assigned fewer hours than other conditions (see Figure 2.7). Marginal means comparison indicated that the low maturation female conditions ($M = 81.71$) were sentenced to significantly fewer hours than high maturation male conditions ($M = 104.13$), but the marginal means comparisons between other conditions were not significant after adjusting for multiple testing.

86

Table 2.3. Hours of community service sentenced in the MTurk sample predicted by condition.

Variable	Main Effects Model			Two-Way Interaction Model		
	B	95% CI	*SE*	B	95% CI	*SE*
Maturation Condition						
Low	-5.17	(-15.73, 5.39)	5.35	6.25	(-11.47, 23.98)	8.98
Race Condition						
White	6.67	(-3.93, 17.27)	5.37	4.85	(-13.33, 23.04)	9.22
Gender Condition						
Female	**-11.58**	(-22.07, -1.09)	5.32	-2.70	(-20.58, 15.17)	9.06
Maturation Condition X Race Condition						
Low maturation White	–	–	–	-0.58	(-21.39, 20.24)	10.55
Maturation Condition X Gender Condition						
Low maturation female	–	–	–	**-22.10**	(-43.13, -1.06))	10.66
Race Condition X Gender Condition						
White female	–	–	–	4.76	(-16.26, 25.77)	10.65
Intercept	**46.92**	(18.66, 75.18)	14.32	**41.49**	(18.66, 75.18)	14.32
R^2		.15			.17	

Note. $F_{7, 191} = 4.71$, $p < .05$ for main effects model; $F_{10, 191} = 3.76$, $p < .05$ for two-way interaction model. CI = confidence interval, SE = standard error. Values in bold are statistically significant based on a 95% C
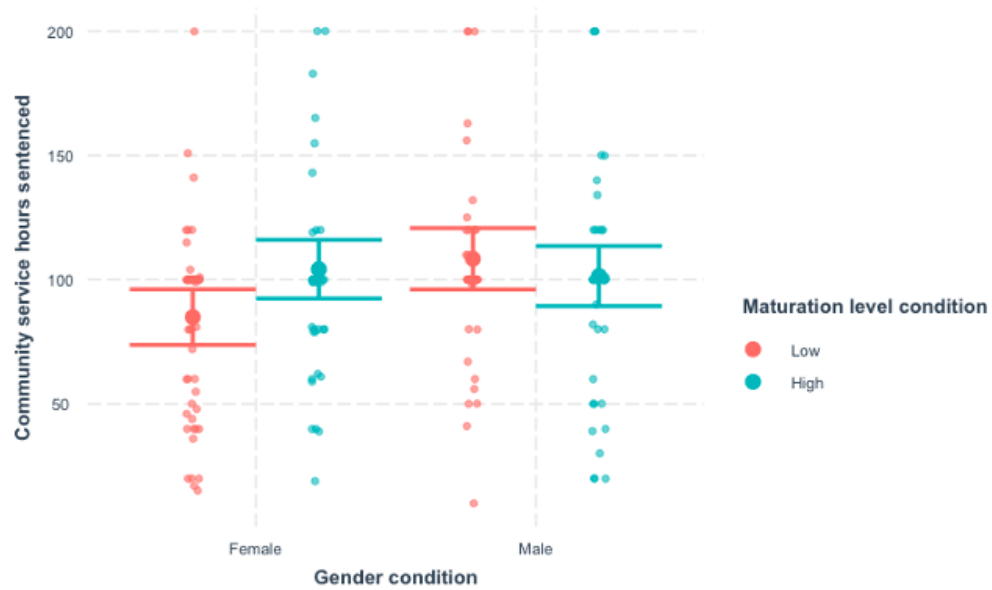
Figure 2.7. Interaction between gender and maturation level in community service hours sentenced across conditions in the MTurk sample.

Results indicated that odds did not differ for other punishment type according to condition maturation level, race, or gender as to whether participants indicated that a warning, monetary fine, or detention were more fitting for the youth.

When assessing if youth were perceived as more likely to offend in the future, a direct effect of gender emerged such that female conditions were perceived as less likely to offend in the future ($M = 3.21$) than male conditions ($M = 3.46$) (see Table 2.4). In the two-way interaction model, an interaction between race and gender condition emerged such that Black male conditions were perceived as more likely to be offend in the future compared to other conditions (see Figure 2.8). Marginal means comparison indicated that the Black female conditions ($M = 3.04$) were perceived as significantly less likely to offend again in the future than Black male conditions ($M = 3.50$), but the marginal means comparisons between other conditions were not significant after adjusting for multiple testing. The three-way interaction was not

88

Table 2.4. Perceived likelihood of offending in the future in the MTurk sample predicted by condition.

Variable	Main Effects Model			Two-Way Interaction Model		
	B	95% CI	SE	B	95% CI	SE
Maturation Condition						
Low	.05	(-.18, .27)	.11	.19	(-.18, .56)	.19
Race Condition						
White	-.05	(-.27, .18)	.11	-.32	(-.70, .06)	.19
Gender Condition						
Female	**-.23**	(-.45, -.01)	.11	**-.29**	(-.67, -.08)	.19
Maturation Condition X Race Condition						
Low maturation White	–	–	–	0.06	(-.38, .49)	.22
Maturation Condition X Gender Condition						
Low maturation female	–	–	–	-.35	(-.79, .10)	.22
Race Condition X Gender Condition						
White female	–	–	–	**.49**	(.05, .94)	.22
Intercept	**2.72**	(2.21, 3.22)	.26	**2.69**	(2.15, 3.24)	.27
R^2	.16			.19		

Note. $F_{7, 193} = 5.15$, $p < .05$ for main effects model; $F_{10, 193} = 4.39$, $p < .05$ for two-way interaction model. CI = confidence interval, SE = standard error. Values in bold are statistically significant based on a 95% CI.

significant. When assessing if youth were perceived as more blameworthy, significant
effects of condition did not emerge.
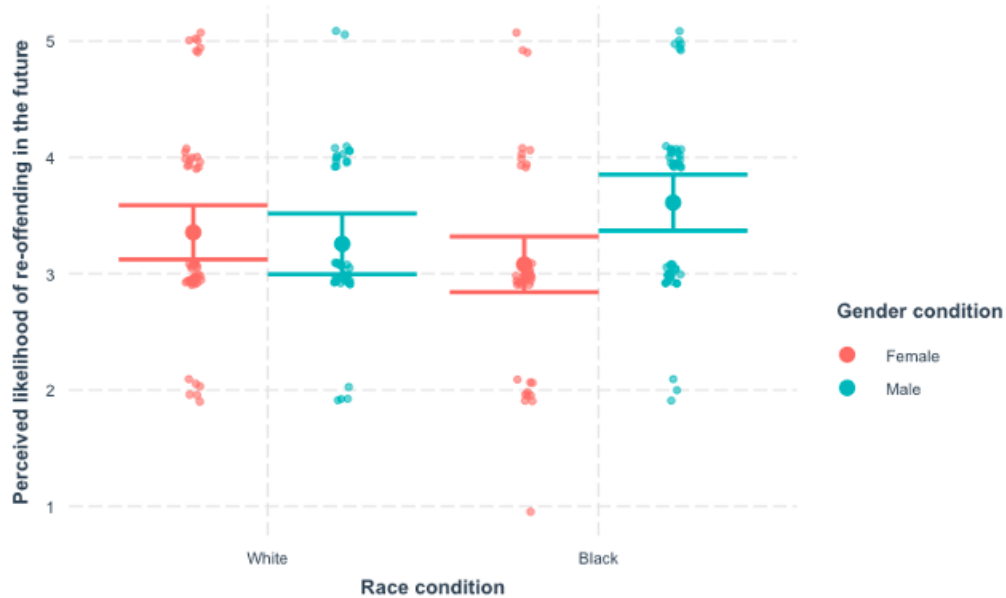
Figure 2.8. Interaction between gender and race in the likelihood of offending in the
future across conditions in the MTurk sample.

Discussion

The present studies explored whether maturation level interacts with race and
gender to influence how youth are perceived at the referral and sentencing stages of
the juvenile justice process. A complex pattern of results emerged when examining
decisions and perceptions of youth, which is congruent with prior research indicating
that expected patterns of marginalization according to race or gender are dependent on
the stage and biases of juvenile justice officials (e.g., Bishop et al., 2010). While there
were not consistent direct or interactions effects of maturation level, race, or gender
across every sample, there was mixed evidence that these social categories did interact
with each other to inform participant decision-making. The pattern of results for

90

textual descriptions of youth behavior were a bit more consistent than closed-choice

variables, as the high maturation Black male condition was consistently offered the

fewest kinds of explanations and these explanations tended toward anger and revenge.

Understanding whether appearing more or less physically mature affects

referral and sentencing decisions for youth was a primary focus of the present

manuscript. Although we predicted that youth who appeared more physically mature

would receive harsher treatment, this pattern of results did not consistently emerge.

Rather, low maturation males were sentenced to more hours of community service

than other conditions for the same crime by participants in the MTurk sample only. It

is possible that the older MTurk sample was enacting a sense of punitive correction

such that perceived younger boys may have a stronger chance at not re-offending if

they are deterred by more punishment now; however, it is difficult to fully interpret

results this way since this finding did not correspond to perceptions of

blameworthiness or future offense according to maturation level in this sample. No

effects of maturation level emerged in the closed-choice variables in the referral study.

Although the greatest percentages of participants did indicate that they would call the

police on the high maturation Black and White males, this was not a statistically

significant difference. Running a similar study with a larger sample may yield more

conclusive results.

Effects of gender and race also stood out in the sentencing study. While we

predicted that male youth conditions would be more penalized than female youth

conditions and Black youth conditions would be more penalized than White youth

conditions, we actually found that White youth were sentenced to more hours of

community service than Black youth conditions in the university sample. In addition, White youth conditions, particularly low maturation White female condition, were at greater odds for participants indicating that they should receive a monetary fine. Consistent with perspectives that court officials more treat girls more harshly for violating gender expectations, female conditions were viewed as more blameworthy than other conditions in the university sample. Finally, an expected effects of race and gender marginalization emerged such that Black male conditions were perceived as more likely to offend again in the future in the MTurk sample.

Effects of race and gender marginalization emerged again when looking at the textual explanations that participants supplied for youth behavior. High maturation Black male conditions were more distinctly characterized as behaving due to anger, revenge, and stealing across samples. Further, they were the only condition characterized by just two target words in each sample, which may suggest participants engaged in heavier reliance on stereotypes for this condition. These results suggest that high maturation Black males may be most at-risk for being negatively characterized in ambiguous scenarios. Female conditions, but especially White female conditions, were more distinctively characterized by friend and peer involvement or pressure. This may track with chivalry explanations of girls' treatment during the juvenile justice process in which adults have a hard time imaging women committing crime due to stereotypical beliefs and that women are in need of protection.

It is perhaps tempting to suggest that the mixed pattern of results across studies, samples, and variables disconfirms the possibility of a meaningful effect of visible maturation on the juvenile justice process. However, in situating present results

amid prior literature, the question of whether or not it is significant that we found effects at all emerges. Evangelist and colleagues (2018) found that the greatest leniency in juvenile court was given to youth in the range of 11 to 13 years of age. This leniency held consistent across the gender and race of youth. In tandem with these findings, Mears and colleagues (2014) suggested that youth at the bottom and top of a court's age jurisdiction may be treated with more leniency than youth in the middle of the age jurisdiction. For younger youth, this may be because they are perceived as less culpable and as better candidates for successful rehabilitation than those in the middle of the court's age jurisdiction.

Accordingly, it may be that the stakes of the present study were too severe to evidence significant differences in treatment given that participants were always told that the youth in question was 12-years old, which falls in the range of highest leniency in real-world scenarios. Future research should either substantially increase sample size so as to capture effects if they are indeed smaller than anticipated. Or, future research may consider focusing on assessing scenarios and perceptions of youth that participants are more likely to actually encounter or enact in their everyday lives. For instance, most adults will not be sentencing youth to community service in a juvenile court nor necessarily calling the police. Maturation bias may take effect in seemingly more minor decisions like school discipline that can cascade from localized punishment to broader consequences like it has been shown to do for race (Abrams et al., 2021). Such scenarios would also echo findings from the classroom studies done by Carter et al. (2018). Given the robust association between peer influences and delinquency during adolescence, it would also be interesting to examine maturation

93

effects in a paradigm in which a group of peers is also present. It is possible that this may amplify victim narratives for girls, particularly White girls, if they are perceived to be behaving due to the influence of peers.

It is also possible that a maturation bias would be more evident in a scenario in which participants did not have all the information on the age and grade of the youth in question, but instead needed to quickly react based only on visual information. This lack of information would be consistent with theory that individuals draw on stereotyped or biased thinking when they lack information (e.g., bigger means older). We intentionally gave participants the time and information to contextualize the youth as a 12-year-old and 7th grader because we wanted to make sure there was developmental anchor point to the results. However, this may have made the maturation bias we were testing more marginal because we may have been capturing participants' reactions of *Wow, that kid looks old but they are only 12 so I will adjust my expectations accordingly* rather than the intended reaction which was *Wow, that kid looks old enough to know better*. It is possible that scenarios in which participants are asked to automatically react and/or are not informed about the youth's age might show amplified maturation bias.

Even more compelling than robust experimental results would be to demonstrate evidence of a maturation bias in a naturalistic study. Psycholegal studies often demonstrate effects of race and gender through archival studies of actual arrest and sentencing data. However, this may be prohibitive to do archivally since the juvenile justice process does not uniformly collect measures of pubertal maturation that could be used to approximate effects of older physical appearance.

Conclusions. A complex pattern of results emerged such that maturation level occasionally interacted with race and gender to influence perceptions in the juvenile justice process. Maturation bias may follow the same patterns of mixed results that race and gender do in the juvenile justice process. More research is needed to evaluate the contexts in which a maturation bias may be most robust. However, preliminary analyses from textual data do suggest that high maturation Black males may be most at-risk for harsher treatment when assessing the interactions between maturation, race, and gender.

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CHAPTER 3

WHAT'S ON THE MENU? A PRELIMINARY INVESTIGATION OF MEDIA

REPRESENTATIONS OF PUBERTY AND COMING-OF-AGE NARRATIVES

The experiences that youth have and the media that they consume during puberty may have important psychological consequence. Youth draw from cultural menus of media to inform perceptions of identity, gender expectations, and body ideals during this developmental period of adolescence (McLean et al., 2007). Further, this developmental period corresponds with a concert of cognitive and social changes that prompt more engagement in meaning-making and narrative identity, which youth often scaffold with information drawn from media (e.g., Habermas & de Silveira, 2008; McAdams, 2001). It is important to understand the media content and language from which youth may be drawing to guide their experiences because of language's power to communicate social information. Research has shown that subtle gender stereotypes were pervasive in the language of a range of both child- and adult-directed media (Charlesworth et al., 2021). Patterns of gender stereotypes and negative representations of puberty in media may set youth up for a more turbulent transition into adolescence. The present study leveraged data from television shows centered on puberty and coming-of-age novels to better understand the content of media that purport to represent adolescence and also that youth may be drawing from to inform their narratives. Particular attention is given to gendered differences in how characters and issues are represented.

The ways in which youth perceive and react to the changes that accompany puberty can shape psychosocial consequences of the broader developmental transition

(e.g., Moore et al., 2014; Moore et al., 2016). Puberty constitutes enduring changes to the warp and weft of daily life. Not only is this period accompanied by a suite of physical and cognitive changes, but also dynamic shifts in the importance of peers and the negotiation of new roles and responsibilities within the family. A broad body of literature documents the prevalence of psychological change, such as changes in emotional reactivity, and psychological distress, such as depressive symptoms, during puberty (Alloy et al., 2016; Dahl & Gunnar, 2009). Research has indicated that self-reported early pubertal timing (i.e., developing earlier than one's peers) is robustly linked to myriad psychosocial problems, including depression and anxiety, for both boys and girls beyond physical exams performed by medical professionals (Ullsperger & Nikolas, 2017). This suggests that youth self-perceptions of change during puberty are as relevant as the physical manifestations of the changes themselves, and that perceptions of deviating from peers carries negative psychological consequences.

The psychosocial consequences of self-perceptions are also evidenced in the clinical literature. Cognitive theories of psychopathology propose that a broad range of psychopathologies are grounded in subjective interpretations of events and distorted self-perceptions (Beck, 2011). Accordingly, the kinds of concurrent and retrospective perceptions of puberty individuals maintain may inform trajectories of psychological distress. For instance, girls who self-reported as maturing earlier than their peers were more anxious about menarche than peers (Natsuaki et al., 2011). Retrospective research indicates that recollections of feeling unprepared and disliking the physical changes of puberty are linked with eating disorder symptoms, lower feelings of self-esteem and self-efficacy, and increased interpersonal problems in undergraduate

105

women (Moore et al., 2016). Taken together, information that girls perceive and internalize about their bodies may have both short- and long-term psychological consequences.

During broader adolescence, individuals start to independently develop their narrative self. They do so by drawing on the scaffolding of stories told by parents, peers, and the broader media (McLean et al., 2007). Accordingly, the media that youth consume during puberty may color the ways in which they perceive and interpret their experiences. In a qualitative study, Breen and colleagues (2017) examined the role that the stories emerging adult participants had consumed in the forms of books, movies, and television during adolescence played in developing a sense of self in narrative identity. The findings suggested that salient stories tended to focus relational themes, which the authors noted as highlighting the importance of others' stories in the development of identity. However, Breen and colleagues (2017) relied on a small sample of participants and a small sampling of the stories that they remembered in the moment. These results may not provide full or accurate insight into the influence of stories on the developing self during adolescence. Expanding this investigation of media may provide further insight into what media may be representing at this developmental period.

Further, the gender expectations that the narrative menus of media provide may affect girls' perceptions of themselves and their futures as youth start to translate and internalize their knowledge of society into templates for self-reference. This is important because girls' expectations regarding their future transitions can influence the decisions they make and the actual pattern and timing of their role transitions

106

(Crockett & Beal, 2012). Expectations for education and occupation are shown to predict subsequent attainment (Beal & Crockett, 2010). For instance, an adolescent girl who expects to be married and having her first child by 25-years-old is more likely to experience this outcome than an adolescent girl who expects to be in graduate school by 25-years-old (Crockett & Beal, 2012). Accordingly, the menus of characters, themes, and language that media offers by gender may have significant influence on how girls construct templates for their future roles and expectations.

The Present Study

The aim of the present study was twofold: (1) In the first study, my goal was to provide a preliminary investigation of how puberty themed media presents puberty and its related changes, as well as whether these changes differ based on the gender of the characters. I anticipated that depictions of physical changes associated with puberty would be more negatively represented and that physical changes for female characters would be represented in a more sexualized manner than the changes of male characters. (2) In the second study, I examined a sample of coming-of-age novels to systematically explore language use across all novels for the strength and prevalence of gender stereotypes. Because stereotypical language and representation of gender can be subtle and not explicit, I employed a partial replication of the word embeddings method that Charlesworth and colleagues (2021) used in examining stereotypes across representation and traits. I anticipated gendered stereotypes associated with themes within the novels (e.g., survival or man versus nature centered language would be more strongly associated with male characters).

Study 1

Method

Procedure and Materials.

I examined two popular television shows that thematically center on puberty and middle school: Netflix's *Big Mouth* and Hulu's *PEN15*. In both of these shows, the main characters are middle school students and plot lines frequently address physical or social changes associated with puberty. My primary research question was to understand how female associated and male associated physical changes were represented, as well as how social changes with peers and parents were represented.

Big Mouth. This dataset included transcripts of 40 episodes of *Big Mouth* over the course of season one through season four, which were released from 2017-2020. The corpus included 173,251 words. *Big Mouth* is led by two male showrunners and focuses on centrally on two male characters although both male and female characters are present throughout the show.

PEN15. This dataset included transcripts of 17 episodes of *PEN15* over the course of season one and season two part one, which were released from 2019-2020. The corpus included 48,486 words. *PEN15* is led by two female showrunners and focuses on centrally on two female characters although both male and female characters are present throughout the show.

Data Analysis

Pointwise mutual information (PMI). PMI is a metric that identifies the frequency at which terms co-occur, which offers a statistical test of what words tend to go together in a corpus. In other words, it tests whether words co-occur more frequently than would be expected under an independence assumption. Pairs of words

that have high PMI are considered to have a higher probability of co-occurring together. PMI values can be more informative than raw co-occurrence counts between two words because it can account for semantic context and indicate when a co-occurrence is more likely than what would be expected by chance. For instance, co-occurrence counts with common words like "the" or "it" are not particularly informative and may be due to chance.

In order to investigate how both shows represent physical and social changes, I compared the respective PMI scores of a set of representative target words. I compared the top five co-occurring words with "period" and "bra" for female associated physical changes and "voice" and "hair" for male associated physical changes. While changes to voice and hair are also a part of female physical change during puberty, these changes are often colloquially associated with male puberty (e.g., the stereotype of a boy's voice cracking in class and public comparisons of growing facial hair). To compare representations of social changes, I compared the top five co-occurring words with "girl," "boy," and "date" for peer-related changes and "Mom," "Dad," and "parents" for parent-related changes. Note that the terms of mom and dad were capitalized in order to capture how characters were talking to their respective parent. Context windows were used to zoom in on target words in order to situate results.

Sentiment analysis. In order to determine how positively or negatively *Big Mouth* and *PEN15* represent puberty and its corresponding developmental period, I examined sentiment scores across the seasons of both shows. I used the Bing lexicon to generate sentiment scores. The Bing dictionary is a commonly used sentiment

lexicon wherein negative words (e.g., "hate") are assigned a sentiment weight of -1 and positive words (e.g., "happy") are assigned a sentiment weight of 1 (Hu & Liu, 2002). One potential drawback of the Bing lexicon is that of the 6,789 words for which it accounts, 2,006 are positive and 4,783 are negative, which may skew results toward negative trends. I plotted the sentiment scores of *Big Mouth* and *PEN15* chronologically across their respective seasons (i.e., the first episode of the first season is represented on the left end of the x-axis and the latest episode of the series is represented at the right end of the x-axis. In addition, I examined an episode from *Big Mouth* that heavily featured the topic of periods (season four, episode 2) and *PEN15* (season 2, episode 5) to compare the general sentiment trends of these episodes. Given that anxiety about menarche-related changes is associated with negative psychosocial outcomes (e.g., Pinto, 2007; or see Chapter 2), I posit that it is important to examine how both shows represented this change in their dedicated plots depicting periods. General sentiment trends were interpreted as a proxy for how positively or negatively each show represents puberty and middle school. Sentiment plots were implemented with rolling window calculations for time-series data to smooth scores.

Results

PMI. A general trend emerged such that the top co-occurring words for both male and female associated physical changes were more sexualized in the *Big Mouth* transcripts than *PEN15* transcripts (see Table 3.1). The notable exception to this trend are the co-occurring terms with "period." Context windows indicate that top terms tended to describe achievement of menarche and menstrual flow. However, the context surrounding these terms was often neutral to negative in tone (e.g., "I just had

a huge fat period" and "cooter plugs for your ginormous period.").

Table 3.1. Top co-occurring terms for physical changes target words in *Big Mouth* and *PEN15*

Top Term		Female associated physical changes		Male associated physical changes	
		period	bra	voice	hair
Big Mouth	1	got (40.68)	red (48.14)	mocking (15.39)	pubic (33.05)
	2	fat (8.78)	wear (21.68)	presenter (14.00)	pubed (22.29)
	3	my (7.41)	sexy (19.17)	normal (9.97)	your (16.61)
	4	plugs (6.99)	under (8.47)	sultry (7.00)	brush (14.09)
	5	hugest (6.99)	shopping (5.58)	cringe-worthy (7.00)	dye (11.59)
PEN15	1	don't (10.65)	wearing (13.34)	sounds (12.64)	your (21.30)
	2	my (10.17)	strap (7.59)	inner (7.24)	blonde (16.86)
	3	yet (3.99)	lowers (7.59)	lower (7.24)	like (14.84))
	4	big (3.60)	about (6.64)	deep (6.14)	locker (13.25)
	5	wish (3.53)	nothing (5.02)	keep (5.16)	beautiful (11.64)

Note. PMI score reported in parentheses alongside corresponding top term. Greater PMI scores mean the words are more likely to co-occur.

The sexualization trend was particularly robust for the target word "bra." Context windows centered on "bra" in the *Big Mouth* transcripts situate these top words indicating that there was both a focus on mother-daughter bra shopping (e.g., "Oh honey, buying a fancy bra won't make you look like a grown up") but also a number of sexualized scenarios (e.g., "…and she's wearing a red bra, which means she wants us"; "under the shirt over the bra."). Although the target word "hair" had strong associations with "pubic" and "pubed," context windows indicated that these terms were descriptive of physical change rather than sexualization (e.g., "I am supposed to be growing more pubic hair, not losing the ones..").

In contrast, physical change target words in the *PEN15* transcripts did not appear to co-occur in overtly sexualized contexts. Context windows indicated that

"period" tended to occur in contexts of desire to reach menarche (e.g., "I wish I had my period."). Similarly, the term "bra" occurred in contexts where the characters were trying to situate physical change (e.g., "…why you're wearing a bra, Anna, because there's nothing there.").

Differences in sexualized co-occurring terms also emerged in depictions of social changes (see Table 3.2). Particularly striking is the difference between *Big Mouth* top terms for "girl" as compared *PEN15*. While *Big Mouth* tended to depict male characters talking about girls (e.g., "Olivia's pretty much the hottest girl in school…"), *PEN15* more often depicted self-deprecating thoughts the central female characters made about themselves (e.g., "I understand I am the ugliest girl in school.").

Given that the main characters and showrunners of *PEN15* are female, more sexualized or objectifying terms might be expected in context when examining the target word "boy." However, context windows indicate that "boy" was often used in navigating changes with boys (e.g., "What happened in the closet with that boy?").

PEN15 and *Big Mouth* were most aligned in their language surrounding "parents" as both captured characters dealing with or describing parental divorce. Notably, *PEN15* often depicted both "Mom" and "Dad" used in contexts where the characters were exasperated with parents (e.g. "Mom, Mom, I know. Mom stop.").

Table 3.2. Top co-occurring terms for social changes target words in *Big Mouth* and *PEN15*

Top Term		Peer-related changes			Parent-related changes	
		girl	boy	date	Mom	Dad	parents
Big Mouth	1	sophisticated (31.14)	big (27.73)	with (16.95)	Dad (43.32)	Mom (42.56)	are (39.32)
	2	hottest (17.80)	dick (23.78)	on (15.32)	you (15.58)	locket (10.05)	my (32.95)
	3	turned (11.40)	needs (12.72)	ironic (14.43)	hey (11.10)	hey (7.86)	your (19.50)
	4	school (11.37)	pillows (10.66)	non-date (13.04)	Mrs (7.45)	out (6.35)	our (12.67)
	5	new (10.76)	who (9.39)	deeply (10.85)	calm (7.21)	unforgivable (6.13)	divorced (10.53)
PEN15	1	ugliest (17.19)	wriggly (20.84)	our (13.26)	stop (25.87)	stop (16.11)	divorced (27.44)
	2	school (13.41)	bad (19.00)	on (12.70)	straight (14.17)	love (14.70)	are (23.27)
	3	your (13.17)	closet (9.87)	first (8.87)	touching (9.21)	dear (12.96)	your (18.67)
	4	sup (7.30)	with 9.64)	handle (7.38)	fax (9.21)	help (9.95)	my (10.82)
	5	sleepover (5.73)	athletic (6.54)	let's (5.59)	leave (8.23)	go (8.03)	call (9.73)

Note. PMI score reported in parentheses alongside corresponding top term. Greater PMI scores mean the words are more likely to co-occur.

Sentiment analysis. Both shows have a range of sentiment across episodes. However, *Big Mouth* has more negative peaks overall than *PEN15* (see Figure 3.1), which suggests that it is a more negative depiction of puberty and middle school in context.
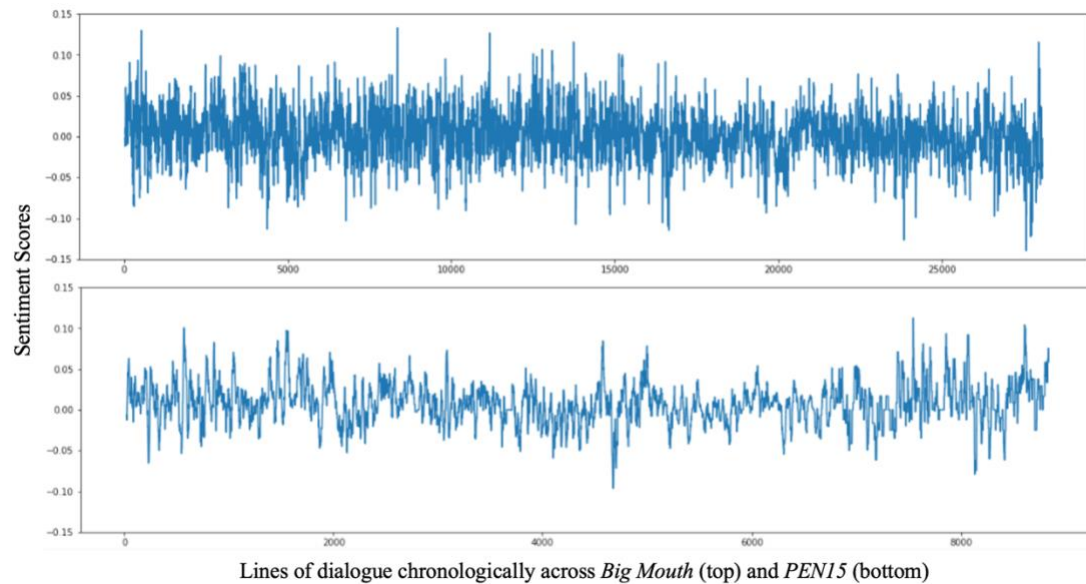

Figure 3.1. Sentiment scores plotted chronologically across *Big Mouth* and *PEN15*. Positive values on the y-axis indicate positive sentiment scores and negative values on the y-axis indicate negative sentiment scores.

Additional sentiment analysis on the period-centric episodes of both shows indicated that *Big Mouth* included more negative sentiment overall in the language of its period-centric episode (see Figure 3.2). Both shows had similar numbers of negative sentiment peaks, but *PEN15* had higher overall positive sentiment and the episode ended on a greater positive note than the *Big Mouth* episode. It should be noted that *Big Mouth* included more words overall, so it is possible that some of the trend in negative sentiment could simply be due to higher word count.
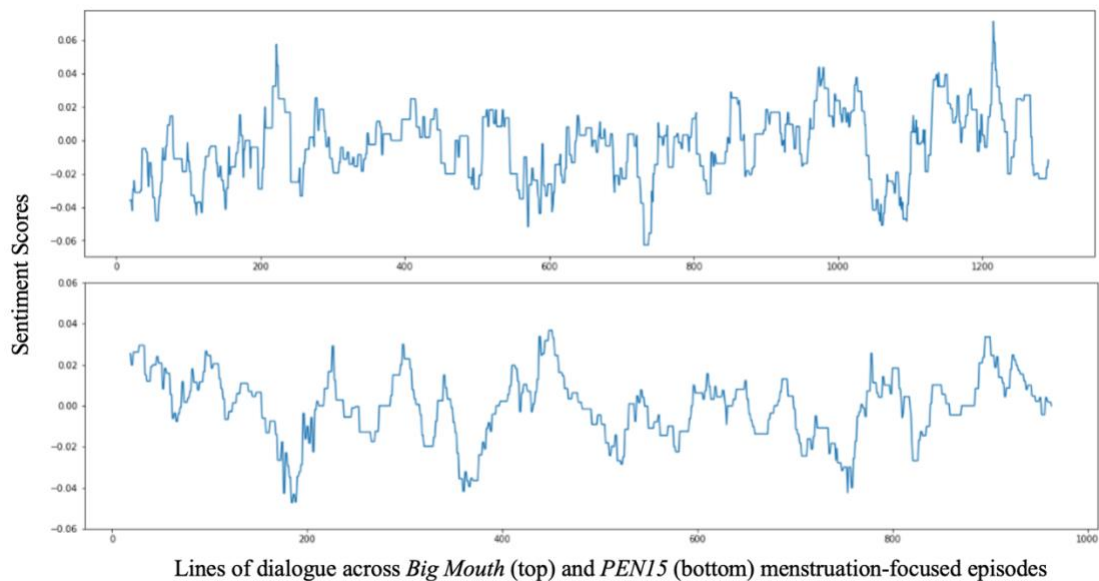
114

Figure 3.2. Sentiment scores plotted chronologically across period-centric episodes. Positive values on the y-axis indicate positive sentiment scores and negative values on the y-axis indicate negative sentiment scores.

Discussion

Popular media outlets have praised both *Big Mouth* and *PEN15* for their characterizations of puberty. Although neither show is explicitly made for adolescent audiences nor claims to be a guide through puberty, it is possible that youth may seek out these shows in light of this praise and because they provide much of the limited representation of puberty that exists on television. Given that youth may be consuming these shows as primary media guides or representations of puberty, it is important to understand how these two shows present puberty. Findings from present analyses indicate that *Big Mouth* in particular tended to characterize puberty and middle school with more negative sentiment than *PEN15*. In addition, *Big Mouth* may be particularly inaccurate in its representation of female pubertal changes as it tended to reference breast development and other physical changes in objectifying and sexualized ways. In

contrast, *PEN15* tended to capture physical and social changes in the context of situating these changes with friends. For example, the characters tended to discuss periods and bras in the context of comparing developmental trajectories, which may more accurately capture the lived experience of actual youth better than hypersexualized depictions of puberty.

Puberty is not a singular point of change, but a process of many different changes. Accordingly, characterizing puberty in a limited or entirely negative may not be reflective of the lived experience of the diversity of pubertal changes. Although some pubertal changes, such as acne, may be viewed as negative, youth may enjoy other changes, such as height and muscle growth, for the benefits they confer. Further, youth may hold multiple, conflicting views of pubertal change because puberty both signifies growing up and gaining new responsibilities, but also invites public gaze. Qualitative work on girls' opinions of menarche highlight this conflict with the finding that some girls look forward to menarche because it is a marker of womanhood, but that these girls still described having anxiety and low self-esteem about menarche because of the uncertainty in how others thought about and reacted to them (Pinto, 2007). Normalizing the variety of reactions youth may have about puberty rather than describing puberty as an invariable period of discomfort, may be critical given the prevalence of psychological distress during puberty (e.g., Alloy et al., 2016).

The representation of female associated pubertal changes in *Big Mouth* underscores broader issues with public response to puberty. With the onset of puberty and transition into adolescence, youth become more aware of their bodies and report greater body dissatisfaction (e.g., Stice, 2003). In addition, peer sexual harassment

116

increases for both boys and girls across middle school as they become increasingly physically developed (McMaster et al. 2002). In turn, increased peer sexual harassment is related to increased self-surveillance and body shame as youth become increasingly aware of objectification from others (Lindberg et al., 2007). Pathways to body objectification and shame were specifically tied to pubertal development for girls but not boys. Accordingly, overtly sexualized messages about breast development for girls in *Big Mouth* may be particularly harmful for young viewers – girls because it may increase body surveillance and shame, and boys because it may encourage perpetuation of peer sexual harassment. Further, negative representation of menstruation related changes may have long-term developmental consequences for girls who absorb these messages as menstrual shame in associated with body shame and sexual decision-making in undergraduate women (Schooler et al., 2005).

In contrast to the hypersexualized and negative depictions in *Big Mouth, PEN15* may come off as less exciting or even more awkward. This may be due in part to gender differences of the showrunners given that *PEN15* is helmed by two women and centers on two female best friends whereas *Big Mouth* is helmed by men and centers on a central male character, which may explain stereotypical gendered associations. However, I posit that the medium of the shows is the bigger contributor to the difference in puberty depiction. While *Big Mouth* is a cartoon that can take advantage of adult voice actors enacting sexualized scripts that are presented on screen through the mouths of animated 12-year-olds, *PEN15* manages to do something more outlandish, which is to film the show with a cast of actual middle school aged-youth except for two leads who are played adults. The result is that *PEN15* is centrally about

117

the psychology of puberty rather than a mechanical representation of physical change. Although this is still not a show marketed for youth, increased representation of puberty and the psychology of puberty may be important for normalizing these changes and feelings for youth. While youth may receive descriptive information about puberty in school health classes, deeper representation of how these changes may fee or be distressing might also be helpful.

Study 2

Method

Procedure and Materials.

I examined a collection of American coming-of-age novels in order to explore their semantic representation of male and female characters. I selected coming-of-age novels for analysis because they are often assigned in high school classes (e.g., *The Catcher in the Rye*) and may offer adolescents templates of identity and future-planning given that they are also in a developmental period of searching for identity that is represented in this genre of novel. My primary research questions were: (1) Are there gendered differences in associations between characters and attributes? (2) Are there gendered differences in semantic distance from common traits? (3) Are there gendered differences in semantic distance from occupations? This study also serves as a partial replication and extension of Charlesworth et al. (2021), which found robust gender stereotypes in general children and adult books but only used a sample of books published prior to 1920.

Coming-of-age novels. I analyzed a sample of 140 novels in the present study. Novels were determined to be "coming-of-age" from user-generated lists on

118

Goodreads and from genre tags that publishers gave to books. From this initial

collection, novels were further snowballed sampled through searching other books by

the same authors and searching the "more like this" options on Google and Goodreads.

In order to be included, novels needed to be written by American authors, published

between 1920 and 2021, and in English. The inclusion criteria were implemented so

that findings could be contextualized in time and culture. In this sample, 73 novels had

male protagonists and 67 had female protagonists (determined by reading for

pronouns).

Data Analysis

Word embeddings were used to examine the relationship between words

within the coming-of-age corpus. This method represents a collection of text as a high-

dimensional space in which each word in the corpus is assigned a corresponding

vector of numbers. Word vectors that share common contexts in the corpus are

proximal in the vector space. For example, we might expect "girl" and "she" to be

close to each other in vector space because they likely co-occur in similar contexts.

Since word embeddings quantify how similar words are to each other in space, we can

also use measures like cosine similarity to estimate how distant words or groups of

words are from each other. Word embeddings may be particularly useful for

measuring stereotypes because stereotypes are frequently not explicit in language.

Rather, word embeddings is able to capture how much semantic distance there is

between words of interest which is a more implicit test of stereotypes. For instance,

we can compare the distance between "girl" and "nature" to the distance between

"boy" and "nature" using cosine similarity and determine that the pairing with the

greater similarity score likely co-occurs together more frequently across the novels.

Word embeddings were trained in R with GloVe on 9,920,525 words that occurred at least 40 times across all coming-of-age novels to reduce the chances that rare words skewed the data. These metrics satisfy common heuristics for building stable word embeddings models (Hvitfeldt & Silge, 2021). GloVe is an unsupervised learning algorithm in which word co-occurrence statistics are derived from a collection of text and are turned into a representative word vector space of these co-occurrences. (Pennington et al., 2014). The embeddings model was run over 20 iterations to determine stability and relationships between words were calculated with the default skipgram window of five words (i.e., the relationship between word X is calculated for five words to the left and five words to the right of X).

Gendered word associations. To answer my first question, I tested the association of between male and female categories with semantic categories of interest that were modified versions of well-tested gender stereotypes (see Table 3.3 for specific words in each category or vector). Specifically, I examined the association between female–home/male–nature, which was a modification of the stereotype between female–home/male–career (Croft et al., 2014). I modified this association in part because career related words like "office" were not highly representative of this genre of novels and also because there is a potentially gendered difference in thematic content of coming-of-age novels according to character. That is, female characters may be more likely to be associated with domestic or home-centered plots or themes while male characters may be more associated with man versus nature elements (e.g., think *Hatchet* versus *Are You There, God? It's Me, Margaret*). Similarly, I modified

120

the association between female–good/male–bad to examine if there were gender differences in social versus violence focused themes and actions (Dunham et al., 2016). Finally, I examined gender differences in female–weaker/male–stronger given Koeing's (2018) finding that female adolescents and young adults may be more strongly prescribed stereotypes of weaker and less dominant while males are encouraged to be stronger and dominant.

Table 3.3. Word stimuli used to represent each category and attribute

Category	Word stimuli
Female	*female, woman, girl, sister, she, her, hers, daughter*
Male	*male, man, boy, brother, he, him, his, son*
Home	*home, house, family, wedding, kid, marry, kitchen*
Nature	*nature, dog, horse, hunt, fish, animal, woods*
Social	*happy, fun, excited, laughter, lover, friend*
Violence	*murder, die, kill, death, fight, enemy*
Stronger	*taller, stronger, bigger, faster, grew, growing*
Weaker	*weaker, smaller, lighter, shorter, quieter, slower*

Word association embedding tests (WEAT) were used to quantify the effect size of the word associations via the sweater package in R. This test is a modification of the method developed by Caliskan et al. (2017) that tests the bias in a set of word embeddings by taking the difference in distance between the vector of *female* words and the vector of *male* words from the target association and dividing that difference by the standard deviation of average cosine similarity. The resulting effect size can be interpreted similarly to an implicit association test (IAT) *D* score wherein strong effects are greater than WEAT = .65.

Gendered associations between traits and occupations. To answer my second and third question, I examined the mean average cosine similarity between the

vectors of target traits and occupations and the female and male vectors. Traits and occupations were derived from the analyses of Charlesworth et al., 2021). Results are plotted according to gender vector in order to visually compare differences in semantic distance between trait and gender.

Results

Gendered word associations. Analyses indicated that there were significant and large WEAT effect sizes for each of the gendered associations in the expected directions (see Table 3.4).

Table 3.4. Gender associations occurring in coming-of-age novels

Gendered association	WEAT	*SD*	*p*
Female-home, male-nature	1.33	.06	.0026
Female-social, male-violence	1.22	.05	.0142
Female-weaker, male-stronger	1.26	.04	.0029

Accordingly, the vector of female words was more likely to be associated with the vector of home words, the vector of social words, and the vector of weaker words whereas and the vector of male words was more likely to be associated with the vector of nature words, the vector of violence words, and the vector of stronger words. In context, this means that both male and female characters were more likely be represented by or semantically similar to gender stereotypical associations across all novels. It should be noted that there was a relatively even split between male and female protagonists represented in the sample, as well as a fairly even split between male and female authors, so it is unlikely that these results stem purely from gender of

122

the main character or author.

Gendered associations between traits and occupations. Analyses of the stereotypes in gender–trait association revealed that the majority of traits tended to be more semantically similar to the female word vector than the male (see Figure 3.3). Descriptively, there were greater gender differences in traits that associated male characters with the traits of *steady*, *cold*, and *hard*. In contrast, female characters were more strongly associated with *happy*, *relaxed*, *sensitive*, *thoughtful*, *neat*, and *helpless*. These gender differences in trait associations mirror prior findings that female adolescents are more likely to be prescribed stereotypes of being communal weak, emotional, shy, likeable, and wholesome whereas male adolescents are prescribed stereotypical traits of being dominant, agentic, and independent (Koening, 2018). It should also be noted that *lazy* had stronger similarity with male characters too, which may correspond to a warning or lesson that men need to be hard-working.

In converse to trait–gender associations, the majority of occupations had greater similarity similar to the male vector (see Figure 3.4). The gendered difference in similarity was most striking for the occupations of judge, doctor, police, and driver for male characters. Although there was slightly greater similarity for female characters for the occupations of teacher, maid, sailor, and scientist, the largest gendered difference was therapist and dancer. However, these occupations were also smaller in cosine similarity value. I probed individual contributions of the words in the female vector to similarity with "dancer" and found that the word "her" was largely dragging down the vector average score because it had a strong negative association (-.28) whereas all other words in the vector were positively associated.
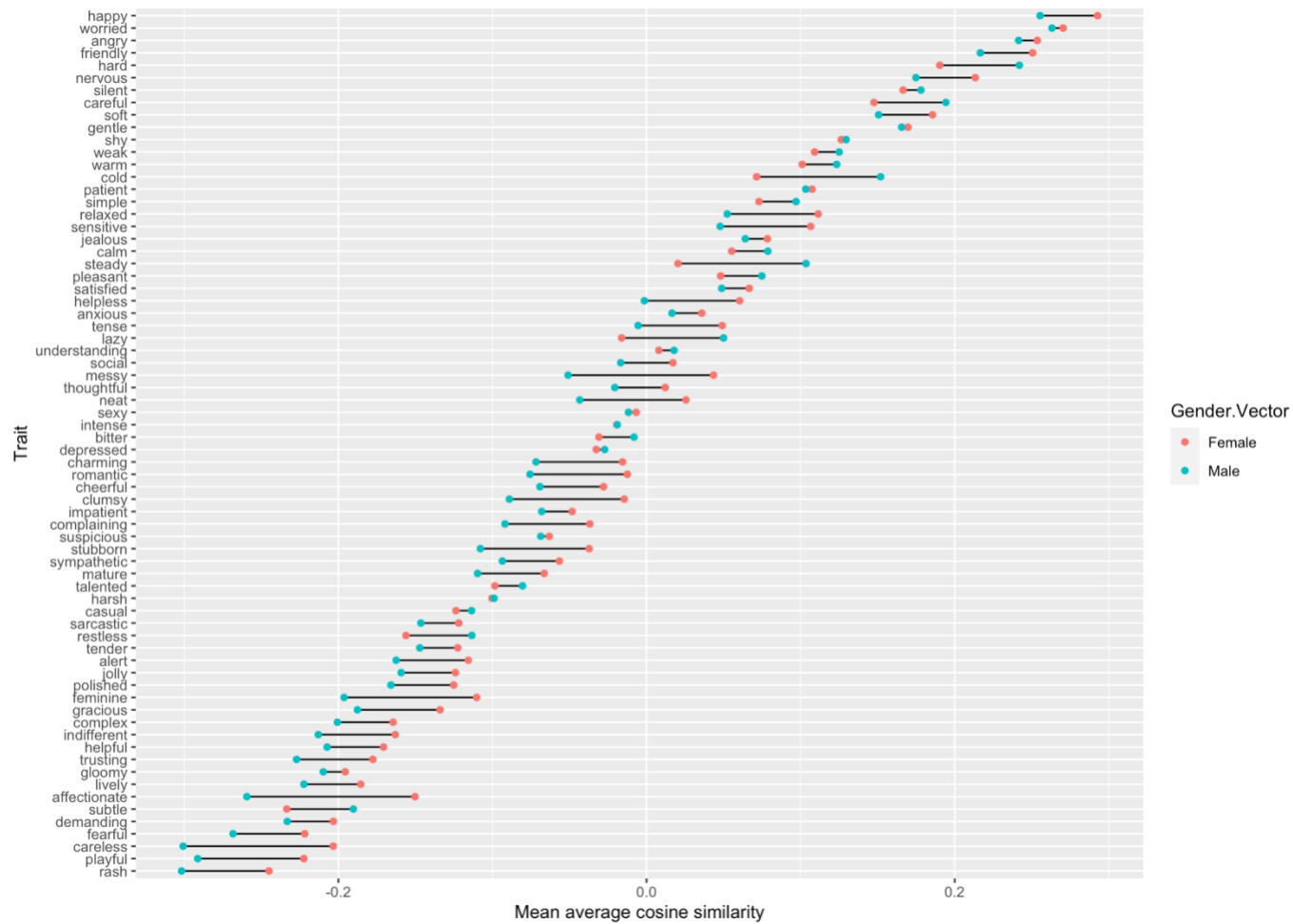
123

Figure 3.3. Gender–trait stereotypes in coming-of-age novels. Negative cosine similarity means less association and positive cosine similarity scores mean greater association with the trait.

Figure 3.4. Gender–occupation stereotypes in coming-of-age novels. Negative cosine similarity means less association and positive cosine similarity scores mean greater association with the trait.
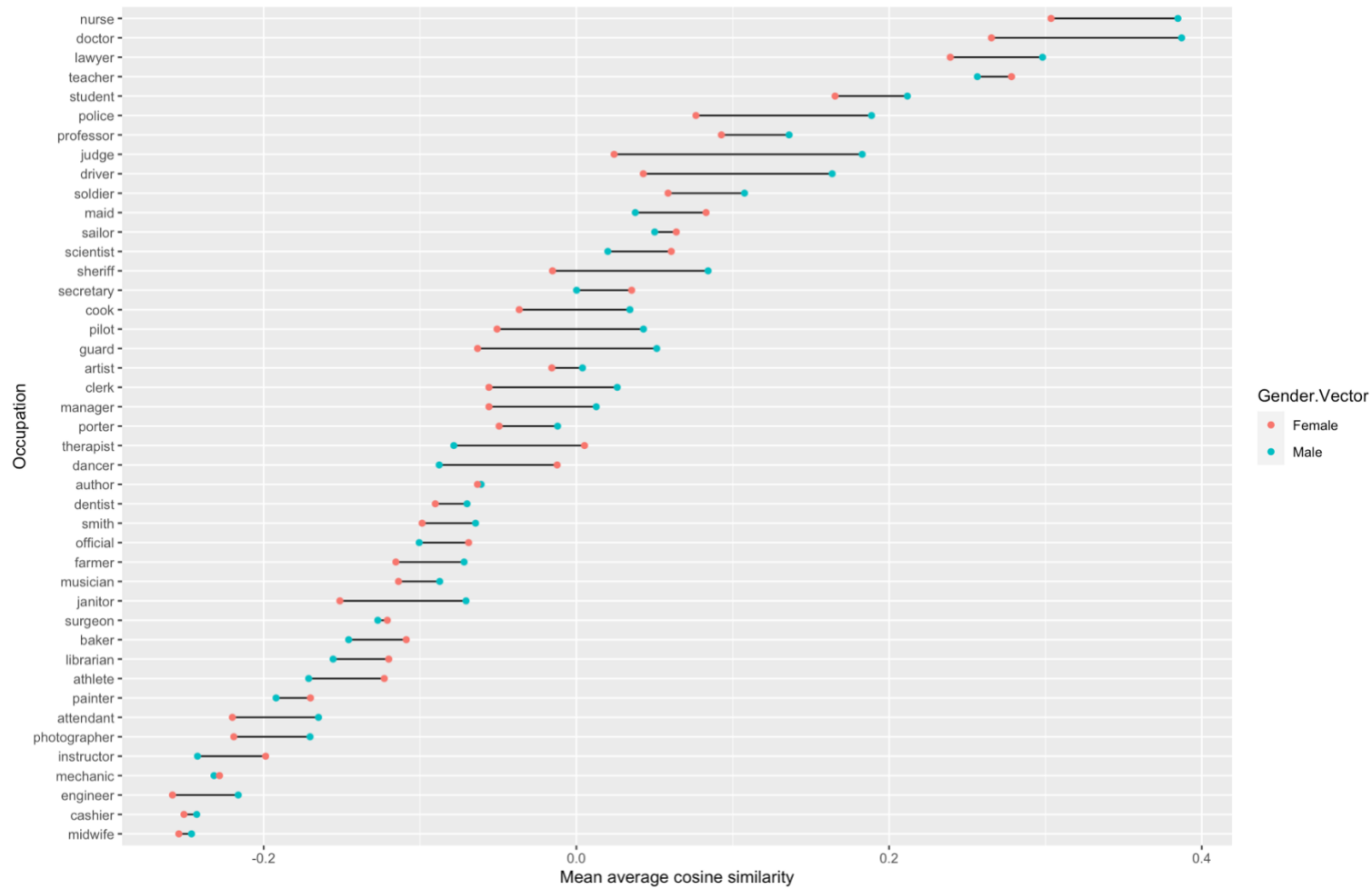
Discussion

The language used in novels and broader media have the capacity to codify stereotypical representations and associations with gender. Such collective stereotypes are likely maintained through subtle or indirect language as opposed to explicit and direct language (e.g., Moscovici, 2000). Understanding how these stereotypical associations may pervade coming-of-age novels is particularly important given that this genre is often read by young adults who may be drawing on these stories to build their narrative identities. The present study adds to the mounting pile of evidence pointing to how pervasive and consistent gender stereotypes are in natural language with a set of modern coming-of-age novels in which female characters were more strongly associated with domestic/home, social, and weaker word categories.

The present results provide a partial replication of findings from Charlesworth et al., (2021) that showed female word categories were more strongly associated with home, good, art, and reading word categories than males. However, present results extend this study in both word category and date of publication. I showed that female word categories were also more strongly associated with social and weaker word categories than male word categories, and that male word categories were more strongly associated with nature word categories. Further, the sample of coming-of-age novels dates from 1920 to 2021 whereas the books Charlesworth et al., (2021) analyzed only dated to 1920. However, Charlesworth et al., (2021) posited that there was a movement toward more equitable gender representation over time because gendered stereotypes slightly decreased across time as represented by different mediums (movies and television being their modern sample. Present results suggest

that this finding may have been an artifact of medium rather than time as gendered stereotypes were still robust in a sample in which the average publication year was 1992 and the median year of publication was 2001. This may suggest that novels and visual media carry semantic biases differently from each other.

The association between male–nature and female–home may map onto agentic versus communal themes that are broadly replicated across gender stereotype empirical literature. For example, the nature word category may be capturing more agentic content in which male characters must face nature to come of age in the form of hunting, surviving, or a related activity. In contrast, female characters may be mapping to social or domestic tasks that need to be addressed to come of age. These stereotypes correspond with findings from Eagly and colleagues (2020) in which stereotypes of women being more communal and men being more agentic have remained relatively consistent across decades in the United States.

Results from the word associations and trait and occupation results further correspond with research from Koeing (2018) that found robust associations of prescriptive gender stereotypes across age groups. Girls were rated higher for characteristics of communal, weak, emotional, shy, likeable, wholesome, and feminine appearance whereas boys were rated higher for agentic, dominant, independent, active, noisy, sexually active, and masculine appearance. Of all prescriptive stereotypes tested, adolescence was the period during which more were prescribed as compared to other developmental periods (gender differences in expected characteristics were lowest for toddlers and elderly). In the present study, the traits more associated with the female word category corresponded to findings from Koeing (2018). Further, the

greater association between most occupation categories with males may correspond with this idea that males need to be more agentic and active.

Future research should expand this collection of novels to be more inclusive beyond the present snowball sample. In addition, analyses that formally investigate temporal patterns of gender stereotyped language should be included. It is possible that stereotypes have diminished in language over time but not as quickly as in more immediate mediums like movies or television. Further, it would be interesting to map the kinds of media that youth report consuming and as important to their self-concept to see if semantic relationships in language have a concurrent effect in youth behavior, feelings, or future plans.

Cross-study conclusions. Although narratives and images of this developmental period are popular in broader culture, as evidenced by pervasiveness of coming-of-age stories, this does not correspond with the actual representation of voice for adolescent girls, which may be harmful in a media culture in which girls tend to have less self-esteem as they become more aware of how society perceives them (e.g., Fredrickson & Roberts, 1997). If youth integrate media into their narrative identity and also use it to orient themselves during this developmental transition, then they need options that go beyond gender stereotypes, negative sentiment, and sexualization. Text analyses across television shows and novels salient to adolescence and puberty revealed that present representation may be marred with gendered stereotypes and negative depictions of puberty. These negative representations may contribute to psychological distress surrounding physical change at puberty or perceptions of what kinds of traits, behaviors, or futures are appropriate according to gender identity.

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GENERAL DISCUSSION

The overarching goal woven into this dissertation was to recast central questions about experiences at puberty through examination of individual, social, and cultural contexts. Puberty is a period of significant change across multiple domains of life (i.e., physical, social, biological), and this change may be highly distressing to youth as evidenced by the robust empirical literature documenting the relationship between puberty and negative psychosocial outcomes like depressive symptoms and delinquency (e.g., Ullsperger & Nikolas, 2017). However, it is less clear how youth make sense of these changes and what messaging from their social environments (including from peers and parents) and their cultural context (including from media) they integrate into this process. The shared motivation for these chapters came from the need to identify the ways in which girls make sense from change at puberty and the role social and cultural contexts may play in shaping these narratives. Across each chapter emerged a common theme of the power of words and language, and new directions for understanding puberty in context.

The intersections between Chapters 1 and 3 offer a site for analyzing the gap in the needs girls have for making sense of change at puberty and the materials broader American culture offers in a selection of media. As I demonstrated in Chapter 1, early adolescent girls are concerned with making sense of physical changes associated with puberty, but this may quickly be superseded by their desire to make sense of changes with peers and friends. Further, girls may find changes related to menstruation particularly distressing in comparison to other physical changes. In Chapter 3, we see that the subset of television and novels analyzed offer girls meaning-making materials

that may be tinged with gendered stereotypes and negative sentiment. For instance, girls wanting to navigate new feelings of romantic interest in peers may glean hypersexualized messaging from shows like *Big Mouth* or gendered stereotype messaging from coming-of-age novels that more closely associates female characters with more subordinate, domestic language. If these are the templates that girls rely on, than this can dramatically shape their visions of themselves in the future (Beal & Crockett, 2010; McAdams, 2001). In addition, the distress girls may feel surrounding menarche may be exacerbated or reified in shows like *Big Mouth* that represent this change as a physical event that is vaguely gross and must be endured. Both of these representations fundamentally fail to offer girls adaptive material to weave into their own narratives. An important next step in this research is to examine the relationship between media and girls' narratives of puberty more directly by having girls report the media that they primarily consume and analyze both whether gendered stereotypes or negative sentiment emerge in that media and whether those features can be traced through girls' narratives. Based on narrative identity research (e.g., Breen at al., 2017), we might expect this relationship to be meaningful and shape long-term narratives.

The intersections of Chapters 1 and 3 also offer unique insights into how different physical changes are viewed by girls. In both chapters, I examined how physical and social changes associated with puberty were talked about and represented (in Chapter 1 through girls writing about directed prompts in and Chapter 3 through targeted pointwise mutual information comparisons). One overlap that stands out is how similar the language of the television shows was to ways in which girls discussed physical changes related to breast development in Chapter 1. Both girls in their

135

narratives and the television shows discussed *shopping* when referencing bras, which highlights social salience around shopping to signify this pubertal change. The prospect of going bra shopping with mothers was often a source of excitement in the narratives of girls in Chapter 1, which was also reflected in *Big Mouth*. This excitement was not evident in discussion of other physical changes that also require new tools or materials be purchased such as buying tampons with the onset of menarche or buying a razor to address new hair growth. Girls did not voice similar enthusiasm or even mention shopping trips for razors or tampons in Chapter 1 narratives, and the single plot around buying tampons in *Big Mouth* was marked with confusion (e.g., what size to buy, how does it work).

One possibility is that bras mark an opportunity for girls to express themselves or try on different identities in a way that other puberty-necessitated tools do not. For example, experimenting with size of tampons is not the same because girls are not in control of how heavy their menstrual flow is. Conversely, regardless of breast size, bras offer a wide range of styles, fabrics, and colors that offer girls opportunities for self-expression. For example, girls who perceive themselves as athletes may identify with sports bra while girls who are excited to imitate models or actresses may opt for more lingerie-like bras. Further, popular stores like Victoria's Secret that specialize in bras may contribute to enthusiasm for bra shopping because they might offer a sense of group membership to girls or a kind of rite of passage. In contrast, shopping for menstrual products typically constitutes a trip down the hygiene aisle at the local drug store which may feel neither as glamorous nor special as a trip to Victoria's Secret. Future research should examine what modern "rites of passage" might look like to

youth in the present-day United States to better understand differences in psychological reactions to the different physical changes associated with puberty. In addition, future research should continue to mine the overlaps and discrepancies between what youth and media say about puberty for cultural insights.

In Chapter 2, I posited that the perceptions that adults have of youth at puberty can significantly impact their outcomes. While peers and parents certainly play a primary role in shaping the social environment and its consequences for youth, less relative empirical attention has been given to the role other adults in the social environment (teachers, neighbors, coaches, etc.) may play. Although I traced the roots of this idea through psychological theories like gender intensification (Hill & Lynch, 1983), this idea that differences in visible physical maturation in adolescence may result in differences in how youth are treated also maps onto intersectionality as discussed in the Preface. Just as we might expect intersections of race and gender to impact the ways in which youth interface with their social environments, we might also reasonably expect age to do the same. We see this threaded through everyday life in moments where physical size and maturation violate our expectations for the age period. This may happen in subtle ways that are relatively innocent (e.g., disbelieving that the physically imposing player on the opposing soccer team is the same age as your child) or more nefarious (e.g., a police officer treating a teenager like an adult because they look physically older than they actually are). This is also overtly codified in society through concepts like the age of majority (legal age of adult status; 18-years-of-age in the United States) in which youth are given new privileges and expectations for transitioning into a new social category of age (e.g., Zimring, 2013).

Although the scenarios tested in Chapter 2 did not yield a clear and consistent effects of maturation bias, there is still ample space for testing this phenomenon in different that vary in their ambiguity, severity, and setting. Effects of maturation bias may operate through cascading minor events as opposed to a single dramatic life event like being adjudicated in juvenile court. Future research should continue to explore maturation bias in tandem with race and gender since these social categories are likely interlocking and effects cannot be fully understood without each other (i.e., appearing older likely has different consequences for girls than it does boys and for Black youth than it does White youth).

What did emerge in Chapter 2 is that words may capture subtle biases that close-ended questions and variables do not. Effects of race, gender, and maturation appearance were all evident when examining statistical differences in how participants talked about youth. In conjunction with the methods and results from Chapter 3, these findings suggest that text analysis methods may help researchers uncover and trace biases in language that may otherwise be unclear at the overt level (Moscovici, 2000). Just as amplifying girls' words to speak to their own experiences of puberty and highlight the roots of issues that matter to them, amplifying and scrutinizing the words of surrounding adults and media may help further elucidate sites for change and intervention in adolescent research.

Distilled across these chapters is a sense that girls need more social support and menus of content when making sense of puberty. Given that parents are an important sources of narrative scaffolding for youth (Fivush, 2019), this support might look like increased presence of parents scaffolding physical and social change at

138

puberty for girls so that they can make meaning more adaptively. Such scaffolding would go beyond instrumental discussion of menstrual products and bras to more meaningfully to contextualize changes in social and personal identities. In addition, this social support might look like having adults in the local social environment appropriately grading their expectations to the realities of the chronological age of youth rather than their visual maturity level. Given findings about teachers' differential treatment of early maturing girls across time (Carter et al. 2017; Eccles et al.; 1995), this may mean testing the efficacy of age or maturation bias training; more work is needed to determine if similar interventions may be necessary in legal contexts. Finally, girls need more media selections that present positive, empowering content in regards to both physical change and unbiased representation of the kinds of identities, traits, and futures girls can have.

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General change prompt. I would like you to start today by writing about a specific experience that happened to you at puberty – a time that you can remember when you first realized that things might be changing. You may write about a conversation you had with someone else, when you started wearing a bra, when you received comments on your body by other people, when you got your first period, when you noticed that other people's bodies had changed and yours had not. These are just suggestions for a starting point. You can write about any aspect of puberty you want: <u>When was a significant and memorable time when you realized that you were changing?</u>

Changes with peers and friends prompt. You should be in a private place in the room to do your writing – someplace where you cannot be disturbed. Are you in that place? Today, I want you to continue writing about the changes of puberty and write specifically about <u>changes you have noticed in your relationships with other kids your age</u>. In what ways are your relationships different now than when you were younger? How do you feel about these changes? Why do you think they came about? When did you first notice these changes?

Are there any major conflicts or problems that you have experienced or are experiencing now? You can take your writing in any direction you want – these questions are just ways to help you start thinking – but be sure to explore your very deepest thoughts and feelings about the changes in your relationships with other kids.

Changes with parents and caregivers. You have written now for two days. You only have today and tomorrow to finish your writing. As with the first two days, I want you to really explore your deepest thoughts and feelings about puberty and the

changes that may have happened in your life because of puberty. Today you will be

writing about <u>changes you have noticed in your relationships with your parents or</u>

<u>guardians</u>.

In what ways is your place in your family different now that you are older?

What changes have come about as you have grown up? You can choose to write about

a specific instance – a conversation, a conflict, a memorable event – but please explore

your very deepest thoughts and feelings about changes in your relationships with your

parents or family members.

Physical changes prompt. You have completed the first three days, and today is the

last one. In your writing today, I again want you to explore your deepest thoughts and

feelings about puberty. Today you will write <u>about how you feel about your body and</u>

<u>the changes you may have experienced or will experience as you grow up</u>.

What do you think of these changes? Do you think other people have noticed these

changes? What do you think about your body's changes over time? You can write

about a specific event, conversation, conflict, or concern – just as long as you delve

into your deepest emotions and thoughts and consider <u>changes in your body.</u>

APPENDIX B

Developmental age baseline. These 8th grade students just competed in a district

debate between local middle schools. Please read the following statements from the

affirmative and opposition and decide which team you believe won the debate.

Figure A.1. The visual stimuli in the developmental age basline.

Topic: Television is a bad influence on children under the age of 13.

Affirmative's claim: "First, kids 13 and under might try to mimic what is on TV. If

they are watching bad things, they might also try to mimic those bad things. Second,

television is unhealthy because many kids snack while they are watching and therefore

could gain weight. Third, TV gets in the way of important things kids need to do, like

homework or reading. Finally, watching TV could get in the way of family and

friends. If you have no time to be social, what will you grow up to be?"

Opposition's rebuttal: "While my opponent argues that children might mimic the bad

things on TV, they could also mimic the many good things on TV. Shows like Sesame

Street tell children about healthy messages, and the Cookie Monster tells about how

cookies are a sometimes snack, not an always snack. They also said that TV provides

no health, but like I just said Sesame Street, and many shows, tell how to improve

your health and eat right. They said how there is no time for reading, but that is not

right. You do not watch TV all the time. Children have to do their homework, and

many children do do their homework. Finally, children will be able to contribute to

society because children 9-12 do watch the news and they learn things from news."

Variations of depicted youth.

Figure A.2. The eight variations of maturational level, race, and gender to depict the
youth presented in the referral and sentencing scenarios.

Referral scenario vignette.

You are inside a house in the neighborhood pictured above. You hear a loud

crack from outside and come out to investigate the source of the sound. Outside, you

see a boy who is wearing a school uniform (pictured). You recognize that the school

uniform is from the local middle school. He is very quickly zipping a backpack and

walking quickly away from your neighbor's car, which now has a smashed

windshield. Although you did not witness the moment when the windshield was

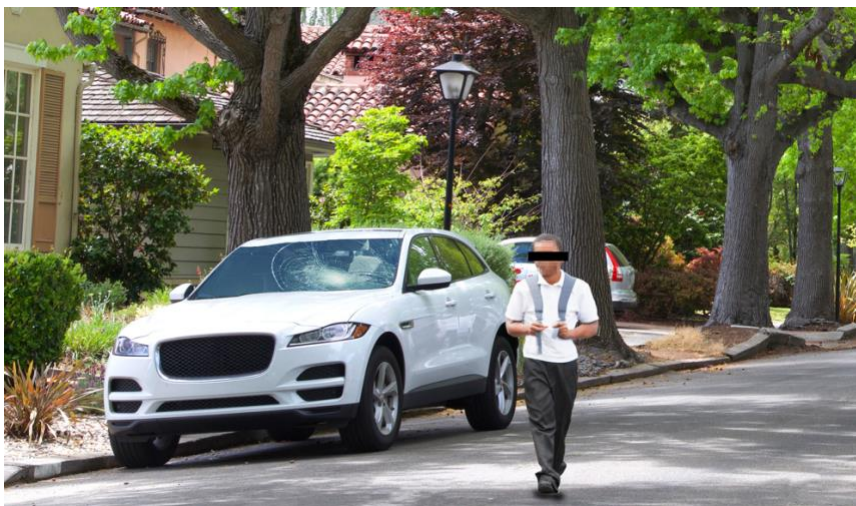cracked, you do not see anyone else in the area besides this boy.

Figure A.3. The visual stimuli in the referral scenario with the high maturation Black male condition depicted.

Sentencing scenario vignette.

J.M., a seventh-grade girl, recently vandalized a local department store which resulted in damage estimated around $1200. During the offense, J.M. deliberately broke clothing racks and drew in permanent marker on the store's retail signs. The store owner called the police to report the crime. The police found security footage of J.M. in the store moments before it was vandalized (pictured above). No other customer was in the store at the time of the incident, meaning that J.M. was the only individual who could have vandalized the store. The police took J.M. into custody. J.M. was adjudicated in juvenile court, and the judge found her guilty of one count of criminal mischief in the third degree (i.e., damage to property in an amount exceeding $250 but not more than $1500). In juvenile court, the punishment for criminal mischief in the third degree is typically community service. The average number of community service hours given for a sentence such as this is 100 hours.

You are now tasked with the responsibility of determining the appropriate

sentence for J.M. How many hours of community service should J.M. be required to

complete?

Figure A.4. The visual stimuli in the referral scenario with the high maturation Black female condition depicted.