

Blooming Sexuality

A Biopsychosocial Perspective on Adolescent Romantic and Sexual
Development

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Blooming Sexuality

A Biopsychosocial Perspective on Adolescent Romantic and Sexual Development

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Chapter 1

General Introduction

Adolescent romantic and sexual development

The attainment of satisfactory romantic and sexual relationships is a developmental task in adolescence (e.g., Carver, Joyner, & Udry, 2003; Collins, Welsh, & Furman, 2009; Crockett, Raffaelli, & Moilanen, 2003; Tolman & McClelland, 2011). One of the great myths about adolescent romantic and sexual relations is that they are short-lived, superficial, and unimportant (Collins, 2003). While, actually, romantic and sexual relations can have great meaning for adolescents' identity development and important implications for adjustment and health (Furman & Shaffer, 2003).

During adolescence, youth start spending more time with peers and the prevalence and intensity of these relationships increase (Laursen & Williams, 1997; Laursen & Collins, 2009; Zimmer-Gembeck, 2002). During this time, adolescents will often begin their first romantic relationships and start experimenting with sexual behavior (de Graaf, Kruijer, van Acker, & Meijer, 2012). Unfortunately, most research on adolescent sexuality has focused on sexual intercourse and "risks", with little attention or focus on common (non-coital) sexual behaviors such as kissing and petting that often precede sexual intercourse (de Graaf et al., 2012; Fortenberry, 2013; O'Sullivan, Cheng, Harris, & Brooks-Gunn, 2007). Also, an important influence on adolescent sexual development—a romantic relationship—is rarely included in current theories and empirical work on adolescent sexual development. A complete understanding of adolescent sexuality requires a focus on both sexual and romantic involvement (Fortenberry, 2013; Rostosky, Galliher, Welsh, & Kawaguchi, 2000).

Cross-sectional studies (e.g., de Graaf et al., 2012) among Dutch adolescents and young adults (aged 12-25 years old) have shown that Dutch youth have a relatively healthy romantic and sexual development. Table 1 shows several descriptives of Dutch adolescents' romantic and sexual experience taken from the Dutch Seks onder je 25e study in 2012 (de Graaf et al., 2012). These data show that in mid adolescence most have experience with romantic relationships, and many start experimenting with sexual behavior. Further, the first sexual intercourse occurs with a partner of around the same age, and usually in the context of a romantic relationship. Motives to engage in sexual intercourse range from curiosity to being in love (see Table 1). Although there are risks and potentially risky pathways during adolescence, most Dutch adolescents make responsible choices. Consequently, what follows are rather low teen pregnancy and STI/HIV rates among Dutch adolescents, compared to other Western countries.

Table 1
Romantic and Sexual Experiences Among Dutch Adolescents and Young Adults

	% Experience at 14–15 years old	
Being in love	90	
Romantic relationship	71	
	Average age at first...	
“French” kiss	14.4	
Petting and carressing	15.1	
Manual sexual experience	16.0	
Sexual intercourse	16.6	
Oral sexual experience	16.8	
	% Boys	% Girls
Context of first sexual intercourse		
Sexual partner around the same age	74	51
Involved in romantic relationship	66	80
Motives for first sexual intercourse		
Being in love	60	73
Having been in a relationship for quite some time	53	67
Arousal (horny)	73	49
Curious	60	58

Note. Data from *Seks onder je 25e 2012* (de Graaf et al., 2012, Tables 2.1, 2.3.4, and 2.4)

Although these statistics are important for giving an overview of Dutch adolescents’ romantic and sexual experiences, to date there has been little attention for individual and contextual predictors of romantic and sexual involvement. Moreover, because of the cross-sectional nature of many previous studies, developmental patterns cannot be inferred. Thus, studying the prevalence of romantic and sexual involvement is not sufficient—the individual characteristics of adolescents and the context they grow up in are vital in understanding these experiences.

In the past, many scholars studied adolescent sexuality or romantic involvement from a risk-perspective, and with a narrow definition of sexuality, often disregarding same-sex attractions (Fortenberry, 2013; Furman & Shaffer, 2003; Tolman & McClelland, 2011). The age range of the samples often only included late-adolescents and college students with only a few studies on early or pre-pubertal sexual development. Few studies went beyond “age at first intercourse” and even fewer asked questions about emotions, attitudes, or relational context.

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The research in the present dissertation was designed to address these and other gaps in the literature and draws on two key concepts recognized and defined by the World Health Organization (WHO; 2010):

Sexuality is defined as: "...a central aspect of being human throughout life encompasses **sex, gender identities and roles, sexual orientation, eroticism, pleasure, intimacy and reproduction**. Sexuality is experienced and expressed in **thoughts, fantasies, desires, beliefs, attitudes, values, behaviors, practices, roles and relationships**. While sexuality can include all of these dimensions, not all of them are always experienced or expressed. Sexuality is influenced by the interaction of **biological, psychological, social, economic, political, cultural, legal, historical, religious and spiritual factors**." [emphasis added in bold]

Sexual health is defined as: "...a state of **physical, emotional, mental and social well-being** in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a **positive and respectful** approach to sexuality and sexual relationships, as well as the **possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence**. For sexual health to be attained and maintained, the sexual rights of all persons must be respected, protected and fulfilled." [emphasis added in bold]

Thus, to examine the full scope of adolescent romantic and sexual development it is important to acknowledge the different aspects of sexuality (e.g., cognitions, behavior, relationships) and what constitutes sexual health (e.g., a positive and respectful approach; pleasure, free of coercion and discrimination; WHO, 2010). The definition of sexual health includes a reference to sexual experiences *free of discrimination and violence*. Unfortunately, however, members from sexual minority groups are found to have less access to safer and pleasurable sexual and romantic experiences. Many of these youth grow up in a context of rejection and negativity surrounding their sexual development. Insights from a better understanding of romantic and sexual development would enrich adolescent developmental research and provide a foundation of what healthy adolescent romantic and sexual development entails (Fortenberry, 2013).

Despite the long tradition of sexuality research in the Netherlands, much of the early Dutch research focused on risks or descriptive statistics, with little attention for transactional processes of individual characteristics such as personality and puberty and/or social contextual factors in relation to the development of romantic and sexual developmental trajectories. In the current dissertation this lacuna is addressed by studying the development of both sexual and romantic behaviors, cognitions, and well-being, among early, mid, late adolescents, and young adults, using a biopsychosocial approach.

Biopsychosocial approach to understanding adolescent romantic and sexual development

There are large individual differences in romantic and sexual development among adolescents—in timing, experience, and context. To examine predictors of adolescent romantic and sexual development a biopsychosocial perspective was adopted in the current dissertation. In this model, factors related to physical development (i.e., puberty), psychological factors, and the social environment that adolescents grow up in are examined.

- (1) The biological factors in the biopsychosocial model include among others pubertal development, genetic composition, and physiological characteristics (Petersen, 1987). Biological processes are assumed to be necessary in the physical functioning of the adolescent, and they can change over time, in part because of genetic and environmental influences (Newman & Newman, 2006).
- (2) The psychological aspects in the biopsychosocial model include mental processes that aid in the meaning making of experiences and subsequent actions (Newman & Newman, 2006). Factors include personality, emotion, and self-concept. These individual factors are reciprocally related to social contextual factors such as peer group involvement, family, and media (Lindau, Laumann, Levinson, & Waite, 2003).
- (3) The contextual or social environmental factors include processes that link a person to society (Newman & Newman, 2006). These social processes can include media, social roles, culture, familial roles and relations, but also patterns of discrimination and prejudice. Similar to biological and psychological processes, social process are developmental and can change over the life span. In particular during adolescence, social roles and relations can change when adolescents move from a parent-focused to a peer-focused context.

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With the biopsychosocial approach we aim to understand the individual in a social context (Bronfenbrenner, 1979), as well as the reciprocal nature between adolescents' behavior and their social environment (e.g., Bandura, 1977; 1994; Sameroff, 1995).

During adolescence, the mutually reciprocal relations between biological, psychological, and sociocultural processes are particularly pronounced and adaptive processes are particularly strained (Hamburg, 1974; Schneirla, 1957). Further, many developments (physical, psychological, and social) occur in sync with one another—for example, adolescents experience physical changes brought on by puberty, engage in new and larger peer groups, and mature into young adults emotionally and cognitively (Petersen, 1987). In sum, this approach, during this period, offers an understanding of the “conditions under which individual functioning contributes to, constrains, or is influenced by the adolescent’s psychosocial functioning” (Lerner & Foch, 1987, p. 3).

In the current dissertation, the presence of these factors, and the transactions between them were used to predict romantic and sexual development, and general health and well-being of adolescents and young adults. Figure 1 provides an illustration of the biopsychosocial model (Bronfenbrenner, 1979; Olsen & Sameroff, 2009). Here, the individual factors (biological and psychological) are expected to be reciprocally related to environmental factors and also expected to be directly related to outcomes of adolescent development. Further, biological and psychological factors may be reciprocally related. For example, an early pubertal development may impact psychological adjustment (Mendle & Ferrero, 2012; Mendle, Turkheimer, & Emery, 2007). Environment may act as a mediator/moderator in this relation, or directly impact adolescent outcomes.

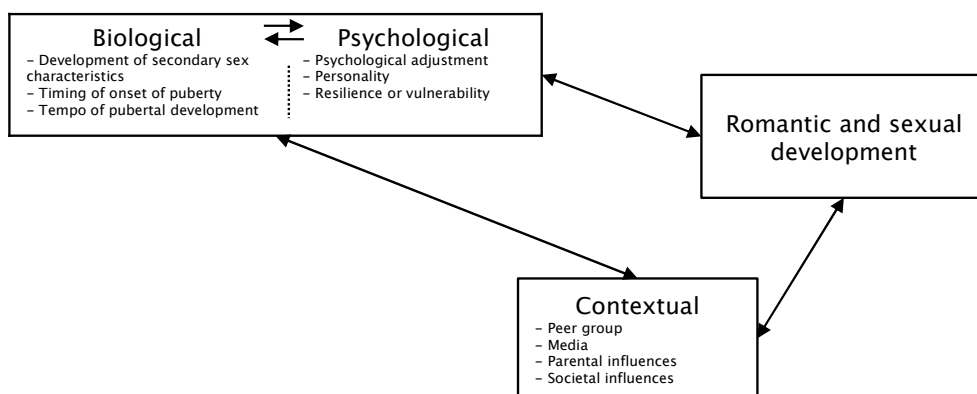


Figure 1. The biopsychosocial model that is used in the current dissertation. Model was adapted from Petersen (1987).

Goals of this dissertation

The research studies in the current dissertation are divided into three major sections each addressing different aspects of the biopsychosocial model. In the first part of this dissertation the focus is on individual characteristics pertinent to adolescent development in relation to romantic and sexual involvement, for this we considered puberty and personality. In the second part, research is presented that focused on the transactional processes between individuals and their environment. Here, the role of peers and media in relation to individual factors was addressed. The final, third part of this dissertation focuses on sexual minority adolescents and young adults. Considering that many sexual minority youth develop their sexuality and romantic interests in a context of negativity from peers, parents, and society, these contextual influences on their health and well-being were examined.

Part 1: Biological and psychological factors in romantic and sexual development

Adolescence is characterized by developments in hormone levels, appearance, self-consciousness, and cognitive flexibility (Blakemore & Choudhury, 2006; Lerner & Steinberg, 2009). Adolescence is also a vulnerable period, in part because it is linked to biologically-based changes in neural systems of emotion and motivation (Blakemore, Burnett, & Dahl, 2010), that are linked to increases in risk taking and sensation seeking (Dahl, 2004). These physical, hormonal, and social changes are interrelated and have a presence in adolescents' social lives. With the start of the first physical changes, many adolescents become aware of their own sexuality (if they were not already before). The visible physical changes elicit responses from peers, teachers, and parents. Girls may suddenly be told to wear a towel when walking from the shower to their bedroom. Early maturing boys may stand out in the locker room, and some may receive attention from older peers.

Although an association between pubertal development and sexuality seems evident, there are several methodological issues and gaps in the research that have made it difficult to generalize findings to all or even most adolescents (Fortenberry, 2013). First, the operationalization of pubertal status and timing is often not reported in empirical studies, unclear in its description, or simply incorrect (Dorn & Biro, 2011). Second, in addition to conceptual and measurement issues in puberty research, the focus often lies on girls, to the neglect of boys' pubertal and sexual development (Dorn & Biro, 2011). Third, although previous research has suggested important differences in age and ethnicity, these different relations have not been quantified and therefore the magnitude of these relations is not clear.

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Fourth, the measurement of sexual behavior is often limited to sexual intercourse status or age at first sexual intercourse, limiting the ability to generalize findings to non-coital behaviors and less experienced adolescents.

To conclude, previous research has shown the importance of pubertal development in sexual behavior. However, it is currently unclear what the magnitude of the relation between pubertal status, pubertal timing, and sexual (risk) behavior of adolescents is. Further, it is unknown whether these relations differ for boys and girls, adolescents of different ages, or by ethnic group. Thus, the first purpose of the present dissertation was to study the link of pubertal status and timing with adolescent sexual (risk) behavior, across genders, ages, and ethnic groups. In this dissertation, this was addressed in a meta-analysis (reported in Chapter 2) with the following research question:

- (1) *Are pubertal timing and status related to sexual (risk) behavior, and how are these relations moderated by gender, age, and ethnicity?*

In addition to pubertal development, individual differences in personality are also important for understanding adolescent romantic and sexual development. Decades of research have shown that personality is an important factor in how children thrive or prosper in life. Some personality characteristics can be beneficial. Extraversion for example (as one of the Big Five dimensions), has been linked to having more friends (Selfhout, Burk, Branje, Denissen, van Aken, & Meeus, 2010), and to job performance in adulthood (Barrick & Mount, 1991). Low emotional stability on the other hand (or high neuroticism) has been linked to negative outcomes such as depressive symptoms (Yang, Chiu, Soong, & Chen, 2008). Personality types, derived from personality dimensions, have also been related to social outcomes such as shyness and sociability (Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001; Denissen, Asendorpf, & Van Aken, 2008; Scholte, Van Lieshout, De Wit, & Van Aken, 2005). The three most commonly used personality types are: undercontrolling, overcontrolling, and resilient (Asendorpf et al., 2001). Considering the role of personality in positive and negative aspects of peer relations, it seems logical to extend the impact of these personality types to romantic and sexual relations.

Previous research has shown that the Big Five personality dimensions and personality types derived from these, are related to sexual development in both adolescents and adults (e.g., Atkins, 2008; Hoyle, Fejfar, & Miller, 2000; Miller et al., 2004; Schmitt, 2004). Among adults, extraversion is related to more sexual behavior and more risky sexual behavior (Eysenck, 1976). Further, conscientiousness is related to lower levels of risky sexual behavior (Hoyle et al., 2000), while emotional instability (neuroticism) is seen as a predictor of lower levels of sexual behaviors—

possibly because these individuals will shy away from socially intimate contacts (Eysenck, 1976). Among adolescents, the only study in which personality types have been related to adolescent sexual risk behavior, found that overcontrolling adolescents engaged in less sexual risk behavior (Atkins, 2008).

Thus, previous research has shown that personality is a potentially important factor in adolescent sexual development but there are few studies on adolescents. Thus, the second goal of this dissertation was to investigate whether personality dimensions and types were associated with a wide array of adolescent sexual behaviors including sexual experiences, casual sexual behavior, and risky sexual behavior. Thus, the second research paper (reported in Chapter 3) addresses the question:

(2) *Is personality (dimensions and types) related to adolescent sexual development?*

Part 2: The role of peers and media in romantic and sexual development

Overall, many characteristics related to popularity (that is, social dominance, extraversion, and attractiveness) are related to having more opportunities for relationships and sexual contacts (Carlson & Rose, 2007; Friedlander, Connolly, Pepler, & Craig, 2007; Ivanova, Veenstra, & Mills, 2012; Kim & Smith, 1999; Lam, Shi, Ho, Stewart, & Fan, 2002; Prinstein, Meade, & Cohen, 2003; Stroud & Davila, 2008). However, especially for girls, being involved in romantic and sexual relations can also decrease popularity among peers (Kreager & Staff, 2009; Prinstein et al., 2003), possibly because sexuality among adolescent girls is devalued (Reiss, 1960). To examine the role of contextual factors in adolescent romantic and sexual development, in part two of this dissertation, together with individual characteristics, the role of adolescent's popularity, their friendship networks, and their sexualized media consumption in relation to romantic and sexual development is assessed.

One of the characteristics that is suggested to be beneficial for adolescent sexual and romantic opportunities, is social status (Ha, Overbeek, & Engels, 2010; Ha, van den Berg, Engels, & Lichtwarck-Aschoff, 2012), which is thought to be related to an early pubertal timing, especially among boys (Jones & Mussen, 1963; Mussen & Jones, 1963). More specifically, an early pubertal timing is thought to make boys more physically attractive, thus mate-value or social status has been suggested to explain the relation between pubertal development and romantic and sexual involvement for boys (James et al., 2012; Weisfeld, 1999). In contrast, early maturing, young adolescent girls are thought to "stand out" in comparison to their same-sex peers and their other-sex peers. Their physical maturation is thought to

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elicit negative self-feelings, and often does not (yet) attract others (Jones & Mussen, 1963).

Whether peer-perceived popularity mediates the relation between pubertal development and romantic and sexual involvement, and whether these relations are different for boys and girls is currently unknown. The third purpose of this dissertation was to address this lacuna. This led to the following research question, elaborated in Chapter 4:

- (3) *Are pubertal timing and tempo related to changes in romantic and sexual behavior of early adolescents, and can these relations be explained by popularity?*

The second contextual factor examined is the role of adolescent's friendships. Considering the increasingly important role that peers and friends play during adolescence, and the importance of peer norms and cognitions about sexuality (Ali & Dwyer, 2011; Van de Bongardt, Reitz, Sandfort, & Deković, in press), it is vital to examine how peers play a role in adolescent sexual development. Personality has been related to peer processes and sexual behavior, thus it is surprising that these three factors have not been investigated in prior research. Previous work has shown that young adults tend to seek out friends who are similar in the Big Five personality dimensions extraversion, openness, and agreeableness. Further, those high on extraversion tend to select more friends, and those high on agreeableness tend to be preferred as friends and are selected more often as friends (Selfhout et al., 2010). What is currently unknown, however, is whether adolescents select friends based on their own or other's sexual intention and behavior, and how this functions in relation to adolescent's personality.

In sum, from previous studies the role of personality and peers in sexual development has become clear. However, whether personality can attenuate or strengthen the role of peers in sexual development is currently unknown. Therefore, the fourth purpose of this dissertation was to study adolescents sexual development in a peer-context, and factors that may alter the impact, such as personality. This has led to the following research question, presented in Chapter 5:

- (4) *Do adolescents select friends based on sexual behavior and intention in a social network? Are these relations moderated by personality?*

Sexual attitudes in the context of media.

In the last decade, media has been coined a “super-peer” (Brown, Halpern, & L’Engle, 2005), and researchers have suggested that adolescents now spend more time with media than ever before (e.g., Bleakley, Hennessy, & Fishbein, 2011; Strasburger, 2012; Strasburger, Donnerstein, & Bushman, 2014). Considering the pervasiveness of sexual messages and images in today’s media, it is important to consider media’s role in adolescent sexual development.

Adolescents have a tendency to imitate behaviors they see, either in peers or in media (social cognitive theory, Bandura, 1977; 1994). However, the selective exposure hypothesis (e.g., Festinger, 1957; Zillman & Bryant, 1985) and the media practice model also describe that adolescents are active agents in selecting the media they wish to see or engage in (Brown, 2000). Perhaps those adolescents with more permissive sexual attitudes seek out media that confirms these attitudes—thus a reciprocal relation between sexualized media and permissive sexual attitudes could be expected.

It is important to consider that not all adolescents will be influenced by the media in the same way. One factor that has been proposed as increasing the impact of media is perceived realism—the degree to which someone perceives what they encounter in the media as realistic. Higher levels of perceived realism have been found to increase the impact of aggressive video games on aggression (Haridakis & Rubin, 2003; Huesmann, Moise-Titus, Podolski, & Eron, 2003). However, whether perceived realism functions as a moderator of the reciprocal relation between sexualized media consumption and permissive sexual attitudes is not yet known.

In the current dissertation, the fifth purpose was to study media’s impact on permissive sexual attitudes and the active selection of sexualized media based on existing attitudes. Further, the degree to which adolescents find sexualized media realistic was investigated. The purpose of Chapter 6 was to examine the relation between sexualized media consumption and permissive sexual attitudes, and the role of perceived realism:

- (5) *Are sexualized media consumption and permissive sexual attitudes reciprocally related across time and is this relation moderated by perceived realism?*

Part 3: Sexual minority youth: Health and well-being

Sexual identity development is an important part of adolescence. As romantic and sexual interests become more salient, many adolescents will become aware of same-sex attractions (de Graaf et al., 2012). However, for sexual minority individuals, finding a romantic or sexual partner may be more challenging. They have fewer opportunities to interact with same-sex attracted peers (Mustanski, Birkett, Greene, Hatzenbuehler, & Newcomb, 2014), and engaging in same-sex relations may put them at risk of experiencing rejection and discrimination (Diamond, Savin-Williams, & Dubé, 1999). Unfortunately, much of the research and theories on romantic and sexual relationships assume that adolescents are heterosexual, and that they move from same-sex peer groups to an involvement with other-sex peers. These perspectives will often include a disclaimer for same-sex attracted adolescents, but do not offer much insight beyond the existing theories.

The HIV epidemic, starting in the 1980s, has made research among sexual minority individuals focus on risks and risky behavior, and unfortunately, few researchers have moved beyond this. It is thought that because of the long history of pathologizing sexual minority individuals, many scholars still work with a disease model. Although this model has worked in the identification of mental health disparities, it often fails to address normative development and the identification of potential positive factors. Fortunately, in the past few years some researchers have moved from problematizing sexual minority identities, to focusing on the risks of discrimination and inequality. The focus now lies on the impact of contextual stressors such as discrimination, rejection, and violence in response to one's actual or perceived sexual identity—as opposed to viewing sexual minority individuals as inherently impaired.

Although acceptance and equal rights of gay, lesbian and bisexual (LGB) individuals in the Netherlands is good compared to other Western countries (Kuyper, Iedema, & Keuzenkamp, 2013), there are still areas that can be improved (Keuzenkamp & Kuyper, 2013). Dutch LGB adolescents experience rejection, bullying, and violence in response to their sexual orientation (Bucx, Sman, Jalving, 2014; Keuzenkamp & Kuyper, 2013). Further, Dutch LGB adolescents are found to report higher rates of suicidal ideation and suicide attempts compared to general adolescent samples (Herba et al., 2008; Van Bergen, Bos, van Lisdonk, & Sandfort, 2013).

The minority stress model

The research papers included in this dissertation on sexual minority individuals (Chapters 7 and 8) were framed by the minority stress model (Meyer, 2003). Minority stress is described as the unique stressors that LGB individuals are confronted with, above and beyond the daily stressors that any individual can experience (Meyer, 2003). In numerous studies, the experience of minority stress has been used as an explanation for mental and physical health disparities (Kuyper & Fokkema, 2011; Kuyper & Vanwesenbeeck, 2011; Meyer, 2003). Recently, experiences of stigmatization have even been found to predict life-long health disparities and a shorter life-span (Hatzenbuehler, Bellatorre, Lee, Finch, Muennig, & Fiscella, 2014). Only a few studies have examined the mechanism through which minority stress can impact well-being. Minority stress disrupts emotion-regulation strategies resulting in rumination and social isolation and through this causes psychological distress (Hatzenbuehler, 2009). It is important to move beyond the direct relation between minority stress and well-being, by incorporating potential explanatory mechanisms. As such, the interpersonal psychological theory of suicide (Joiner et al., 2009) has given more insight into these relations.

Interpersonal psychological theory of suicide

In the interpersonal psychological theory two concepts are described as predicting depression and suicidal ideation: perceived burdensomeness and thwarted belongingness. Perceived burdensomeness is described as the perception of being a burden to others and has been linked to suicidal ideation and behavior (Hill & Pettit, 2012; Joiner et al., 2002; Van Orden, Lynam, Hollar, & Joiner, 2006). Because sexual minority individuals have been suggested to feel like a burden to their friends and family (Diaz, 1998; Diaz, Ayala, Bein, Henne, & Marin, 2001), this concept may offer some understanding of mental health disparities among this group. The second concept that is important in the interpersonal psychological theory is thwarted belongingness—“the sense that one does not belong” (Joiner, 2005, p. 117). This is described as social isolation from a community, peers, and family (Joiner et al., 2009; Ribeiro & Joiner, 2009) and has also been related to suicidal risk (Hill & Pettit, 2012; Roberts, Roberts, & Chen, 1998). For sexual minority adolescents in particular, thwarted belongingness is thought to be more prominent due to experiences of bullying and rejection (e.g., Kosciw, Greytak, Bartkiewicz, Boesen, & Palmer, 2012). Abusive experiences have been shown to help habituate to pain and lower resistance to self-injury, and it also facilitates low self-worth and alienation (Joiner, 2005). Thus, for sexual minority individuals, the minority stress model may offer a description of abusive and rejecting messages and experiences and its link to suicidality and depression.

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In the existing literature very little is known about the mechanism that may explain the relation between minority stress and mental health among LGB adolescents and young adults. No research has examined whether the link between minority stress (the most used model to explain health disparities) and depression and suicidal ideation might operate through the experience of perceived burdensomeness and thwarted belongingness. The interpersonal psychological theory may offer relevant insight. Thus, the sixth purpose of this dissertation was to examine the relation between minority stress and depression and suicidal ideation, and whether this relation could be explained by the concepts of the interpersonal psychological theory—perceived burdensomeness and thwarted belongingness. The following research question was answered in Chapter 7:

- (6) *Is minority stress related to depression and suicidal ideation among LGB youth, and can this relation be explained by perceived burdensomeness and thwarted belongingness?*

Same-sex romantic relationships

Although sexual minority youth often experience minority stress from their peers or parents, more recently, scholars have started investigating resilience and protective factors in adolescent development (Russell, 2005). Research has shown that supportive parents, peers, and a positive school environment can protect youth from the impact of minority stress (e.g., Eisenberg & Resnick, 2006; Goodenow, Szalacha, & Westheimer, 2006; Hershberger & D’Augelli, 1995; Ryan, Russell, Huebner, Diaz, & Sanchez, 2010). However, what has not been researched is whether being involved in a same-sex relationship may protect youth from the impact of minority stress. Unfortunately, research on the function of same-sex romantic relationships among youth is scarce (Mustanski et al., 2014). Some research has suggested that engaging in same-sex relations could “out” sexual minority youth, and put them at risk of rejection and discrimination (Frost & Meyer, 2009; Heinze & Horn, 2014), others have suggested that it may support them in their identity development and increase resilience (Diamond et al., 1999; Glover, Galliher, Lamere, 2009). Although romantic and sexual development are developmental tasks during adolescence, research on same-sex relationships—their effects and function—is lacking. Considering that a romantic relationship may offer support and protect adolescents against the impact of minority stress, the seventh purpose of this dissertation (presented in Chapter 8) was to examine the potentially protective role of a same-sex relationship in the relation between minority stress and psychological well-being:

- (7) *Does being involved in a romantic relationship protect same-sex attracted youth from the impact of minority stress on psychological well-being?*

Current dissertation

To answer the abovementioned research questions, data were used from several survey studies and by reviewing studies in a meta-analysis. A more detailed description of each sample is provided in the respective chapter. Here a brief overview of the different studies and methodological practices used in the dissertation is presented along with an outline of the subsequent chapters (see also Table 2).

Research samples

Meta-analysis (Chapter 2). A total of 50 English language, peer-reviewed empirical studies were included in a meta-analytic review to examine the relation between pubertal status, timing, and sexual (risk) behavior, and the role of age, gender, and ethnicity.

SEXual development of Youths (SEXY) (Chapters 3 and 6). A total of 408 Dutch adolescents participated in four measurement waves. Adolescents were recruited from seven high schools throughout the Netherlands and filled out an extensive survey at school. The goal of this study was to examine adolescent sexual development among mid-adolescents.

Studies on Trajectories of Adolescent Relationships and Sexuality (Project STARS) (Chapters 4 and 5). This four-wave longitudinal study among 1297 Dutch adolescents was undertaken in eight elementary schools and four high schools throughout the Netherlands (Dekovic et al., 2010). The aim of Project STARS was to examine adolescent romantic and sexual development and the role of individual, peer, family, and media use characteristics.

Risk and Protective Factors for Suicide among Sexual Minority Youth study (Chapter 7). For this chapter data from an ongoing longitudinal project among U.S. LGBTQ youth (aged 15 to 21 years old) was examined. We used the first panel from this five-panel study and examined suicidality among LGB youth. The aim of this study was to examine risk and protective factors for suicidal ideation and behavior among sexual minority youth in the U.S.

Homosexuality and the Internet (Chapter 8). For this study 309 Dutch same-sex attracted youth and young adults completed a cross-sectional online survey study (Baams, 2009; Baams, Jonas, Utz, Bos, & van der Vuurst, 2011). The goal of this study was to examine minority stress, online behaviors, and social support among Dutch same-sex attracted youth and young adults.

Chapter 1

Outline

The empirical chapters in this dissertation are divided into three parts. In the first part of this dissertation, individual factors were related to adolescent sexual development. **Chapter 2** presents a meta-analysis on the different types of operationalizing of pubertal development, specifically pubertal timing and status, their relation to sexual (risk) behavior, and differences by age, gender, and ethnicity. **Chapter 3** presents a study on sexual experience, casual sexual behavior and risky sexual behavior across personality types among mid adolescents. In the second part, transactional processes in the development of romantic and sexual behavior were examined. **Chapter 4** describes a study on pubertal timing and tempo in relation to romantic and sexual behaviors among early adolescents and how these relations may be explained by popularity. In **Chapter 5**, the focus was on the friend-context and the study examines whether friendship networks are based on adolescents' sexual intention and behavior, and whether this is moderated by personality characteristics. **Chapter 6** presents a study on the relation between sexualized media consumption and permissive sexual attitudes, and the moderating role of perceived realism is assessed. In the third part of this dissertation the studies included lesbian, gay, and bisexual or same-sex attracted adolescents and young adults and the impact of minority stress was examined. In **Chapter 7**, the relations between minority stress and psychological well-being were assessed and the role of thwarted belongingness and perceived burdensomeness was examined. **Chapter 8** presents a study in which the relation between minority stress and psychological well-being was assessed, and the potentially protective function of being involved in a romantic relationship was examined. Finally, in **Chapter 9** the collective results of the empirical studies are discussed and an extension of the biopsychosocial model is presented along with suggestions for future research.

Table 2
Description of Studies Included in this Dissertation

Chapter	Data-source	Predictors	Outcomes	Moderators	Mediators	Covariates	Method / Analyses
Part 1: Biological and psychological factors in romantic and sexual development							
2	Meta-analysis	Pubertal status Pubertal timing	Sexual behavior Risky sexual behavior	Gender Age Ethnicity	--	--	Meta-analysis
3	SEXY	Personality	Sexual experience Casual & Risky sexual behavior	--	--	Pubertal timing Gender	LCA / LGM
Part 2: The role of peers and media in romantic and sexual development							
4	Project STARS <i>11-13 yrs old subsample</i>	Pubertal timing Pubertal tempo	Romantic involvement Sexual involvement	Gender	Popularity	--	LGM Model indirect
5	Project STARS <i>waves 1-3</i>	Friendship network	Sexual behavior Sexual intention	Personality	--	--	RSiena
6	SEXY <i>waves 1-3</i>	Sexualized media consumption	Permissive sexual attitudes	Perceived realism Gender	--	--	Multigroup Parallel LGM
Part 3: Sexual minority youth: Health and well-being							
7	U.S. LGBTQ youth	Minority stress	Depression Suicidal ideation	Sexual identity Gender	Perceived burdensomeness Thwarted belongingness	--	Multigroup Model indirect
8	Homosexuality and Internet	Minority stress	Psychological well-being	Romantic relationship status	--	Gender Age Same-sex attraction	Regression analysis

Part 1:
Biological and psychological
factors in romantic and sexual
development

*“Every person is like all other persons, like some other persons,
and like no other person”* – Kluckhohn and Murray

Chapter 2

Transitions in body and behavior: A meta-analytic study on how pubertal status and timing are related to adolescent sexual behavior

The current meta-analysis aimed to study the relations of pubertal timing and status with sexual (risk) behavior among youth aged 10.5-24 years old. We included biological sex, age, and ethnicity as potential moderators. Four databases were searched for studies (published between 1980 and 2012) on the relation between pubertal timing or status and sexual behavior. The outcomes were a) sexual intercourse, b) combined sexual behavior, and c) risky sexual behavior. The results showed that an earlier pubertal timing or more advanced pubertal status was related to earlier and more sexual behavior, and earlier pubertal timing was related to more risky sexual behavior. Further, the links between (1) pubertal status and combined sexual behavior, (2) pubertal timing and sexual intercourse status and risky sexual behavior were stronger for girls than for boys. Most links between pubertal status, timing, and sexual (risk) behavior were stronger for younger adolescents. Moderation by ethnicity did not yield consistent results. In conclusion, there was significant variation in results among studies that was not fully explained by differences in biological sex, age, and ethnicity. Future research is needed to identify moderators that explain the variation in effects and to design sexual health interventions for young adolescents.

This chapter was based on "Transitions in body and behavior: A meta-analytic study on how pubertal status and timing are related to adolescent sexual behavior" by Baams, L., Dubas, J. S., Overbeek, G., & van Aken, M. A. G. Revise & Resubmit. *Journal of Adolescent Health*.

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Recent perspectives on adolescent development views sexual development as a normative task of this life phase (e.g., Crockett, Raffaelli, & Moilanen, 2003). However, the early initiation of sexual behavior has also been linked with increased risk for unwanted pregnancies, sexually transmitted infections and depression (e.g., Mendle & Ferrero, 2012; Mendle, Turkheimer, & Emery, 2007). Given the obvious link between pubertal development and sexual reproduction capacity, the onset of puberty has been associated with the initiation of sexual desires and behavior. Less clear is to what degree pubertal development is related to sexual activity and whether early pubertal development is particularly problematic for the development of risky sexual behavior.

Although qualitative reviews have shown support for the relationship between pubertal timing and the age at sexual debut and risky sexual behaviors, no meta-analytic review exists that quantifies the magnitude of this relationship or that explains variation in results across studies.

Moreover, while most studies focus on whether (vaginal) sexual intercourse has occurred, sexual development consists of a broad range of physical behaviors besides intercourse including such activities as kissing, petting, and oral sex. Therefore, the primary objective of the current meta-analysis is to examine and quantify the association between pubertal status and timing with age-normative and risky coital and non-coital sexual behaviors.

Not only do studies vary in terms of the sexual behaviors examined, but there is also substantial variation in how pubertal status and timing are assessed. Pubertal status is most often measured using (1) Tanner scale ratings made by trained professional of adolescent pubic hair development (males and females), and breast development (females) or penis and testicular development (males) (2) adolescent self-report of these characteristics using photographs or line drawings, or (3) questionnaire measures of pubertal characteristics (growth spurt, acne, pubic hair, menarche, voice change). Pubertal timing is often assessed using (4) adolescent self-report of age at growth spurt, age at first ejaculation or voice change (males), or age at menarche (females), (5) age adjusted measures of pubertal status or (6) adolescent self-perceptions of whether their pubertal development is early, on-time or late. There is moderate consistency across these different methods but the degree to which adolescents rate themselves as more or less developed than their peers might not just reflect their physical development but might also reflect the degree to which they feel psychologically or behaviorally more mature (Dubas, Graber, & Petersen, 1991; Dorn & Biro, 2011; Moore, Harden & Mendle, 2014). Therefore, the second objective is to compare whether the magnitude of the association between pubertal development and age-normative and risky sexual behaviors depends on how pubertal development was assessed.

Drawing from a developmental systems approach we also explore whether the associations are moderated by characteristics of adolescents (age, sex, and ethnicity). First, boys and girls show different patterns of pubertal development (Herman-Giddens et al., 1997) and these differences are also seen in the effects on social status and well-being. Early maturing girls are found to have more internalizing problems (Mendle et al., 2007) while early maturing boys are found to gain a higher social status (James et al., 2012; Mussen & Jones, 1963) and higher self-esteem (Simmons, Blyth, Van Cleave, & Bush, 1979). We therefore examine whether the effects of pubertal status and timing on (risky) sexual behavior are different for boys and girls.

Second, as adolescents move from a parent- to a peer-focused context during adolescence (Laursen & Collins, 2009), they are faced with more opportunities to engage in intimate and sexual behavior. The effects of puberty on adolescents' sexual development may therefore be stronger at younger ages, particularly in risky sexual behavior, because younger adolescents may not have the social and cognitive skills to engage in safer sexual behavior. However, stronger effects may be found in older adolescents because they are less restricted by parents.

Third, research has shown several inconsistent racial and ethnic differences in pubertal (e.g., Kaplowitz, Slora, Wasserman, Pedlow, Herman-Giddens, 2001; Herman-Giddens et al., 1997) and sexual development (Cavanagh, 2004; Zimmer-Gembeck & Helfand, 2008). For the current study we were only able to examine differences in the associations between pubertal development and sexual (risk) behavior between Black or White adolescents because most studies only reported the correlations for the overall sample, or only reported percentage of Black and White adolescents. This was limited to four relations: pubertal status and pubertal timing with and sexual intercourse status; pubertal timing with combined sexual behavior; and age at menarche with age at sexual intercourse.

The current study

Although initially our intention was to study differential effects of pubertal development on a range of sexual behaviors, most studies have examined either only sexual intercourse or have lumped together several sexual behaviors. Therefore, we have made the distinction between three sexual behavior categories: 1) sexual intercourse status (had sexual intercourse or not) and age at first sexual intercourse, 2) combined sexual behavior, which includes measures that are not exclusively about sexual intercourse (to examine whether the inclusion of sexual intercourse in the measure would moderate the effect we added this as a moderator), and 3) sexual risk behaviors such as a combined measure of sexual risk behavior, unwanted pregnancy, contracting sexually transmitted infections (STIs) or HIV, non-condom/contraception use, and drug/alcohol use during sex. With this

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meta-analysis, we answer the following questions: Within the research literature published between 1980 and 2012, are pubertal timing and status related to (risky) sexual behavior? If related, is this relation moderated by how pubertal development is assessed or age, sex, and ethnicity?

Method

Sample of studies

We searched four electronic databases (Scopus, Medline, Web of Science, and Psycinfo) using variations and Boolean connections of the key terms *pubertal development*, *menarche*, *spermarche*, *spermatogenesis*, *breast development*, *andrenarche*, *gonadarche*, *oogenesis*, *adolescents*, and *sexual behavior*. To supplement these searches, we searched reference lists of reviewed studies and contacted key authors in the field. To be included in the meta-analysis, studies had to be: (a) published in a peer-reviewed, English language journal; (b) empirically examine and report the relation between pubertal development and adolescents' (risky) sexual behaviors; (c) be published between January 1980 and December 2012; and (d) include adolescents with a mean age no older than 24 years old.

Information extracted from each study included: (1) age, sex, and/or ethnicity of sample; (2) pubertal development measure(s); (3) sexual behavior measure(s); and (4) effect size. Thirty percent of the studies were independently coded by two coders (including the first author). Intra-rater reliability was good (correlations ranged from .68 to .99). Any inconsistencies in the coding were checked by another independent coder and reconciled. Data were entered into SPSS 20.0 and analyzed with the SPSS macro (Lipsey & Wilson, 2000).

First, effect sizes were calculated or recoded using the Pearson product-moment correlation (r) such that higher r values indicated a stronger relation between pubertal status or timing, and (risky) sexual behavior. If a study reported results on group-differences (t , F , or odds/risk ratio), their results were converted to r (Lipsey & Wilson, 2000). Second, all r values were converted to Fisher's Z (Zr). Third, for each effect size we calculated a relative weight for Zr , taking into account sample size. To yield an interpretable overall effect size, the weighted mean effect size was then converted back to r .

Pubertal development

Pubertal status. Several studies included self-report occurrences of physical pubertal events (e.g., first spontaneous nocturnal emission, menarche, Tanner drawings (Marshall & Tanner, 1969, 1970), Pubertal Development Scale (Petersen, Crockett, Richards, & Boxer, 1988), Index of Adolescent Development, or ratings of

physical maturity by coders (Siebenbruner, 2007) as markers of adolescents' pubertal status.

Pubertal timing. Most studies used a self-report measure of adolescents' perceptions of pubertal timing (i.e., "Is your pubertal development early or late compared to peers?"), age at menarche, or the PDS adjusted for age. We analyzed studies using age at menarche separately from the other studies.

Sexual development

Sexual intercourse. All studies used a self-report measure of either age at first sexual intercourse or sexual intercourse status.

Combined sexual behavior. Several self-report measures were used to assess behaviors other than sexual intercourse. These measures include self-reports of non-coital sexual behavior such as petting, kissing, caressing, and oral sex, but also self-reports of behavior that is not exclusively non-coital, such as impulsive sexual behavior. Age at first sexual behavior included measures of age at first sexual arousal and age at first sexual experience.

Risky sexual behavior. Measures of risky sexual behavior included questions about unwanted pregnancy, contracting STIs/HIV, non-condom/contraception use, and drug/alcohol use during sex. Some studies included a measure of risky sexual behavior that comprised multiple risky behaviors. The number of studies examining different categories of risky sexual behavior measures was too small to analyze separately.

Moderators

Age. For age we included the mean age of the sample, if not reported we took the mean age of the reported range of ages.

Sex. Studies were classified according to the sex composition of the sample: a) boys, b) girls, and c) mixed. In our moderator analyses we used dummy variables (boys versus girls; mixed versus girls; and mixed versus boys) to compare the different samples.

Ethnicity. For ethnicity we included the percentage of "Black" adolescents in the sample if this was reported. If, in a study, it was reported that a sample was 100% White, this was coded as zero percent Black.

Data analyses

To examine the homogeneity of effects across studies we assessed the Q statistic. This statistic indicates to what extent effect sizes differ between studies (Lipsey &

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Wilson, 2000), indicating the need to examine moderators if significant. We analyzed the data using fixed effect models and random effects models. Because the current meta-analysis includes small samples of effect sizes, we only report the fixed effect model results. We examined sex, age, and ethnicity of the sample as potential moderators in the relation between pubertal status or timing and (risky) sexual behavior. The moderation analyses yielded Betas that when significant indicate an interaction between the moderator and predictor (pubertal status or timing) in their effect on the sexual behavior outcomes.

Results

Description of studies: Overview of included studies

Initially, 70 studies were found. In total, 50 independent studies met the inclusion criteria, with a total of 112 effect sizes. Table 1 presents the included studies across the separate meta-analyses. Samples included a total of 87,498 adolescents (min = 41, max = 5700). The mean ages of the adolescents in these studies ranged from 10.5 to 24 years, with an overall mean of 15.19 years ($SD = 3.04$). Of the included effect sizes, 51 were all girl samples, 32 all boys samples, and 29 were mixed samples. Of these, most ($k = 71$) were from the USA, see Table 1.

Results of the separate meta-analyses

In what follows, we describe the effects that emerged from our meta-analysis, and whether the effect sizes varied according to pubertal timing measure, sex, age, and ethnicity of the sample (see Tables 2 and 3 for statistics on the overall effect size and heterogeneity analyses). For discontinuous moderators (sex) we report the effect size per group; for continuous moderators we report the overall effect size of the moderator (age and ethnicity).

Table 2
Omnibus Q-Statistics for the Separate Meta-Analyses

	<i>N</i>	<i>Q</i> omnibus	<i>df</i>	<i>p</i>	<i>k</i>	<i>ES</i>	<i>95%CI</i>
Pubertal status							
Age at sexual intercourse ^a	2494	--	--	--	1	.11	--
Sexual intercourse status ^{ab}	1242	--	--	--	1	.19	--
Sexual intercourse status	7239	9.93	4	.042	5	.20	[.18, .22]
Combined sexual behavior	6065	1279.12	12	< .001	13	.42	[.39, .44]
Age at combined sexual behavior	601	5.04	2	.081	3	.17	[.09, .25]
Risky sexual behavior	240	0.09	1	.770	2	.05	[-.07, .18]
Pubertal timing							
Sexual intercourse status	28050	165.42	18	< .001	19	.14	[.13, .15]
Age at sexual intercourse	2355	18.42	6	.005	7	.21	[.17, .25]
Combined sexual behavior	9610	62.29	18	< .001	19	.14	[.12, .16]
Age at combined sexual behavior	702	2.72	3	.437	4	.10	[.03, .18]
Risky sexual behavior	9809	130.31	9	< .001	10	.16	[.14, .18]
Age at menarche							
Age at sexual intercourse	7779	79.21	12	< .001	13	.21	[.19, .23]
Sexual intercourse status	4212	31.99	4	< .001	5	.15	[.11, .18]
Combined sexual behavior	4982	4.37	3	.225	4	.10	[.08, .13]
Risky sexual behavior	2118	192.49	5	< .001	6	.51	[.48, .54]

^a We were unable to test heterogeneity of effect sizes because only one study could be included for this analysis. ^b This category includes the link of menarcheal status and sexual intercourse status, but has been categorized under pubertal status.



Table 3
Moderating Effects of Gender, Age, and Ethnicity for the Different Meta-Analyses

	Moderator						
	Boys(0) vs. Girls(1)	Mixed(0) vs. Girls(1)	Boys(0) vs. Mixed(1)	Age ^a	Ethn. ^b	PT ^c	Coital ^d
Pubertal status							
Age at sexual intercourse ^e	--	--	--	--	--	--	--
Sexual intercourse status ^{ef}	--	--	--	--	--	--	--
Sexual intercourse status	--	--	ns	ns	-.95**	--	--
Combined sexual behavior	.11**	-.61***	1.65***	-.50***	--	--	ns
Age at combined sexual behavior ^g	--	--	--	--	--	--	--
Risky sexual behavior ^g	--	--	--	--	--	--	--
Pubertal timing							
Sexual intercourse status	.40***	ns	.60***	ns	ns	.25*	--
Age at sexual intercourse	ns	--	--	.76***	--	ns	--
Combined sexual behavior	ns	.97***	ns	.29*	ns	ns	ns
Age at combined sexual behavior ^f	--	--	--	--	--	--	--
Risky sexual behavior	.73***	--	--	-.43***	--	ns	--
Age at menarche							
Age at sexual intercourse	--	--	--	-.28*	.38**	--	--
Sexual intercourse status	--	--	--	-.63***	--	--	--
Combined sexual behavior ^b	--	--	--	--	--	--	--
Risky sexual behavior	--	--	--	-.15*	--	--	--

Note. ns = not-significant, $p > .05$. * $< .05$ ** $< .01$ *** $< .001$. Dashes represent moderator analyses that could not be tested due to lack of variance or non-report of moderator. Ethn. = ethnicity. PT = Pubertal timing measure. Coital = combined sexual behavior measure includes coital or does not include coital behaviors. ^a Positive values indicate stronger relations for older youth. Negative values indicate stronger relations for younger youth. ^b Positive values indicate stronger relations for samples with a higher percentage of Black adolescents. Negative values indicate stronger relations for samples with a lower percentage of Black adolescents. ^c 0 = perceived pubertal timing, 1 = objective pubertal timing. ^d 0 = exclusively non-coital, 1 = coital. ^e We were unable to test moderation effects because only one study could be included for this analysis. ^f This category includes the link of menarcheal status and sexual intercourse status, but has been categorized under pubertal status. ^g We were unable to test moderator effects because there was no heterogeneity in effect sizes.

Pubertal status and (risky) sexual behavior

Sexual intercourse. There was only one study that examined the link between pubertal status and age at sexual intercourse (Johnson & Tyler, 2007) and another that studied the link between menarcheal status and sexual intercourse status (Vanoss Marín et al., 2000). Both studies found a significant positive association between status and sexual intercourse (ES = .11 and ES = .19, respectively). No further analyses were conducted.

We were able to conduct a meta-analysis on 5 effect sizes that examined the link between pubertal status and sexual intercourse status. As expected, pubertal status was positively associated with intercourse status (ES = .20). That is, adolescents who are more advanced in pubertal development were more likely to have had intercourse. There was significant heterogeneity in effect sizes. Moderator analyses revealed that ethnicity moderated these effects. The link between pubertal status and intercourse status was weaker for samples with a higher percentage of Black adolescents.

Combined sexual behavior. With a meta-analysis on 13 effect sizes that examined the link between pubertal status and combined sexual behavior we found a positive association (ES = .42). As expected, adolescents who are more advanced in pubertal development were more likely to be engaged in sexual behavior. There was significant heterogeneity in effect sizes. Moderator analyses revealed that sex and age moderated these effects. The link between pubertal status and sexual behavior was stronger for girls (ES = .72; 95% CI [.69, .74]), compared to boys (ES = .48; 95% CI [.44, .51]), and compared to mixed-sex samples (ES = .19; 95% CI [.15, .22]). Further, moderation by age showed that the link between pubertal status and combined sexual behavior was stronger for younger samples. There was no moderation by type of combined sexual behavior (coital or non-coital).

There were only three effect sizes that examined the link between pubertal status and age at combined sexual behavior. These effect sizes showed a significant positive association (ES = .17). That is, adolescents who are more advanced in pubertal development engaged in combined sexual behavior at a younger age. There was no significant heterogeneity in effect sizes—therefore, no further analyses were conducted.

Risky sexual behavior. There were only 2 effect sizes that examined the link between pubertal status and risky sexual behavior—these showed a significant positive association (ES = .05). Adolescents with a more advanced pubertal development engaged in more risky sexual behavior. There was no significant heterogeneity in effect sizes.

Pubertal timing and (risky) sexual behavior

Sexual intercourse. With a meta-analysis on 19 effect sizes that examined the link between pubertal timing and sexual intercourse status we found a positive association ($ES = .14$). As expected, adolescents with an early pubertal timing were more likely to be engaged in sexual intercourse. There was significant heterogeneity in effect sizes. Moderator analyses revealed that sex moderated these effects. The link between pubertal timing and sexual intercourse status was stronger for girls ($ES = .17$; 95%CI [.15, .19]), compared to boys ($ES = .11$; 95%CI [.09, .13]), and stronger for mixed-sex samples ($ES = .18$; 95%CI [.14, .21]) compared to boys. Further, moderation by pubertal timing measure showed that the link between pubertal timing and sexual intercourse status was stronger for studies that used an objective pubertal timing measure ($ES = .15$, 95%CI [.13, .17]) compared to a perceived pubertal timing measure ($ES = .13$; 95%CI [.11, .15]).

With a meta-analysis on 7 effect sizes that examined the link between pubertal timing and age at sexual intercourse we found a positive association ($ES = .21$). As expected, adolescents with an early pubertal timing engaged in sexual intercourse at a younger age. There was significant heterogeneity in effect sizes. Moderator analyses revealed that only age moderated these effects. The link between pubertal timing and age at sexual intercourse was stronger for older adolescents. There was no moderation by pubertal timing measure.

Combined sexual behavior. With a meta-analysis on 19 effect sizes that examined the link between pubertal timing and combined sexual behavior status we found a positive association ($ES = .14$). As expected, adolescents with an early pubertal timing engaged in more sexual behavior. There was significant heterogeneity in effect sizes. Moderator analyses revealed the link between pubertal timing and combined sexual behavior was stronger for girls ($ES = .29$; 95%CI [.18, .39]) compared to mixed-sex samples ($ES = .15$; 95%CI [.12, .17]), and stronger for older adolescents. There was no moderation by type of combined sexual behavior (coital or non-coital) and no moderation by pubertal timing measure. There were only 4 effect sizes (from one study; Meschke, & Silbereisen, 1997) that examined the link between pubertal timing and age at first personal sexual experience. We categorized this under combined sexual behavior because it was unclear whether this included sexual intercourse. These effect sizes showed a significant positive association ($ES = .10$). That is, adolescents with an early pubertal timing were more likely to engage in their first sexual experience at a younger age. There was no significant heterogeneity in effect sizes.

Risky sexual behavior. With a meta-analysis on 10 effect sizes that examined the link between pubertal timing and risky sexual behavior status we found a positive association ($ES = .16$). As expected, adolescents with an early pubertal timing

engaged in more risky sexual behavior. There was significant heterogeneity in effect sizes. Moderator analyses revealed that the link between pubertal timing and risky sexual behavior was stronger for girls (ES = .25; 95%CI [.21, .26]) compared to boys (ES = .07; 95%CI [.04, .10]), and stronger for younger adolescents. There was no moderation by pubertal timing measure.

Age at menarche and (risky) sexual behavior

Sexual intercourse. With a meta-analysis on 13 effect sizes that examined the link between age at menarche and age at sexual intercourse we found a positive association (ES = .21). As expected, adolescents with a younger age at menarche engaged in sexual intercourse at a younger age. There was significant heterogeneity in effect sizes. Moderator analyses revealed that the link between age at menarche and age at sexual intercourse was stronger for younger adolescents, and for samples with a higher percentage of Black adolescents.

There were only 5 effect sizes that examined the link between age at menarche and sexual intercourse status. As expected, we found a positive association that showed that adolescents with a younger age at menarche were more likely to have engaged in sexual intercourse (ES = .15), with significant heterogeneity in effect sizes. Moderator analyses revealed that the link between age at menarche and sexual intercourse status was stronger for younger adolescents.

Combined sexual behavior. Only 4 effect sizes examined the link between age at menarche and combined sexual behavior—these showed a significant positive association (ES = .10). Adolescents with a younger age at menarche were more likely to engage in combined sexual behavior. Of these effect sizes none included intercourse in their combined sexual behavior measures. There was no significant heterogeneity in effect sizes.

Risky sexual behavior. Only 6 effect sizes examined the link between age at menarche and risky sexual behavior. As expected, we found a positive association that showed that adolescents with a younger age at menarche were more likely to engage in risky sexual behavior (ES = .51). There was significant heterogeneity in effect sizes. Moderator analyses revealed that the link between age at menarche and risky sexual behavior was stronger for younger adolescents.

Discussion

With the current study we show the first meta-analytical results of the relation between pubertal development and adolescent sexual behavior. Our results indicated that adolescents who developed relatively early, and adolescents who were further developed, engaged in earlier, more, and more (risky) sexual behavior.

Moderation of the relation between puberty and (risky) sexual behavior

Although all effect sizes were in the expected direction, the heterogeneity in all but four relations underline that although all adolescents go through puberty, and will most likely experience sexual interests it remains important to study for whom puberty has stronger or different effects.

The current meta-analysis showed that the links of pubertal status and timing with (risky) sexual behavior were more pronounced in girls. The effect of pubertal status on combined sexual behavior showed a strong effect for girls, but only a moderate effect for boys. The effect of pubertal timing on risky sexual behavior was moderate for girls, and only small for boys. This suggests a different mechanism by which puberty is related to sexual development.

Further, the moderation by age showed stronger effects for *younger* adolescents for the links between pubertal status with combined sexual behavior, pubertal timing with risky sexual behavior, and age at menarche with age at sexual intercourse, sexual intercourse status, and risky sexual behavior. The links of pubertal timing with age at sexual intercourse and combined sexual behavior were stronger for *older* adolescents. It should be noted that the difference in effects on combined sexual behavior could not be accounted for by the difference in coital and non-coital sexual behaviors. Overall, the results showed that especially among young participants, (risky) sexual behavior was affected by a more advanced pubertal status, earlier pubertal timing, and a younger age at menarche, perhaps because young adolescents are not as capable to handle potentially risky situations (Ge & Natsuaki, 2009) at least in part because of a delay in the development of the cognitive control system of the brain (Dahl, 2001; Steinberg, 2007). This notion is strengthened by the idea that when adolescents engage in sexual behavior at young ages they tend to engage in more risky behaviors (Waylen & Wolke, 2004). Together with our meta-analytic findings on risky sexual behavior among early maturing and younger adolescents, this emphasizes the need for early interventions to prevent pregnancy and STIs/HIV.

Moderation by ethnicity showed inconsistent findings. For pubertal status measures that reflect thelarche, adrenarche, and gonadarche stronger links for White adolescents are found, whereas for the later-occurring menarche stronger effects for Black girls are found. The difference between pubertal status and age at menarche is important to consider because this indicates that pubertal status may show a combined effect of the development of several secondary sex characteristics, whereas menarche is the final stage of girls' pubertal development and an indicator of gonadarche. These findings indicate ethnic differences in the magnitude of the link between pubertal development and sexual development, but

also that research needs to disentangle the effects of thelarche, adrenarche, and gonadarche. Unfortunately, we were only able to include percentage of Black adolescents in the samples and there are insufficient numbers of cross-national studies that use similar pubertal development measures or that focus on similar sexual outcomes. In addition to potential ethnic differences within countries there are differences between countries in contextual controls and the culture around pubertal and sexual development that may impact the results (Schalet, 2000).

Finally, we examined the difference in pubertal timing measures as a moderator. For the link between pubertal timing and sexual intercourse status, we found that the effect of pubertal timing was stronger when an objective measure of pubertal timing was used than when a perceived pubertal timing measure was used. This finding highlights the importance of the way pubertal timing is assessed. Considering that many studies used a *perceived* measure of pubertal timing—which constitutes an individuals' interpretation of experiences during puberty (Moore et al., 2014)—the effects on sexual (risk) behavior may be underestimated and the mechanism that can potentially explain the relation may be different.

Pubertal status versus pubertal timing

With the current meta-analysis we can conclude that both pubertal status and timing are important predictors of non-coital and coital sexual behavior, and of risky sexual behavior. However, because there is great variability in age, sex, and the pubertal timing and status measures, we cannot conclude whether pubertal status or timing is a stronger predictor of sexual (risk) behavior. Further, in young samples both age and pubertal status are confounded, and pubertal status and timing are confounded—those with an earlier pubertal timing have moved through more stages of pubertal development (which would indicate a more advanced pubertal status). In contrast, those with a later pubertal timing have not moved through as many stages and are thus categorized as having a less advanced pubertal status. Considering these confounds, it is difficult to interpret unique effects of pubertal status and timing, from general age-related changes (Steinberg, 1987). Moreover, recent research has shown the importance of studying the rate of pubertal development (pubertal tempo) in relation to sexual development (Mendle, 2014). In sum, because studies on pubertal development often combine several physical changes (such as pubic hair and breast development, or pubic hair and growth spurt) into one pubertal status or timing measure, regardless of their biological basis it is unclear what the instigator of these changes (McClintock & Herdt, 1996) is, and thus what spurs on sexual development, at what age, and for whom. Although our review confirms the effects of pubertal status and timing on sexual (risk) behaviors it remains vital that

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the unique contribution of the various components of puberty to adolescent sexual development among boys and girls be studied.

Gaps in the literature

Our analysis focused on the direct association between puberty and sexual behavior and many of the studies also included a number of other individual (personality, attractiveness) and social factors (dating partner status, peer group) and yet surprisingly few have focused on whether these factors moderate or mediate the link between pubertal development and sexual behavior. While pubertal development × individual or contextual models have been developed (Ge & Natsuaki, 2009) and tested for mental health and substance use, these models have not been used when investigating the link between pubertal development and sexual behavior.

Further, although few studies have examined the relation between pubertal development and sexual (risk) behavior among boys, research has shown the association between pubertal development and a variety of psychological and behavioral outcomes among boys (Mendle & Ferrero, 2012).

Finally, research on puberty and sexual risk often does not include the actual health outcomes as a measure, rather it includes risky behaviors that have potentially negative outcomes. More research including measures of sexual health (e.g., pregnancy, the occurrence of STIs/HIV) is necessary to advance the field of adolescent sexual health.

Strengths and limitations

With the current meta-analysis we were able to quantify the effects of pubertal development on sexual (risk) behavior with a large number of participants and across a wide range of ages. The studies included in this meta-analysis have several limitations that are important to note. The measurement of pubertal development and sexual behavior was solely by (retrospective) self-report, which can be biased (Coleman & Coleman, 2002; Dorn & Biro, 2011). Further, many studies do not clearly report the pubertal development measure nor do studies report whether they controlled for sex or age in their measure or analyses. In addition, many studies lump together several sexual behaviors in one measure, or disregard beginning sexual behaviors (e.g., kissing, petting). This makes it difficult to study pubertal development in relation to age-normative sexual behaviors.

Future research and implications

Our findings point to a need for continued research into the relation between pubertal development and adolescent sexual development. The current meta-

analysis suggests that puberty affects boys and girls differently, or that the environment reacts differently to the physical changes. In order to extend these findings studies need to incorporate contextual factors such as reactions from peers, the romantic context of sexual behavior, availability of sexual health care, and media exposure to tease apart the effects and interaction of the biological and social contexts. Research including potentially risky and protective factors will provide a better understanding of adolescent sexual development and provide potentially important information for education programs and interventions.

Conclusions

Our findings underline the important role of an early transition to reproductive maturity for the onset and timing of age-normative and risky sexual behavior that is stronger for girls than for boys. Adolescents who develop earlier relative to their peers engage in more risky sexual behaviors. In order to study adolescent sexual development with a developmental systems approach, hormonal, genetic, and environmental factors need to be included.

Table 1
Included Studies and Characteristics

	Puberty measure	Sexual behavior measure	Sex of sample	Mean age	Country	Ethnicity	<i>N</i>	<i>r</i>
Sexual intercourse								
(1) Arim et al., 2011	Pubertal timing relative to peers based on PDS	Intercourse status	(1) Boys	13	Canada	--	3700	0.03
(2) Benson et al., 1995	Timing of age at menarche or first semen release	Virginity loss (yes/no)	(2) Girls 50% Boys; 50% Girls	13	USA	33% Black 45% Hispanic 27% White	3564 307	0.265 0.318
(1) Brown et al., 2006	Pubertal timing relative to peers	Sexual intercourse status (yes/no) at follow up (2 yrs later)	50% Boys; 50% Girls	13.7	USA	(1) 100% Black	526	0.22
Bingham et al., 1990	Age at menarche	Age at first sexual intercourse	Girls	17	USA	--	1717	0.17
(2) Campbell et al., 2005	Pubertal status based on secondary sexual characteristics, first erection, and first spontaneous nocturnal emission Age at menarche	Intercourse status	Boys	15	Zimbabwe	(2) 100% White 100% Black	491 437	0.08 0.089
(1) Cavanagh, 2004	Age at menarche	Sexual intercourse status	Girls	13.88	USA	(1) 100% White	882	0.20
(2) Crockett et al., 1996	Pubertal timing relative to peers of the same age and gender	Timing of first intercourse (early, middle, or late)	(1) Girls	16.5	USA	(2) 100% Latina --	149 166	0.40 -0.059
(2) Deardorff et al., 2005	Age at menarche	Age at first sexual intercourse	(2) Boys Girls	20.5	USA	13.8% Black 31.4% Latina 28.7% Non-Hispanic white 23.9% Native 2.0% Other	123 666	-0.035 0.27
	Puberty measure	Sexual behavior measure	Sex of sample	Mean	Country	Ethnicity	<i>N</i>	<i>r</i>

				age				
(1) Deppen et al., 2012	(1) Perception of pubertal timing (on-time vs. early) on time is reference group	Sexual intercourse before age 16	Girls	18	Switzerland	17.5% parental non-Swiss origin	890	0.20
(2)	(2) Perception of pubertal timing (on-time vs. late) on time is reference group						778	0.31
Durant et al., 1990	Age of menarche	Engaging in premarital coitus	Girls	17	USA	100% Hispanic	202	0.25
Edgardh, 2000	Menarche < 11 years, or 11 years	Coitarche < 15 years; Coitarche > 15 years	Girls	17	Sweden	--	712	0.21
Edgardh, 2002	Pubertal timing assessed with early puberty (first ejaculation before age 13)	Intercourse status	Boys	17	Sweden	13% Immigrant background	647	0.19
Felson & Haynie, 2002	Pubertal status assessed with PDS items on pubic hair; facial hair; and voice changes. Items were summed.	Sexual intercourse (yes/no)	Boys	14,4	USA	54% White	5700	0.20
Gaudineau et al., 2010	Early menarche (before 11yrs old)	Sexual intercourse before 15yrs old	Girls	15	France	--	1072	0.20
Johnson & Tyler, 2007	Pubertal status assessed with status question for boys and menarche onset question for girls	Age at first sexual intercourse	52% Boys; 48% Girls	12.59	USA	--	2494	0.11
Kahn et al., 2002	Age at menarche	Age at first sexual intercourse	Girls	20.4	USA	59% White 12% Black 13% Hispanic 9% Asian 7% other	504	0.16
Kim & Smith, 1999	Age at menarche	Age at first sexual intercourse	Girls	19.5	UK	--	228	0.34

	Puberty measure	Sexual behavior measure	Sex of sample	Mean age	Country	Ethnicity	N	r
(1) Khurana et al., 2012	Pubertal status assessed with Tanner drawings (boys: genitals and body hair; girls: breast and pubic hair)	(1) Intercourse status	48% Boys; 52% Girls	14.4	USA	55% Non-Hispanic White 28% Non-Hispanic Black 9% Hispanic	347	0.26
(2)		(2) Intercourse status 1 yr later						0.26
Koo et al., 2012	Pubertal status (boys: questions about body and voice change; girls: questions about breast development and body hair).	Intercourse status	45.1% Boys; 54.9% Girls	10.5	USA	99% African American	408	0.26
(1) Kuzman et al., 2007	(1) Age at menarche; On time compared to early	Sexual intercourse before 16yrs old.	Girls	15.5	Croatia	--	656	0.190
(2)	(2) Age at menarche; Late compared to early						284	0.310
(1) Kvaalem et al., 2011	Pubertal timing relative to peers at wave 1	Coital onset at wave 2 (2 yrs later)	(1) Boys	14	Norway	--	1246	0.09
(2)			(2) Girls			--	1343	0.04
(3)	Pubertal timing relative to peers at wave 2	Coital onset at wave 3 (5 yrs later)	(3) Boys	15.6		--	598	0.025
(4)			(4) Girls			--	662	0.035
(1) Lam et al., 2002	(1) Age at first emission (first conscious ejaculation)	Sexual intercourse (yes/no)	Boys	16	Hongkong	--	1905	0.12
(2)	(2) Age at menarche		Girls				1907	0.06
Vanoss Marín et al., 2000	Menarcheal status	Sexual intercourse (yes/no)	Girls	11.5	USA		1242	0.19
(1) Meschke et al., 2000	(1) Age at menarche	Age at first sexual intercourse (< age 16; age 16+; inexperienced)	Girls	16.5	USA	100% White	268	0.28
(2)	(2) Age at growth spurt		Boys	16.5			157	0.12

	Puberty measure	Sexual behavior measure	Sex of sample	Mean age	Country	Ethnicity	N	r
(1) Michaud et al., 2006	(1) Pubertal timing relative to peers; Early vs average	Sexually active	Girls	18	Switzerland	--	2771	0.177
(2)	(2) Pubertal timing relative to peers; Late vs average						2314	0.133
(3)	(3) Pubertal timing relative to peers; Early vs on time		Boys				3359	0.163
(4)	(4) Pubertal timing; relative to peers; Late vs on time						3018	0.153
Miller et al., 1997	Age at menarche	Age at first sexual intercourse	Girls	20.5	USA	29.7% Black	386	0.06
Neberich et al., 2010	Age at menarche	Age at first sexual intercourse	Girls	24	Germany	--	381	0.17
(1) Ostovic & Sabini, 2005	Pubertal timing assessed with ages at several pubertal development events	Intercourse status	(1) Girls	24	USA	58.8% White 27% Asian or Asian-Indian 4.3% Black 3.2% Hispanic 6.7% Other	141	0.06
(2)			(2) Boys				124	0.12
Part et al., 2011	Pubertal timing assessed with ages at menarche and spermatarche	Intercourse status	46.9% Boys; 53.1% Girls	15.5	Estonia	--	959	0.17
(1) Phinney et al., 1990	Age at menarche	Age at first sexual intercourse	Girls	17	USA	(1) 100% Black	581	0.288
(2)						(2) 100% Non-black	1253	0.17
Rosenthal et al., 2001	Age at menarche	Age at initial sexual intercourse	Girls	14	USA	78% Black 22% White	143	0.660
(1) Rosenthal et al., 1999	Physical development timing (less or about as mature as peers vs. more mature than peers)	Timing of sexual intercourse (early or late initiator)	(1) Boys	16.6	Australia	--	94	0.20
(2)			(2) Girls				147	0.16

	Puberty measure	Sexual behavior measure	Sex of sample	Mean age	Country	Ethnicity	N	r
Spencer et al., 2002	Pubertal timing assessed with ages at several pubertal development events	Intercourse status	43% Boys; 57% Girls	13	USA	84% White 16% Black	375	0.14
Combined sexual behavior								
(1) Brown et al., 2006	Pubertal timing relative to peers	Precoital sexual activity (kissing–oral sex) at follow up (2 yrs later)	50% Boys; 50% Girls	13.7	USA	(1) 100% Black	526	0.22
(2)						(2) 100% White	491	0.08
(1) Campbell et al., 2005	Pubertal status based on secondary sexual characteristics, first erection, and first spontaneous nocturnal emission	(1) Light petting	Boys	15	Zimbabwe	100% Black	397	0.189
(2)		(2) Heavy petting					414	0.122
(1) Flannery et al., 1993	Pubertal status (Tanner line drawings)	Sexual experience (kissed–intercourse)	(1) Boys	13.5	USA	78% Caucasian parents 15% Hispanic parents	376	0.51
(2)			(2) Girls				397	0.53
(1) Hipwell et al., 2010	Onset of menarche at age 11 (yes/no)	(1) None vs moderate sexually intimate behavior At age 12	Girls	11.58	USA	54.8% African American 39% European American 6.2% multiethnic or belonging to another ethnic group	604	0.18
(2)		(2) Mild vs moderate sexually intimate behavior At age 12					581	0.08

	Puberty measure	Sexual behavior measure	Sex of sample	Mean age	Country	Ethnicity	N	r
(1) James et al., 2012	Pubertal maturation (combined measure incl PDS) at time 1 (grade 6)	Timing of sexual debut at time 7 (grade 12) Average of first sexual encounter, and first sexual intercourse.	Girls	11.86	USA	82% European American 14% African American 4% other	129	0.33
(2)			Boys	13.86	Hongkong	--	109	0.17
(1) Lam et al., 2002	Age at first emission (first conscious ejaculation)	(1) Kissing	Boys	16			1912	0.11
(2)		(2) Caressing					1908	0.11
(3)	Age at menarche	(3) Kissing	Girls				1905	0.10
(4)		(4) Caressing					1892	0.09
(1) Meschke & Silbereisen, 1997	Pubertal timing compared to peers	Age at first personal sexual experience	Girls	16.5	Germany	(1) West-Germany	227	0.060
(2)						(2) East-Germany	128	0.210
(3)			Boys			(3) West-Germany	242	0.060
(4)						(4) East-Germany	105	0.160
(1) Miller et al., 1998	PDS Pubertal timing (standardized)	Sexual behavior (held hands-intercourse)	(1) Boys	152	USA	95% White	152	0.17
(2)			(2) Girls	169			169	0.13
(1) Negriff et al., 2011	(1) Tanner breast/genital at wave 1	Sexual activity summed across eleven activities at wave 1	53% Boys; 47% Girls	11	USA	38% African american 39% Latino 12% Bi-racial 11% Caucasian	454	0.23
(2)	(2) Tanner pubic hair at wave 1							0.2
(3)	(3) PDS at wave 1	Sexual activity summed across eleven activities 1 yr later						0.09
(4)	(4) Tanner breast/genital at wave 1							0.23
(5)	(5) Tanner pubic hair at wave 1							0.2

	Puberty measure	Sexual behavior measure	Sex of sample	Mean age	Country	Ethnicity	N	r
(6)	(6) PDS at wave 1	Sexual activity summed across eleven activities 2 yrs later						0.12
(7)	(7) Tanner breast/genital at wave 1							0.09
(8)	(8) Tanner pubic hair at wave 1							0.06
(9)	(9) PDS at wave 1							0.08
(1) Ostovic & Sabini (2005)	Pubertal timing assessed with ages at several pubertal development events	Age at first sexual arousal	(1) Girls	24	USA	58.8% White 27.0% Asian or Asian-Indian 4.3% Black 3.2% Hispanic 6.7% Other	135	0.470
(2)	Pubertal status at age 13 assessed with Tanner line drawings	Sexual behavior (oral and/or coital) at age 15	(2) Boys	24	USA	90% European American 4% African American 2% Asian American 2% Hispanic 2% Native American	119	0.460
(1) Price et al., 2009			(1) Girls	13			127	0.15
(2)	Age at pubertal onset	(1) First homosexual sexual experience (2) First heterosexual sexual experience	(2) Boys	20.9	USA	--	110	0.23
(1) Savin-Williams, 1995 (2)			Boys					71
							41	0.07

	Puberty measure	Sexual behavior measure	Sex of sample	Mean age	Country	Ethnicity	N	r
(1) Smith et al., 1985	(1) Pubic hair stage assessed with Tanner drawing.	Sexual behavior (kissing-intercourse)	Girls	13.5	USA	100% White	433	0.934
(2)	(2) Estrogen development assessed with a Tanner drawing of breast development and three items assessing perception of breast and hip development, and general "curviness".							0.544
(3)	(3) Pubertal status measured by ten items		Boys				378	0.873
Van Ryzin (2011)	Physical maturity assessed with two items on body hair and skin changes	Sexual experimentation (items on kissing - touching below the waist summed)	52% Boys; 48% Girls	14	USA	88% Euro-American 7% mixed ethnic background 2% Hispanic 1% African American	363	0.11
(1) Van Zalk et al., 2011	Pubertal status assessed with a partial PDS	(1) Lifetime intercourse frequency (no-several times) wave 1	52% Boys; 48% Girls	14	Sweden	13% 1 st born immigrant 12.5% 2 nd born immigrant	750	0.18
(2)		(2) Lifetime intercourse frequency (no-several times) wave 2						0.21
(3)		(3) Impulsive sexual behavior (sleeping on the first night) wave 1						0.14
(4)		(4) Impulsive sexual behavior (sleeping on the first night) wave 2						0.21

	Puberty measure	Sexual behavior measure	Sex of sample	Mean age	Country	Ethnicity	N	r
Risky sexual behavior								
Aruda, 2010	Age at menarche	Condom-use	Girls	18	USA	36% Hispanic & 50.2% Black 17% White 4% American indian 0.3% Asian 22% Other	305	0.562
Belsky et al., 2010	Age at menarche	Risky sexual behavior at age 15	Girls	12.5	USA	82% White 12% Black 6% Hispanic	526	0.25
(1) Boden et al., 2011	Age at menarche	(1) Pregnant by age 18	Girls	13.5	New Zealand	--	497	0.73
(2)		(2) One or more STI by age 18						0.63
Durant et al., 1990	Age at menarche	Contraceptive behavior	Girls	17	USA	100% Hispanic	85	0.25
(1) Halpern et al., 2007	Pubertal timing relative to peers	Sex for drugs or money	(1) Boys	13.5	USA	79% White 14% Black 7% Other	1879	0.025
(2)			(2) Girls				2239	0.330
(3)		Combination sex and drug use	(3)Boys				1879	0.129
(4)			(4) Girls				2239	0.210
(1) Marceau et al., 2011	(1) Tanner pubic hair	Risky sexual behavior	Boys	15.5	USA	100% White	326	0.03
(2)	(2) Tanner genital development						326	0.04
(3)	(3) Tanner pubic hair		Girls				340	0.05
(4)	(4) Tanner breast development						343	0.04

	Puberty measure	Sexual behavior measure	Sex of sample	Mean age	Country	Ethnicity	<i>N</i>	<i>r</i>
(1) James et al., 2012	(1) Pubertal timing at time 1 assessed with the PDS and IAD, partialling out age	Risky sexual behavior 6 years later	Girls	11.86	USA	82% European American 14% African American 4% other	129	0.25
(2)	(2) Pubertal timing at time 3 assessed with the PDS and IAD, partialling out age	Risky sexual behavior 4 years later	Boys	13.56			109	0.02
Shew et al., 1994	Age at menarche	HPV infection (yes/no)	Girls	17	USA	48% White 44% Black 7% Other	208	0.06
(1) Siebenbruner et al., 2007	Physical maturity rated by coders, at age 13	(1) High risk versus sexual abstainers. Sexual risk behavior at age 16. Composed of number of sexual partners and contraception use.	54% Boys; 46% Girls	13	USA	Mother's ethnicity: 86% Caucasian 10% African American 4% Native American or Asian	118	0.035
(2)		(2) Low risk versus sexual abstainers. Sexual risk behavior at age 16. Composed of number of sexual partners and contraception use.					122	0.073

Note. The included studies and study characteristics are presented in order of sexual behavior measure, and then in order of alphabet. The numbers in front of the author list represent multiple effect sizes from the same study. Puberty measure presents the pubertal timing or status measure used in the study, sexual behavior measure presents the measure that was used to assess sexual behavior or risky sexual behavior. Sex of sample includes 100% boys (Boys), 100% girls (Girls) or a mix of boys and girls, percentages are denoted. Mean age denotes the mean age of the sample included in the analyses, if the mean sample was not reported, the media age of the range was included in the analyses. Ethnicity denotes the reported percentages of adolescents with ethnic backgrounds. We included percentage of Black adolescents in the moderator analyses and the bold percentages represent the values included in the moderator analysis. *N* denotes the number of participants in the particular analysis. Recoded effect size denotes the recoded effect sizes to *r*.

Chapter 3

On early starters and late bloomers: The development of sexual behavior in adolescence across personality types

Little is known about the relationship between personality and sexual development among mid-adolescents. In the current study, we used a person-centered approach to investigate the relation between personality types and the development of sexual behavior. We hypothesized that undercontrolling adolescents would engage in more advanced, casual, and risky sexual behavior compared to their resilient and overcontrolling peers. Data were used from 407 mid-adolescents (M_{age} = 14.5) followed across four measurement waves spanning 18 months. Results from latent class analyses (LCA) identified the three classical personality types: resilient, undercontrollers, and overcontrollers. Controlling for perceived pubertal timing and biological sex, latent growth curve analyses in Mplus showed that, at baseline, undercontrollers were more sexually experienced and engaged in more casual and risky sexual behavior than resilient and overcontrollers. Although initial levels of sexual behavior differed by personality types, over time increases in sexual behavior occurred at a similar rate across the types. Overall, the current study showed that undercontrolling adolescents are early sexual developers who engage in more advanced, casual, and risky sexual behavior than other adolescents. The implications of these findings for longer-term differences in sexual behavior between personality types in later adolescence are discussed.

Chapter 3

Healthy sexual development is one of the developmental tasks of adolescence. While most adolescents seem to make responsible decisions concerning sex (Tolman & McClelland, 2011), others are impulsive decision makers engaging in potentially risky sexual behaviors (Charnigo et al., 2013). In Western countries there is easy access to condoms and contraceptives, yet 20 to 30% of youth fail to use regular protection, increasing risk of sexually transmitted infections (STIs), HIV, and teenage pregnancy (de Graaf, Kruijer, Van Acker, & Meijer, 2012; Fortenberry et al., 2011). Despite numerous studies on late adolescents or young adult sexual development, there still is a lack of knowledge on what factors underlie individual differences in sexual development during the middle adolescent years. As early as the 1970s, the relation between personality characteristics such as extraversion and sexual behaviors among late adolescents received attention (Eysenck, 1976). However, previous studies often exclusively examined sexual risk taking among young adult or college-age samples and if they did include younger participants, these studies often included only a limited range of behaviors, such as holding hands or kissing, or did not assess personality. Little research has focused on the role of personality in sexual development during the middle adolescent years. This is surprising given that personality characteristics are organizational constructs influencing how individuals adapt their behavior to meet new developmental challenges (Caspi & Shiner, 2008). The current study addressed this gap in the literature by investigating how personality dimensions and types are related to a broad range of sexual experiences ranging from initial physical encounters such as kissing to having sexual intercourse in either committed, casual, or risky contexts among mid-adolescents.

Personality (proto) types and sexual behavior

The three most common personality types found across cultures and age groups are undercontrollers, overcontrollers, and resilient (Asendorpf, Borkenau, Ostendorf, & van Aken, 2001). These types can be described in their distribution of personality dimensions from the "big five." The "big five" consists of five personality traits on which individuals can vary and which became a common framework of personality psychology. They are labeled agreeableness, conscientiousness, openness to experiences, extraversion, and emotional stability (van Aken, Hutteman, & Denissen, 2010). Agreeableness describes traits that are of a prosocial nature; conscientiousness describes goal-directed behavior and impulse control; extraversion includes traits of an outgoing, interpersonal nature; openness to experience describes the complexity of an individual's mental and experiential life; and emotional stability refers to the steadiness of a person's mood in contrast to a broad range of negative affects, including sadness, irritability, and anxiety (John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994). Although adolescents go through an abundance of changes as they mature from prepubertal children to

young adults, their temperament and personality are relatively stable. It has been suggested that adolescence is not a period in which personality dispositions change significantly but rather that the levels fluctuate while rank-order stability of the dimensions is relatively stable (Roberts & DelVecchio, 2000; van Aken et al., 2010).

Undercontrolling adolescents are characterized by a relatively low level of agreeableness, conscientiousness, and openness to experiences; a relatively high level of extraversion; and an average level of emotional stability. Overcontrolling adolescents show a relatively high level of agreeableness and conscientiousness; and a relatively low level of emotional stability, openness to experience, and extraversion. Finally, resilient adolescents have a relatively high score on all “big five” dimensions, allowing them to flexibly adapt to environmental demands (Asendorpf, 2006; Van Aken et al., 2010). In the current study we not only examined the relation between the individual “big five” personality dimensions and sexual behaviors but also used a person-centered approach to take into account the internal organization of personality characteristics within a person (i.e., the personality types); that is, we also examined the relationship between personality types and sexual behaviors. In this way, we avoided the problem that one specific personality trait might intensify or weaken the effects of other personality traits (Atkins, 2008; Caspi, 1998).

No previous studies have examined the link between adolescents’ personality types and their sexual development. However, one study (Atkins, 2008) did examine how child temperament at age five or six resembled “proximity” to personality prototypes and used individuals’ fit with these prototypes to predict their contraception use and condom use at age 17 or 18. Based on continuous measures of the degree to which an individual fit each of the three prototypes, Atkins (2008) used these scores to predict risky sexual behavior. The results showed that those with a close fit to the overcontrolling and resilient prototypes reported less failure to use contraception. In addition, those with a close fit to the overcontrolling prototype reported less sex without a condom. Although this study provided intriguing results, it did not explicitly assess whether adolescents’ actual personality types affected their sexual development; instead, it showed that a good fit with a personality prototype at a young age predicted less risky sexual behavior in late adolescence. More important, the sample included only sexually experienced adolescents and therefore the link with initiation of a range of sexual behaviors could not be examined. Despite these limitations, however, the results do show that a typological approach to personality may be useful in understanding individual differences in adolescent sexual development and that those with personality profiles fitting resilient or overcontrollers were the least likely to engage in sexual risk behaviors.

Chapter 3

Personality has long been studied in relation to sexual behavior. In his now classic book *Personality and Sexuality*, Eysenck (1976) investigated the link between extraversion and neuroticism and a range of sexual thoughts and behaviors. Among university students, those high on extraversion scored higher on sexual behaviors (such as oral sex and sexual intercourse) and reported relatively higher rates of sexual promiscuity and sexual satisfaction. University students high on neuroticism scored low on promiscuity and satisfaction. Eysenck proposed that extraverts may seek stimulation and are less “sociable,” while people high on neuroticism may find sexual (and other social) behavior uncomfortable. Outcomes of a recent meta-analysis corroborated some of these findings, showing that high levels of extraversion were related to more high-risk sexual encounters, while low levels of agreeableness were moderately related to more high-risk encounters, number of sexual partners, and unprotected sex. Conscientiousness was moderately and negatively related to having unprotected sex (Hoyle, Fejfar, & Miller, 2000). Finally, the relationship between emotional stability (neuroticism) and sexual risk behavior was weak and inconsistent across the different risk behaviors. Since the meta-analysis by Hoyle and colleagues (2000), studies examining the link between personality and sexual risk behavior have replicated and extended these findings. For example, extraversion was found to be related to higher levels of promiscuity, infidelity, and substance use during sex (Bogg & Roberts, 2004; Miller et al., 2004; Raynor & Levine, 2009; Schmitt, 2004). Although effect sizes in previous research were small to moderate, they do indicate a clear and systematic link between personality and (risky) sexual behavior that deserves further attention.

Considering personality in relation to general risk behaviors, individuals with low levels of conscientiousness report more risky health-related behaviors, such as risky driving and drug use (Bogg & Roberts, 2004), and adolescents with high levels of extraversion exhibit more thrill-seeking behaviors (Gullone & Moore, 2000). Furthermore—taking a typological approach—undercontrolling adolescents are found to report more aggression than overcontrolling and resilient adolescents (Akse, Hale, Engels, Raaijmakers, & Meeus, 2004). Adolescent personality types are also likely to show differences in their sexuality development. Undercontrolling adolescents are often described as having trouble with impulse control, combined with low levels of ego resiliency (comparable to self-regulation) (Block & Block, 1980). Specifically, given that undercontrolling adolescents are characterized by lower levels of conscientiousness and agreeableness and high levels of extraversion, and that they engage in more externalizing of problem behavior (Akse et al., 2004; Dubas, Gerris, Janssens, & Vermulst, 2002; van Aken & Dubas, 2004), they may be prone to engage in (riskier) sexual activities at an earlier age. Further, in contrast with undercontrollers, overcontrolling adolescents have relatively high levels of impulse control (Block & Block, 1980) combined with low

levels of ego resiliency. They are also characterized by lower levels of extraversion and higher levels of conscientiousness and agreeableness (Denissen, Asendorpf, & van Aken, 2008; Meeus, Van de Schoot, Klimstra, & Branje, 2011). The combination of these characteristics would predict that they are less likely to engage in sexual behavior (or start later), and when they do they would be expected to engage in less risky behavior. Further, resilient adolescents are described as being able to modify their ego control as a function of environmental demands (Block & Block, 1980); they have relatively high levels of emotional stability, agreeableness and conscientiousness, and they show higher levels of social competence, and normative timing of their romantic relations (Denissen et al., 2008; Meeus et al., 2011). Therefore, they would be expected to show a more normative (on-time) pattern of sexual behavior and less risky sexual behavior compared to undercontrolling adolescents.

Pubertal development and biological sex

The onset of pubertal development sparks an interest in sexuality and sexual interactions. Early maturing boys and girls are shown to initiate (risky) sexual behavior earlier than those who develop later (Belsky, Steinberg, Houts, & Halpern-Felsher, 2010; Negriff, Susman, & Trickett, 2011; Udry, 1979). Research on the link between personality and sexual development may therefore be overestimated if pubertal development is not included as a control variable. During adolescence there are also significant differences in boys and girls concerning sexual interest and behavior, possibly partly due to differences in the hormone testosterone and physical maturation. However, although girls are found to physically mature at an earlier age than boys (Tanner, 1981), U.S. girls initiate sexual behavior at a later age (Zimmer-Gembeck & Helfand, 2008) and have fewer partners (Tubman, Windle, & Windle, 1996). In the Netherlands, gender differences in age at sexual initiation have not been consistent and differ across the different sexual behaviors (de Graaf et al., 2012; de Graaf, Meijer, Poelman, & Vanwesenbeeck, 2005), and predictors of making an early sexual debut have also been found to differ across males and females (Udell, Sandfort, Reitz, Bos, & Dekovic, 2010). For example, Dutch 12- to 14-year-old males have more sexual experience than females, but this difference disappears by ages 15 to 17 (de Graaf et al., 2012). Given that pubertal timing and sex differences in sexual development have been reported, we included biological sex and perceived pubertal timing as control variables in the analyses.

Present study

In the current 4-wave longitudinal study among 407 adolescents aged 13 to 16 years, we examined the relation between personality dimensions and types and the development of sexual behavior. To measure sexual behavior we included a broad

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conceptualization encompassing three concepts of sexual behavior. The first pertained to general sexual experiences (ranging from kissing to sexual intercourse); the second was casual sexual behavior, whereby we included sexual experiences without an emotional commitment to the person involved; and the third was risky sexual behavior, which included behaviors that may have a physical or psychological negative impact on adolescents' lives (sex without a condom, giving or receiving a reward for sexual favors, online sexual behavior).

We hypothesized that at baseline (a) undercontrolling adolescents, compared to resilient and overcontrolling adolescents, would report more sexual experience, more casual sexual behavior, and more risky sexual behavior; (b) overcontrolling adolescents would report less advanced sexual behavior and less casual and risky sexual behavior compared to undercontrolling and resilient adolescents; and (c) resilient adolescents would report levels of sexual behavior and casual and risky sexual behavior that would be in between those reported by either overcontrolling and undercontrolling adolescents.

To our knowledge, no longitudinal study has previously examined the relation between personality and trajectories (rate of development) of sexual behavior, controlling for biological sex and perceived pubertal timing. Concerning developmental trajectories in sexual behavior, we were therefore unable to formulate specific hypotheses based on the literature.

Method

Procedure and sample characteristics

Data were collected from seven high schools in the Netherlands. We specifically asked for participation of third-year (ninth grade) students to target an age group of 14- to 15-year-olds. Permission for this study was granted by the ethics board of the Faculty of Social and Behavioral Sciences at Utrecht University. Adolescents were informed of the study and could withdraw at any time. If the adolescents' parents did not contest their participation, and the adolescents themselves agreed, they could participate in the study. (Three parents did not want their children to take part in the study.) Adolescents did not receive compensation for their participation. Items about explicit sexual behavior could be skipped, or adolescents could indicate they did not want to disclose the information (i.e., they could fill in "I don't want to answer this question"). Two research assistants were present, introduced the questionnaire, emphasized that data would be handled confidentially, and remained present during the school hour to answer any questions.

At baseline (T₁), 407 third-year (13 to 16 years old) students filled out the questionnaire. The subsequent waves of data collection took place after six, twelve, and eighteen months, respectively (T₂₋₄). Our baseline measurement wave took place in October 2009, and after the second measurement wave our participants finished their third year and moved into their fourth. In the Dutch secondary school system students are reassigned to different classes across a grade, which makes class composition change. Because of this transition between T₂ and T₃, we were not able to retain all baseline participants. We collected data from classes that at T₃ had at least seven students who had previously participated at T₁ and T₂ (remaining sample at T₄ = 61%, N₁ = 407, N₂ = 351, N₃ = 273, N₄ = 247). Our sample at baseline consisted of 407 adolescents aged 13 to 16 years (M_{age} = 14.5, SD = 0.6, 215 girls, 52.8%). The dependent variables (sexual experience, casual sexual behavior, and risky sexual behavior) did not predict dropout between T₁ and T₄ ($p_s > .05$, Nagelkerke $R^2 = .04$). Participants were mostly from a Dutch background (82.8%, $n = 337$; 4.7% Turkish; 3.4% Moroccan; 2.20% Caribbean; 7.6% other), enrolled in vocational education (66.0%, $n = 268$; 26.1% general secondary; 7.4% pre-university) and mostly reported being heterosexual (88%, $n = 358$; 3.5% homosexual; 0.5% bisexual; 5.8% unsure of sexual orientation). It should be noted that our data analysis procedure (FIML, or full information maximum likelihood) handles missing data across the waves; therefore, our final sample size for this article remains at 407.

Measures

Personality. Personality of adolescents was assessed with the Ten-Item Personality Inventory (TIPI, Gosling, Rentfrow, & Swann Jr., 2003). This scale includes two items for every Big Five personality dimension. Correlation between the two items for every dimension: extraversion, $r = .23, p < .001$, agreeableness, $r = .22, p < .001$, conscientiousness, $r = .14, p < .001$, emotional stability, $r = -.15, p = .004$, and openness, $r = .01, ns$. Adolescents were presented with two characteristics at a time, and asked to rate how well the characteristics applied to them on a 5-point scale from 1 (*disagree strongly*) to 5 (*agree strongly*). An example item is 'Extraverted, enthusiastic'. Longitudinal autocorrelations between the personality dimensions extraversion, agreeableness, conscientiousness, and openness to experience were relatively high ($r = .44$ to $.72$). Longitudinal autocorrelations between measures of emotional stability across the four measurement waves were relatively low ($r = .30$ to $.51$). As previous studies have shown, personality dimensions and types are highly stable over time (Meeus et al., 2011) therefore we used the T₁ levels of the personality dimensions to form the personality types with a latent class analysis.

Perception of pubertal timing. To assess the perception of pubertal timing, adolescents were presented the item 'Do you have a faster or slower physical

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development compared to your classmates?' that was rated on a 5-point scale from 1 (*much earlier than my classmates*) to 5 (*much later than my classmates*). Scores on this item showed good convergent validity with an item from the Petersen pubertal development scale (Petersen, Crockett, Richards, & Boxer, 1988) (for males; the relation between growth spurt and perceived pubertal timing; $r = .43, p < .001$; for females; the relation between growth spurt and perceived pubertal timing; $r = .30, p < .001$).

Sexual experience. To assess sexual experience, adolescents were presented with five sexual behaviors and asked how often they had engaged in a specific sexual behavior. Adolescents were asked about their experience with french kissing, petting, 'grinding', oral sex, and vaginal sexual intercourse. Adolescents could indicate the frequency of engagement in such behaviors with three categories (1 = *never*, 2 = *sometimes*, 3 = *a lot*). Considering the unclear distinction between the categories 'sometimes' and 'a lot' and the skewed distribution we decided to combine the categories 'sometimes' and 'a lot', resulting in two categories for every sexual behavior (0 = no experience, 1 = experience). These items together resulted in one variable that distinguished between novice and advanced sexual behavior (i.e., 0 = inexperienced with all behaviors, 1 = experience with french kissing, petting, and/or grinding, 2 = experience with category 1 behavior and with oral and/or vaginal sexual intercourse). A small part of the sample (1.5% to 6.9% over the four measurement waves) stated not wanting to answer these items. Cronbach's alpha of these items was .82 to .89 across the four time points.

Casual sexual behavior. The level of casual sexual behavior was assessed with two items with which adolescents were asked about the level of emotional commitment to their sexual partner. The items were "Have you ever had sex with someone for the sex, not because you were in love?" and "Have you ever had sex with someone you had just met?". Adolescents could again rate the frequency of such experiences with three categories (1 = *never*, 2 = *sometimes*, 3 = *a lot*). As with the measure for sexual experience, we combined the answer categories 'sometimes' and 'a lot', resulting in two scores (i.e., 0 = no experience with the specific behavior, 1 = experienced). A sum score of these two items was computed for every adolescent, the minimum score is 0, the maximum score is 2. A small part of the sample (4.7% to 6.4% over four measurement waves) stated not wanting to answer these items. Cronbach's alpha of these items was .90 to .94 across the four time points.

Risky sexual behavior. The level of sexual risk behavior was assessed with four items with which adolescents were asked how much experience they had with specific sexual behaviors. The items that adolescents were presented with were: "Have you ever given money or something else for having sex?", "Have you ever received money or something else for having sex?", "Have you ever had sex

without a condom?" and "Have you ever stripped or done something sexual in front of a webcam?". Adolescents were asked to report the frequency of every behavior with three answer categories (1 = never, 2 = sometimes, 3 = a lot). As was done for the previously described measures, we combined the answer categories 'sometimes' and 'a lot', resulting in two scores (0 = no experience with the specific behavior, 1 = experienced). A sum score was computed based on the four items, with a minimum score of 0 and a maximum score of 4. A small part of the sample (3.4% to 6.6% over four measurement waves) stated not wanting to answer these items. Cronbach's alpha of these items was .70 to .85 across the four time points.

Statistical analyses

To distill personality types from the five separate personality dimensions we conducted a latent class analysis (LCA) in Mplus, version 6 (Muthén & Muthén, 2010). LCA is an analytic strategy that can be used, similar to a cluster analysis, to group individuals into classes. Classifying individuals into these classes was done based on the analysis of patterns of scores on the personality dimensions. Unlike the classical cluster analysis approach, LCA gives fit statistics and significance tests to assess what number of classes best fit the data, and is model-based (Nylund, Asparouhov, & Muthén, 2007). After assessing the appropriate number of classes, we assigned class membership on the basis of class probabilities (i.e., which personality type fits an individual best). By doing so, we assume an underlying latent variable that determines an individual's class membership, and this procedure takes into account error, and is thus preferred over a cluster analysis (e.g., Reinke, Herman, Petras, & Jalongo, 2008). In the current study we assessed whether the three expected personality types emerge from the first measurement wave of personality dimensions.

Model solutions were assessed with the Vuong-Lo-Mendell-Rubin (VLMR) likelihood ratio test, Bayesian information criterion (BIC), and Bootstrapped Likelihood Ratio Test (BLRT; see Nylund et al. for a detailed description of this method). Better fitting models showed a significant improvement compared to the $k-1$ model on the VLMR, lowest BIC values and significant BLRT p -values ($< .05$). At each stage, we considered the meaningfulness of the number of classes based on the existing literature on personality types. Classes were then characterized by looking at the distribution of item means on the personality dimensions. Previous studies have identified three personality types (Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001), therefore our latent class solutions were tested against a three-class solution. After the best fitting model was identified, the most probable class membership of individuals was exported to a data manager (SPSS 18.0), in which dummies were created based on the class membership information. These dummies included two groups of adolescents with two different personality types

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(i.e., dummy 1 = overcontroller versus resilient; dummy 2 = resilient versus undercontroller; dummy 3 = overcontroller versus undercontroller).

In the first step in our analyses, we specified linear growth models in Mplus version 6 (Muthén & Muthén, 2010), including personality *dimensions* (i.e., extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience), perceived pubertal timing, and biological sex as predictors of sexual experience, casual sexual behavior, and risky sexual behavior. Because of the measurement level of the dependent variables, different growth models were specified: one growth model for ordinal outcome variables (i.e., sexual experiences, logistic ordinal regression analysis), and two growth models with a Poisson distribution for count outcome measures (i.e., casual sexual behavior and risky sexual behavior). After running unconditional models to assess development over time, the predictors were included and assessed (i.e., personality dimensions, perceived pubertal timing and biological sex as covariates). As estimator the Maximum Likelihood for Robust standard errors was used (MLR) for sexual experiences, with Full Information Maximum Likelihood (FIML) to correct for missing data. For casual sexual behavior and sexual risk behavior the Maximum Likelihood (ML) estimator was used.

To then test our hypotheses regarding the differences in sexual behavior and development across the three personality *types*, we again specified linear growth models in Mplus version 6 (Muthén & Muthén, 2010), and included and assessed the predictors (dummies for personality types, perceived pubertal timing, and biological sex).

Results

Latent class analysis: From personality dimensions to personality types

Results from the LCA on mean personality dimension scores at measurement wave 1, indicated that compared to the 2 and 4-class solution, a 3-class LCA provided the best fit to the data (see Table 1).

Table 1 *Fit Statistics for Latent Class Analysis Solutions*

	VLMR <i>p</i>	BIC	BLRT <i>p</i>
1 class	n/a	4212.92	n/a
2 class	.09	4202.53	< .001
3 class	.63	4212.96	< .001
4 class	.01	4225.52	.013

Note. VLMR = Vuong–Lo–Mendell–Rubin likelihood ratio test. BIC = Bayesian Information Criterion. BLRT = Bootstrapped Likelihood Ratio Test. n/a = not applicable, these statistics look at the k-1 class solutions, these cannot be computed for the 1-class solution.

The results from the LCA supported the three-type personality structure underlying the Big 5 personality dimensions (see Figure 1). Class 1 consists of undercontrollers ($n = 74, 18\%$), being characterized by high extraversion, average emotional stability, and relatively low openness, agreeableness, and conscientiousness. Class 2 consists of overcontrollers ($n = 69, 17\%$), characterized by relatively high conscientiousness and agreeableness, but low openness, extraversion and emotional stability. Finally, class 3 consists of resilient ($n = 264, 65\%$), characterized by relatively high scores on all Big five dimensions. For further analyses we used the most probable class membership at T_1 to create three dummies differentiating the three personality types.

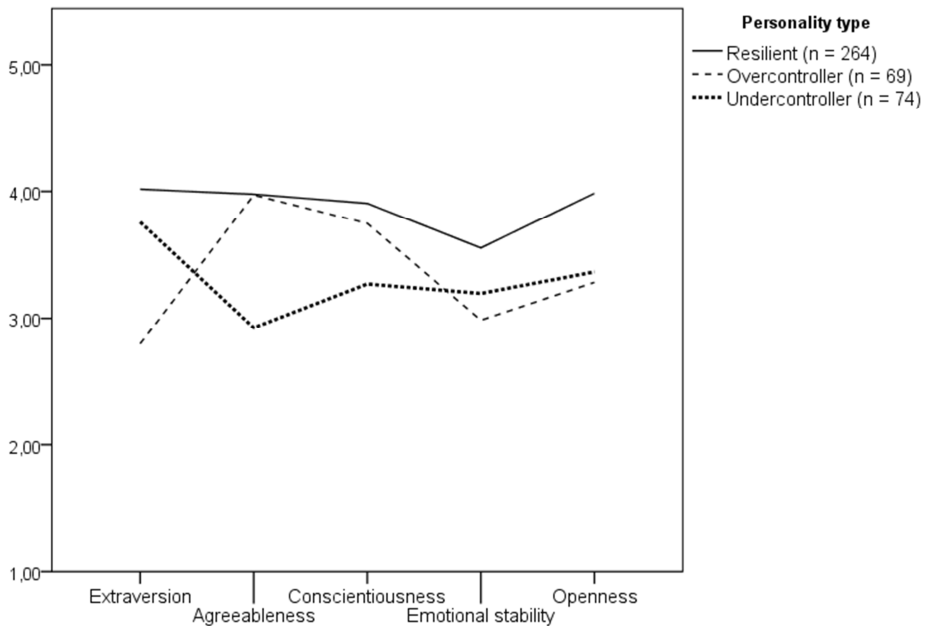


Figure 1. Profiles of the personality types on the Big Five dimensions at T_1 .

Latent growth curve modeling (LGCM) of sexual behavior

We first analyzed three linear unconditional models to examine the development of sexual experience, casual sexual behavior, and risky sexual behavior (see Table 2). Over time, adolescents reported increases in sexual experience, (mean slope = 1.32, $p < .001$), and the tempo of this development varied significantly between adolescents (variance = 2.07, $p = .003$). Reports of casual sexual behavior also increased over time (mean slope = 0.92, $p < .001$), but did not show individual differences in the tempo of development (variance = 0.16, $p = .106$). Adolescents also reported increases in their risky sexual behavior over time (mean slope = .65, $p < .001$), but no individual differences in tempo of development were present

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(variance = 0.05, $p = .345$). These findings clearly showed a significant increase in adolescents' sexual experience and their casual and risky sexual behavior over time. Because there were no individual differences in the increase (i.e., slopes) of casual and risky sexual behavior, it was not possible to specify personality dimensions or type as a predictor of slopes for casual and risky sexual behavior in the conditional models.

Table 2
Percentages of Sexual Experiences and Mean Score of Casual and Risky Sexual Behavior

	Wave 1	Wave 2	Wave 3	Wave 4
	% / <i>M (SD)</i>	% / <i>M (SD)</i>	% / <i>M (SD)</i>	% / <i>M (SD)</i>
Males				
Sexual experience ^a				
category 0	22.6	13.2	17.1	15.5
category 1	57.2	56.3	46.8	39.8
category 2	20.1	30.6	36.0	44.7
Casual sexual behavior (0–2)	0.19 (0.57)	0.29 (0.66)	0.28 (0.66)	0.41 (0.76)
Risky sexual behavior (0–4)	0.10 (0.34)	0.22 (0.66)	0.18 (0.58)	0.29 (0.70)
Females				
Sexual experience ^a				
category 0	17.5	17.5	12.3	7.3
category 1	64.5	62.6	53.6	48.4
category 2	18.0	19.9	34.1	44.4
Casual sexual behavior (0–2)	0.05 (0.26)	0.07 (0.35)	0.12 (0.43)	0.18 (0.53)
Risky sexual behavior (0–4)	0.12 (0.36)	0.11 (0.35)	0.24 (0.46)	0.33 (0.65)

^aSexual experience was assessed with three categories, category 0 = sexually inexperienced; 1 = experience with kissing, and/or petting; 2 = experience with both category 1 and oral and/or vaginal sexual intercourse.

Sexual experience. To assess whether the personality dimensions were related to sexual experience we conducted a logistic ordinal latent growth model (see Table 3). The results showed that higher levels of extraversion and lower levels of agreeableness were related to more advanced sexual experiences at the beginning of the study (i.e., intercept). Concerning the development of sexual experiences over time, the results showed that lower levels of agreeableness and higher levels of emotional stability and openness to experience were related to a steeper increase in sexual experience (i.e., slope). To assess personality types predicted baseline levels of and increases in sexual experience over time, we conducted three logistic ordinal latent growth models (see Table 4). The results showed that undercontrolling adolescents reported more advanced sexual behavior than their overcontrolling and resilient peers at baseline. Furthermore, adolescent personality type was not related to the rate of development of sexual experiences. Pubertal timing and biological sex did not predict the baseline levels and development of sexual experience over time.

Casual sexual behavior. To assess whether the personality dimensions were related to casual sexual behavior we conducted a latent growth curve model (LGCM) (see Table 3). The results showed that higher levels of extraversion and lower levels of agreeableness and conscientiousness were related to more casual sexual behavior at the beginning of the study (i.e., intercept). Further, male adolescents reported higher levels of casual sexual behavior at the beginning of the study than females did. Because there was no significant variance in the slope of casual sexual behavior—no individual differences could be predicted—we examined only the association between personality dimensions and beginning levels of casual sexual behavior.

To test the longitudinal relationship between personality types and casual sexual behavior, three LGCMs were estimated (see Table 4). The results showed that undercontrolling adolescents engaged in significantly more casual sexual behavior than their resilient and overcontrolling peers, and males engaged in more casual sexual behavior than females at the beginning of the study. Perceived pubertal timing was not related to casual sexual behavior at baseline.

Risky sexual behavior. To assess whether the personality dimensions were related to risky sexual behavior we conducted an LGCM (see Table 3). The results showed that higher levels of extraversion and lower levels of agreeableness were related to more risky sexual behavior at the beginning of the study (i.e., intercept). Because there was no significant variance in the slope of risky sexual behavior—no individual differences could be predicted—we examined only the association between personality dimensions and beginning levels of risky sexual behavior.

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To test the hypothesized longitudinal relation between personality types and risky sexual behavior, we conducted three LGCMs (see Table 4). There was no significant variance in the slope of risky sexual behavior; hence, we only examined the association between personality types and beginning levels of risky sexual behavior. The results showed that undercontrolling adolescents engaged in significantly more risky sexual behavior than resilient and overcontrolling adolescents. Undercontrolling and overcontrolling adolescents who reported a later perceived pubertal timing reported more risky sexual behavior those who reported an earlier perceived pubertal timing. Biological sex was not related to risky sexual behavior at baseline.

Table 3

Parameter Estimates of the Conditional Models Including the Big Five Personality Dimensions as Predictors of Sexual Experiences, Casual Sexual Behavior, and Risky Sexual Behavior

	Baseline (intercept) Sexual experience		Growth (slope) Sexual experience		Baseline (intercept) Casual sexual behavior		Baseline (intercept) Risky sexual behavior	
	OR (SE)	Stand. (SE)	OR (SE)	Stand. (SE)	B (SE)	β (SE)	B (SE)	β (SE)
Extraversion	1.95 (0.46)	0.29 (0.06)	-0.06 (0.19)	-0.04 (0.11)	1.32 (0.39)	0.32 (0.09)	1.00 (0.29)	0.32 (0.09)
Agreeableness	-1.97 (0.64)	-0.21 (0.07)	-0.47 (0.23)	-0.22 (0.11)	-1.93 (0.34)	-0.37 (0.06)	-1.17 (0.30)	-0.30 (0.08)
Conscientiousness	-0.58 (0.49)	-0.08 (0.07)	0.15 (0.22)	0.08 (0.11)	-0.35 (0.38)	-0.08 (0.08)	0.09 (0.32)	0.03 (0.09)
Emotional stability	-0.46 (0.55)	-0.06 (0.07)	0.56 (0.22)	0.27 (0.12)	0.56 (0.47)	0.12 (0.10)	0.17 (0.36)	0.05 (0.10)
Openness to experience	-0.57 (0.51)	-0.08 (0.07)	0.51 (0.21)	0.27 (0.10)	-0.04 (0.39)	-0.01 (0.09)	0.19 (0.36)	0.05 (0.11)
Pubertal timing	0.56 (0.31)	0.11 (0.06)	0.25 (0.16)	0.19 (0.11)	0.26 (0.27)	0.08 (0.09)	0.30 (0.21)	0.13 (0.09)
Biological sex	-0.55 (0.65)	0.05 (0.06)	-0.03 (0.27)	-0.01 (0.11)	-1.71 (0.52)	-0.27 (0.08)	-0.07 (0.45)	0.02 (0.09)

Significant estimates are presented in bold; two-tailed. Note. OR = odds ratio. Stand. = Standardized odds ratio. Biological sex: male (0), female (1). Sexual experience: Log likelihood = -706.30, AIC = 1452.60, BIC = 1530.43. Casual sexual behavior: Log likelihood = -405.16, AIC = 848.32, BIC = 923.03. Risky sexual behavior: Log likelihood = -497.54, AIC = 1033.08, BIC = 1107.79. Parameter estimates of the relation between personality type and growth of casual and risky sexual behavior are not shown, because the variance of the slopes was non-significant.

Table 4
Parameter Estimates of the Conditional Models for Sexual Experience, Casual Sexual Behavior, and Risky Sexual Behavior

	Intercept sexual experience		Slope sexual experience		Intercept casual sex. beh.		Intercept risky sex. beh.	
	OR (SE)	Stand. (SE)	OR (SE)	Stand. (SE)	B (SE)	β (SE)	B (SE)	β (SE)
Model 1								
Res. (1) vs. over. (0)	2.49 (1.02)	0.20 (0.08)	0.66 (0.39)	0.21 (0.12)	2.76 (1.53)	0.28 (0.14)	1.97 (0.90)	0.37 (0.14)
Pubertal timing	0.39 (0.36)	0.08 (0.07)	0.23 (0.18)	0.18 (0.13)	0.36 (0.40)	0.09 (0.10)	0.25 (0.23)	0.11 (0.11)
Biological sex	-0.81 (0.75)	-0.08 (0.07)	0.02 (0.32)	0.01 (0.12)	-3.38 (0.79)	-0.43 (0.09)	-0.40 (0.50)	-0.09 (0.11)
Model 2								
Under. (1) vs. res. (0)	2.90 (0.16)	0.22 (0.08)	-0.57 (0.45)	-0.16 (0.12)	1.88 (0.55)	0.26 (0.08)	1.30 (0.45)	0.26 (0.09)
Pubertal timing	0.49 (0.37)	0.09 (0.07)	0.26 (0.19)	0.18 (0.12)	0.30 (0.27)	0.10 (0.09)	0.41 (0.21)	0.20 (0.10)
Biological sex	-0.26 (0.77)	-0.02 (0.07)	-0.17 (0.34)	-0.06 (0.12)	-2.08 (0.56)	-0.34 (0.09)	-0.15 (0.43)	-0.04 (0.10)
Model 3								
Under. (1) vs. over. (0)	4.28 (1.29)	0.38 (0.10)	-0.03 (0.40)	-0.02 (0.20)	3.55 (1.11)	0.68 (0.14)	2.70 (0.81)	0.59 (0.12)
Pubertal timing	0.48 (0.55)	0.08 (0.10)	0.24 (0.23)	0.23 (0.22)	0.34 (0.34)	0.13 (0.13)	0.81 (0.25)	0.35 (0.11)
Biological sex	-0.09 (1.17)	-0.01 (0.10)	-0.38 (0.39)	-0.19 (0.20)	-0.59 (0.36)	0.11 (0.12)	0.37 (0.62)	0.08 (0.14)

Note. Significant estimates are presented in bold; two-tailed. OR = odds ratio. Stand. = Standardized odds ratio. Biological sex: male (0), female (1). Sexual experience: Model 1: Log likelihood = -536.91, AIC = 1097.82, BIC = 1141.14. Model 2: Log likelihood = -535.5, AIC = 1095.90, BIC = 1139.21. Model 3: Log likelihood = -250.64, AIC = 525.29, BIC = 558.33. Casual sexual behavior: Model 1: Log likelihood = -271.21, AIC = 564.43, BIC = 604.29. Model 2: Log likelihood = -358.97, AIC = 739.94, BIC = 779.88. Model 3: Log likelihood = -134.70, AIC = 291.41, BIC = 321.88. Risky sexual behavior: Log likelihood = -331.06, AIC = 684.12, BIC = 723.98. Model 2: Log likelihood = -415.79, AIC = 853.58, BIC = 893.52. Model 3: Log likelihood = -148.34, AIC = 318.67, BIC = 349.15. Parameter estimates of the relation between personality type and growth of casual and risky sexual behavior are not shown, because the variance of the slopes was non-significant. Resilient ($n = 264$), undercontrolling ($n = 74$), overcontrolling ($n = 69$).

Discussion

The results of this study revealed clear differences in sexual behavior between adolescents with different personality types. At the baseline of our four-wave prospective study, undercontrolling adolescents reported engaging in more advanced, more casual, and more risky sexual behavior than their resilient and overcontrolling peers. With respect to development over time, adolescents' personality type was not related to specific developmental trends in sexual experiences, casual sexual behavior, or risky sexual behavior. The separate personality *dimensions* in relation to sexual behavior corroborated our findings with the personality *types*. That is, extraversion was positively related, and agreeableness was negatively related, to baseline levels of sexual experiences, casual sexual behavior, and risky sexual behavior.

We conclude that personality types are not related to the rate of development of sexual experiences, and casual sexual behavior and risky sexual behavior over time during an 18-month span of middle adolescence. Furthermore, for casual sexual behavior and risky sexual behavior we found no individual differences in the development of these behaviors. This means that although baseline levels of casual sexual behavior and risky sexual behavior differed for mid-adolescents, they increased in casual sexual behavior and risky sexual behavior at a similar rate.

Concerning the level of sexual experiences at the beginning of the study, our findings showed that overcontrolling adolescents engaged in less sexual behavior (sexual experiences, casual, and risky) in comparison to resilient and undercontrolling adolescents. These results corroborate earlier studies that found that overcontrolling adolescents may have more trouble engaging in social relations in general (Denissen et al., 2008) and intimate or romantic contact in particular (Meeus et al., 2011). This may also suggest that overcontrolling adolescents select different social contexts matching their personality types, in which they experience fewer or more "distant" types of peer relations (Caspi, Roberts, & Shiner, 2005). Because of a tendency to shy away from intimate contact or to establish intimate bonds, overcontrolling adolescents may have fewer opportunities to engage in sexual behavior, or they may prefer a long-term, supportive, and committed relationship before doing so. Future research might examine these contextual or cognitive factors by assessing romantic relationship status and quality and by investigating how adolescents wish to experience their first sexual encounter.

Undercontrollers are described as having low levels of impulse control and self-regulation. This may make them more directed to the outside world (i.e., having more friends and being more romantically engaged), while it may also increase their difficulty to cope with environmental demands or their own impulses.

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Perhaps they interpret situations differently or do not fully gauge consequences of their behaviors. Our results replicated previous research on the relation between personality and risky sexual behavior (Atkins, 2008; Hoyle et al., 2000; Miller et al., 2004; Schmitt, 2004). Similar to the higher levels of externalizing behavior among these adolescents (Akse et al., 2004; van Aken & Dubas, 2004), undercontrolling adolescents also engaged in more risky sexual behaviors than overcontrolling adolescents did.

Nevertheless, we did not find that undercontrollers differed in their tempo of sexual development from resilient and overcontrollers. Over the course of the 18 months of the study, undercontrolling adolescents seemed to remain at a higher level of sexual behavior than resilient and overcontrolling adolescents. As mentioned, members of our young sample are just starting their sexual careers—which may explain the nonsignificant variance in development of casual and risky sexual behavior. For future research it would be interesting to follow adolescents from a younger age and for a longer time to examine when differences between adolescent personality types develop and whether they continue into adulthood. We would then be able to see whether the differences in sexual behavior become larger because adolescents select different environments in which they are either encouraged to engage or discouraged from engaging in certain behaviors, or whether differences become smaller as more adolescents become increasingly exposed to a wider range of opportunities.

In contrast to previous studies (Belsky et al., 2010; Negri et al., 2011; Udry, 1979; Zimmer-Gembeck & Helfand, 2008), we found that perceived pubertal timing was not related to the baseline level of sexual experiences and casual sexual behavior. However, perceived pubertal timing was related to risky sexual behavior. Those who were “late-developers” reported more risky sexual behaviors than those who were “early-developers”. Most adolescents in our study would already have gone through the initial stages of pubertal development by the time of the first measurement wave. For future research we would therefore suggest a longitudinal study that begins with younger participants who have not yet initiated pubertal development but whose pubertal development is tracked with a comprehensive measure across the study. In this way, pubertal status, timing, and tempo in relation to sexual development could be examined.

Further, we found that there were no gender differences in sexual experiences and risky sexual behavior, although we did find that males engaged in more casual sex behavior than females did. As most adolescents had engaged in some form of sexual behavior at the beginning of the study, potential sex differences in the onset of sexual behavior may have dissolved by the time they participated in the study. Moreover, we did not ask the age at which adolescents had their first encounters,

just whether they had already experienced a particular behavior. Among adult males and females, sex differences in the perception of sexual encounters have been found (Carroll, Volk, & Hyde, 1985; Ellis & Symons, 1990; Sprecher, Barbee, & Schwartz, 1995). For example, female adults report being less inclined to engage in sexual activities without psychological involvement than males are (Carroll et al., 1985). However, there is very little research on adolescent perceptions of their sexual experiences. Thus, for future research, a sample of adolescents from a broader age range is needed, with a focus on whether sex differences exist in how first sexual encounters are experienced.

Despite the addition of studying personality types in an adolescent longitudinal sample and using a broad conceptualization of sexual behavior, the current study has some limitations. Although the current study included a wide range of sexual behaviors, we did not include any measures of how adolescents perceive and experience sexual encounters. Furthermore, an obvious but difficult-to-avoid aspect of the current study is use of self-report measures. Sexual behavior is a sensitive topic that would be difficult to infer from parent or teacher reports. However, to avoid shared-method bias, it would have been better to have different reporters or different assessment methods for the constructs included in our study. For example, it would have been beneficial to include a behavioral measure of sexual development, such as an implicit attitude test, or have others report on the adolescents' personalities.

Despite these limitations, the current study was one of the first to investigate whether adolescent personality type is a useful factor for understanding individual differences in adolescent sexual behavior. In particular, the current study showed that undercontrolling adolescents demonstrate more advanced sexual behavior than resilient and overcontrolling adolescents already at mid-adolescence, and they are also more likely to show risky sexual behavior. This suggests that undercontrollers may be earlier starters, although that remains to be adequately studied in a younger sample of early or even preadolescents. Thus, the current study confirms that personality type is a key individual characteristic that helps explain when adolescents engage in initial sexual encounters and how they develop during middle adolescence.

Part 2:
**The role of peers and media in
romantic and sexual development**

"You can't be what you can't see" – Marian Wright Edelman

Chapter 4

The role of popularity in understanding the link of pubertal development and early adolescent romantic and sexual involvement

This study examined whether the link of pubertal timing and tempo with romantic and sexual involvement was mediated by popularity, using a longitudinal sample of 826 early adolescents (aged 10-13 at baseline). Models were tested for boys and girls separately and included estimates of pubertal timing and tempo, reports of romantic and sexual involvement, and peer-reported popularity. For boys, popularity mediated the link between pubertal timing and sexual behavior, while for girls popularity mediated the link between pubertal tempo and romantic involvement. Findings revealed sex differences in the relation of pubertal development and romantic and sexual involvement, as well as the explaining mechanism.

This chapter was based on “The role of popularity in understanding the link of pubertal development and early adolescent romantic and sexual involvement” by Baams, L., Dubas, J. S., Overbeek, G., & van Aken, M. A. G. Under review.

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Pubertal timing has been related to age-normative and risky sexual behaviors. Early maturing adolescents are more likely to engage in sexual behavior, do so at younger ages, and engage in more risky sexual behavior (see Baams, Dubas, Overbeek, & van Aken, 2014 for a review). Further, early maturing adolescents are found to start dating before their peers (Friedlander et al. 2007; Ivanova et al., 2012). An often overlooked factor in pubertal and possibly sexual development is pubertal tempo—the speed with which an adolescent passes through the different stages of pubertal development (Mendle, 2014). To our knowledge, only one study has investigated pubertal timing and tempo in relation to sexual behavior and the focus was on risky sexual behavior. Early pubertal timing but not pubertal tempo was related to more risky sexual behavior (Marceau, Ram, Houts, Grimm, & Susman, 2011). Thus, pubertal timing is reliably associated with romantic and sexual development (e.g., Baams et al., 2014; Friedlander et al., 2007; Ivanova et al., 2012), but research on pubertal tempo is scarce (Marceau et al.; Mendle, 2014).

A suggested explanation for the relation between pubertal development and sexual involvement is the concept of “social status” (e.g., James, Ellis, Schlomer, & Garber, 2012; Weisfeld, 1999). Those with an early pubertal timing are thought to be more popular and to have more opportunities to experience sexual and romantic involvement at a younger age (James et al., 2012). For example, James and colleagues (2012) found that boys with an earlier pubertal timing reported higher self-perceived mate value, which was in turn related to an earlier timing of sexual debut. Although higher popularity has been related to romantic (Carlson & Rose, 2007; Connolly & McIsaac, 2011; Franzoi, Davis, Vasquez-Suson, 1994; Furman, Low, & Ho, 2009) and sexual involvement (de Bruyn et al., 2012; Mayeux et al., 2008), currently, no study has examined whether popularity can serve as a mediator of the longitudinal relation between pubertal timing or tempo and romantic and sexual involvement among early adolescents. The current study addresses this gap and uses a peer-perceived, reputation-based measure of popularity (Cillessen & Rose, 2005).

Pubertal development in relation to romantic and sexual involvement: Mediation by popularity

Although many studies agree on the importance of studying pubertal development in relation to adolescent romantic and sexual development, few have given attention to a potential mechanism for these relations. In the current study we use evolutionary and social role theories as a framework to explain the relations between pubertal development, popularity, and romantic and sexual involvement.

Drawing from evolutionary theories of sexual and mating strategies, the first theory that we use is based on some aspects of the strategic pluralism theory (Gangestad & Simpson, 2000). This evolutionary-based theory describes how men

and women differ in the application of short- and long-term mating tactics and the considerable within-sex variability in mating tactics and strategies. Here we focus on how those who possess popular attributes are thought to have an advantage in same-sex competition and thus have more opportunities to engage in romantic and sexual relations (Gangestad & Simpson, 2000; Jackson & Ellis, 2009; James et al., 2012). For boys, early or rapid physical changes in secondary sex characteristics are suggested to increase strength, attractiveness and mate-value at a higher rate or a younger age compared to their peers (James et al., 2012; Mussen & Jones, 1963; Weisfeld, 1999) which would make them more attractive as a partner. Social status and physical attractiveness are found to be most important for same-sex competition among males (Ha, Overbeek, & Engels, 2010; Ha, van den Berg, Engels, & Lichtwarck-Aschoff, 2012). Thus, popularity would be expected to play a mediational role between boys' pubertal development and sexual and romantic behavior. For girls the link between popularity and romantic and sexual relations is less clear. Physical attractiveness is more important than social status for girls' same-sex competition (Ha, Overbeek, & Engels, 2010; Ha, van den Berg, Engels, & Lichtwarck-Aschoff, 2012) and early maturation has been suggested to introduce an initial period of isolation from peers (Jones & Mussen, 1963).

An alternative (but not necessarily incompatible) perspective on the role of puberty and popularity in romantic and sexual development is *social role theory* (Eagly, 1987; 2013) which describes the cultural and contextual influences on behavior. According to *social role theory*, "rules" surrounding sexual behavior are based on roles and scripts (Oliver & Hyde, 1993). An important example is the "sexual double standard". Here, the notion is that according to societal expectations of sexuality, sex is more acceptable for boys, but for girls it is more restricted and only "permissible" under certain circumstances such as love or long-term committed relationships (Reiss, 1960). For example, among a large study of adolescents it was found that having a greater number of sexual partners was related to higher peer acceptance of boys, but lower peer acceptance of girls (Kreager & Staff, 2009). In other words, for boys and girls being sexually active is interpreted and evaluated differently. Following *social role theory* and previous empirical work (Kreager & Staff, 2009), we would expect that for early and rapidly maturing girls popularity predicts romantic involvement but not necessarily sexual involvement. For early and rapidly maturing boys we would expect that there would be a link between puberty and both romantic and sexual involvement.

Current study

Following strategic pluralism theory (Gangestad & Simpson, 2000) and social role theory (Eagly, 1987; 2013), we expect pubertal development to increase boys' popularity (i.e., mate-value), and, in turn, romantic and sexual involvement. For girls, these relations are expected to function differently. We hypothesize that among girls, an early pubertal timing and more rapid pubertal tempo are associated with attractive characteristics and changes in social status that may signal higher mate value, and are thus related to higher popularity. However, the expectations about the link of popularity with romantic and sexual involvement is different. From previous empirical work we hypothesize a link of girls' popularity with romantic involvement (Carlson & Rose, 2007; Connolly & McIsaac, 2011; Franzoi et al., 1994; Furman et al., 2009), however not with sexual involvement (Reiss, 1960).

Method

Participants

Data for this study were collected as part of the larger Project STARS (Studies on Trajectories of Adolescent Relationships and Sexuality; Deković, van Aken, ter Bogt, & van Geert, 2010), a four-wave longitudinal research project on romantic and sexual development of Dutch adolescents. For the current study we selected the early adolescents ($N = 826$; 10-13 years old at T1, $M = 12.93$, $SD = 0.79$, 46.8% boys) from our longitudinal sample. Most participants had a Dutch (71.5%) or Western background (23.1%); others had a non-Western background (5.5%). In waves 1, 2, 3, and 4 the number of participants was 826, 822, 732, and 706, respectively. Logistic regression analyses of dropout between T1 and T4 (14.6%) showed that adolescents who did not participate at T4 did not differ in romantic relationship status at T1 (odds ratio = 1.61, $p = .093$) and popularity at T1 (odds ratio = 2.03, $p = .366$). However, they did report more sexual involvement at T1 (odds ratio = 2.72, $p < .001$), were younger (odds ratio = 0.33, $p < .001$), and more likely to be male (odds ratio = 0.56, $p = .024$).

Procedure

Adolescents were recruited from eight elementary schools and four secondary schools in large cities and small municipalities in the Netherlands. Prior to the first measurement, both adolescents and their parents received information describing the aims of the study, confidentiality safeguards, and procedures for declining or ending participation. If adolescents wished to participate, their parents could provide passive informed consent—9.2% of the approached adolescents decided not to participate or was not allowed by their parents to take part in the study.

Adolescents were followed across four waves, with six-month intervals between waves. At each measurement wave, adolescents completed a computer-based questionnaire at school during regular school hours. Researchers were present to supervise data collection, answer questions, and ensure maximum privacy. Adolescents received book gift certificates of increasing values after each completed questionnaire. An ethical protocol was developed should participants have any problems or questions concerning issues in this study. Permission for this study was granted by the ethics board of the Faculty of Social and Behavioural Sciences of Utrecht University, the Netherlands.

Materials

Pubertal timing and tempo. For the construction of the pubertal timing and tempo variables, an adapted version of the Pubertal Development Scale was used (PDS, Petersen, Crockett, Richards, & Boxer, 1988). We first constructed pubertal status scores at the first three measurement waves. For girls this was done with 5 items on their growth spurt, skin changes, breast development, pubic hair, and menarche. If a girl had not experienced menarche, a mean score of the items on growth spurt, skin changes, breast development, and pubic hair was computed as their pubertal status score (range 1 to 4). If a girl had experienced menarche they would get the highest score possible (= 4). For boys, pubertal status was constructed by computing a mean score of six items on growth spurt, skin changes, voice changes, facial hair, ejaculation, and pubic hair. An example item for girls is "Have your breasts begun to grow?", with answer options *Not yet started growing* (1), *Have barely started growing* (2), *Breast growth is definitely underway* (3), and *Breast growth seems completed* (4). An example item for boys is "Have you noticed a deepening of your voice?", with answer options *Not yet started changing* (1), *Has barely started changing* (2), *Voice change is definitely underway* (3), *Voice change seems completed* (4).

Peer-rated popularity. Peer nominations were used to measure popularity. Participants were asked to nominate an unlimited number of peers in their classroom who they thought were most popular. The number of nominations received was summed for each participant and divided by the number of possible nominations (children in the classroom).

Sexual involvement. Sexual involvement was assessed with a combination of two items, the first on kissing (i.e., "Have you ever kissed anyone?") and the second on sexual behavior (i.e., "Have you ever had sex with someone? By sex we mean everything from caressing to sexual intercourse"). For both items, adolescents could indicate whether they had experience with the behavior (0 = no, 1 = yes). We combined these two items resulting in three categories (0 = no experience, 1 =

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kissed, 2 = had sex). Percent of sexual involvement for boys and girls are presented in Table 1.

Romantic involvement. Whether participants were involved in a romantic relationship was assessed with the item “Are you currently involved in a romantic relationship”. Adolescents could indicate whether this was the case (0 = no, 1 = yes). Percent of being involved in a romantic relationship for boys and girls is presented in Table 1.

Table 1
Frequencies and Percentages of Sexual Behavior and Romantic Involvement for Boys and Girls Across Time

	Boys	Girls
	<i>n</i> / %	<i>n</i> / %
Sexual behavior T1		
Kissed	95 / 22.2	89 / 22.5
Had sex	18 / 4.2	12 / 3.0
Sexual behavior T4		
Kissed	111 / 31.4	118 / 33.4
Had sex	43 / 12.2	42 / 11.9
Involved in a romantic relationship T1	55 / 18.4	65 / 24.8
Involved in a romantic relationship T4	31 / 11.6	54 / 21.3

Statistical analyses

To model pubertal timing and tempo we included pubertal status scores of T1 to T3, standardized within age and gender, in a latent growth model (LGM) in Mplus (version 7, Muthèn & Muthèn, 2010). The LGM estimated the intercept of pubertal status standardized within age and gender representing pubertal timing—with higher scores representing an earlier pubertal timing relative to peers within one’s own gender and age group. In addition the LGM estimated the slope from T1 to T3 representing pubertal tempo—with a steeper slope indicating a more rapid development over time. We ran unconditional models to assess individual differences (significant variance) in pubertal timing and tempo. With several correlation analyses we examined the direct relations between our key variables for boys and girls separately.

To test our hypothesis on the longitudinal relation between pubertal timing and tempo and romantic and sexual involvement (separate for boys and girls), we used the intercept (pubertal timing) and slope (pubertal tempo) to predict romantic and sexual involvement at T4 in (ordinal) logistic regression analyses. To examine the

development of romantic and sexual involvement, we controlled for romantic and sexual involvement at T1.

To test our hypothesis that the link between pubertal timing and tempo and the development romantic and sexual involvement would be mediated by popularity we ran the LGM model with MODEL INDIRECT, including popularity at T3 as a mediator, and controlling for popularity at T1. Significance of the indirect effect was inferred from a 95% confidence interval not including zero.

Results

Preliminary analyses

Table 2 presents the correlational results between key variables for boys and girls separately. The results showed that boys with an earlier pubertal timing were rated as more popular, and more likely to be romantically or sexually involved. Boys with a more rapid pubertal tempo were rated as more popular, and more likely to be involved in sexual behavior. However, for boys pubertal tempo was not related to romantic involvement. Finally, boys who were rated as more popular were more likely to be romantically and sexually involved (see Table 2).

Girls with an early pubertal timing were rated as more popular, and more likely to be romantically and sexually involved. In contrast to boys, a rapid pubertal tempo was related to less sexual involvement for girls. Further, girls who were rated more popular were more likely to be romantically and sexually involved. Pubertal tempo was not related to popularity or romantic involvement (see Table 2).

Table 2
Correlations Between Key Variables for Boys (N = 451) and Girls (N = 418).

	1.	2.	3.	4.	5.
1. Pubertal timing	--	-.43***	.42***	.12*	.42***
2. Pubertal tempo	-.29***	--	.03	.00	-.12*
3. Popularity T3	.19***	.11*	--	.39***	.36***
4. Romantic involvement T4	.20***	-.09	.21***	--	.38***
5. Sexual involvement T4	.33***	.10*	.34***	.32***	--

Note. Correlations for girls are presented in the upper right triangle of the matrix; for boys in the lower left triangle. $p < .05$. ** $p < .01$. *** $p < .001$.

Latent growth curve modeling of pubertal development

An unconditional model was analyzed to determine individual differences in pubertal timing and tempo. Pubertal timing and tempo varied significantly between adolescents (boys: variance of intercept = .83, $p < .001$; variance of slope = .10, $p = .001$; girls: variance of intercept = .82, $p < .001$, variance of slope = .13, $p < .001$). These findings clearly showed a significant variation between adolescents in their timing and tempo of pubertal development over time.

The relation between pubertal development and romantic and sexual involvement

Ordinal logistic regression analyses were performed to assess whether pubertal timing and pubertal tempo predicted romantic and sexual involvement in boys and girls.

Romantic involvement. Concerning romantic involvement (boys: $\chi^2(3) = 2.82$, $p = .420$; RMSEA = .00; girls: $\chi^2(3) = 1.37$, $p = .712$; RMSEA = .00) the results showed that an earlier pubertal timing predicted a higher likelihood of being involved in a romantic relationship only for girls (log odds = .53, $SE = .14$, $p < .001$), but not for boys (log odds = .19, $SE = .12$, $p = .120$). Having a more rapid pubertal tempo predicted a higher likelihood of being involved in a romantic relationship for girls (log odds = .48, $SE = .23$, $p = .040$), but not for boys (log odds = -.03, $SE = .19$, $p = .870$).

Sexual involvement. Concerning sexual involvement (boys: $\chi^2(3) = 0.886$, $p = .829$; RMSEA = .00; girls: $\chi^2(3) = 2.53$, $p = .470$; RMSEA = .00), the results showed that for both boys and girls, an earlier pubertal timing (intercept) predicted more sexual involvement at T4 (boys: log odds = .24, $SE = .06$, $p < .001$; girls: log odds = .38, $SE = .06$, $p < .001$). For boys, a more rapid pubertal tempo (slope) also predicted more sexual involvement over time (log odds = .20, $SE = .08$, $p = .009$). This was not the case for girls (log odds = .11, $SE = .09$, $p = .202$).

The indirect effect of popularity

Ordinal logistic regression analyses, with popularity as a mediator, were performed to assess whether pubertal timing and pubertal tempo predicted romantic and sexual involvement in boys and girls, mediated by popularity. The indirect and direct relations among all variables are presented in Figure 1 and 2, for romantic and sexual involvement, respectively.

Romantic involvement. First, the indirect effect of popularity on the relation between pubertal timing and tempo and romantic involvement was assessed (boys: $\chi^2(7) = 7.83, p = .348$; RMSEA = .02; girls: $\chi^2(7) = 12.18, p = .095$; RSMEA = .04). The results showed that for both boys and girls, popularity did not mediate the relation between pubertal timing and romantic involvement (boys: estimate = .021, 95% CI [.000, .040]; girls: estimate = -.010, 95% CI [-.064, .045]). The relation between pubertal tempo and romantic involvement was mediated by popularity for girls (estimate = .137, 95% CI [.016, .258]) but not boys (estimate: .018, 95% CI [-.007, .043]). Girls with a more rapid pubertal tempo were rated as more popular, and in turn more likely to be involved in a romantic relationship.

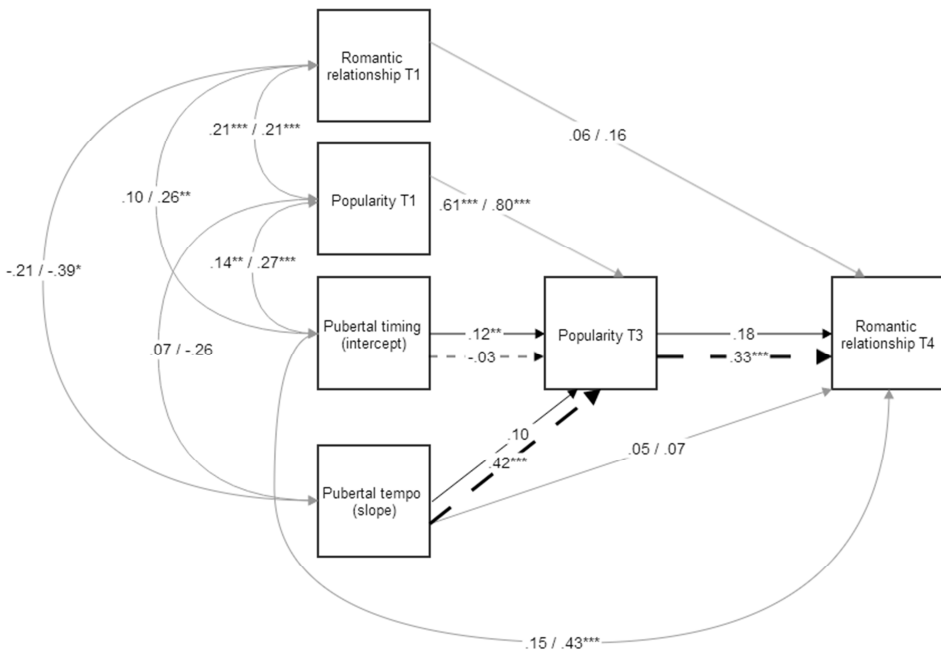


Figure 1. The direct relations are presented for boys before the slash, and girls after the slash. The significant indirect path for girls is presented in a bold dashed line. The non-significant indirect effect for boys is presented in a solid line. This model was also tested without controlling for romantic involvement at T1. This did not yield different results for boys. For girls, the model did not converge. Therefore, we only present the results of the models in which we controlled for romantic involvement at T1.

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Sexual involvement. Second, the mediation of popularity in the relation between pubertal timing and tempo and sexual involvement was assessed (boys: $\chi^2(7) = 3.35, p < .851$; RMSEA = .00 girls: $\chi^2(7) = 7.26, p = .403$; RMSEA = .01). For boys, the results showed a significant indirect effect of popularity in the relation between pubertal timing and sexual involvement (estimate = .024, 95% CI [.006, .044]). Boys with an earlier pubertal timing were rated as more popular, and in turn more sexually active. For girls, this indirect effect was not significant (estimate = -.001, 95% CI [-.025, .024]). For both boys and girls, the relation between pubertal tempo and sexual involvement was not mediated by popularity (boys: estimate = .003, 95% CI [-.013, .020]; girls: estimate = .022, 95% CI [-.011, .054]).

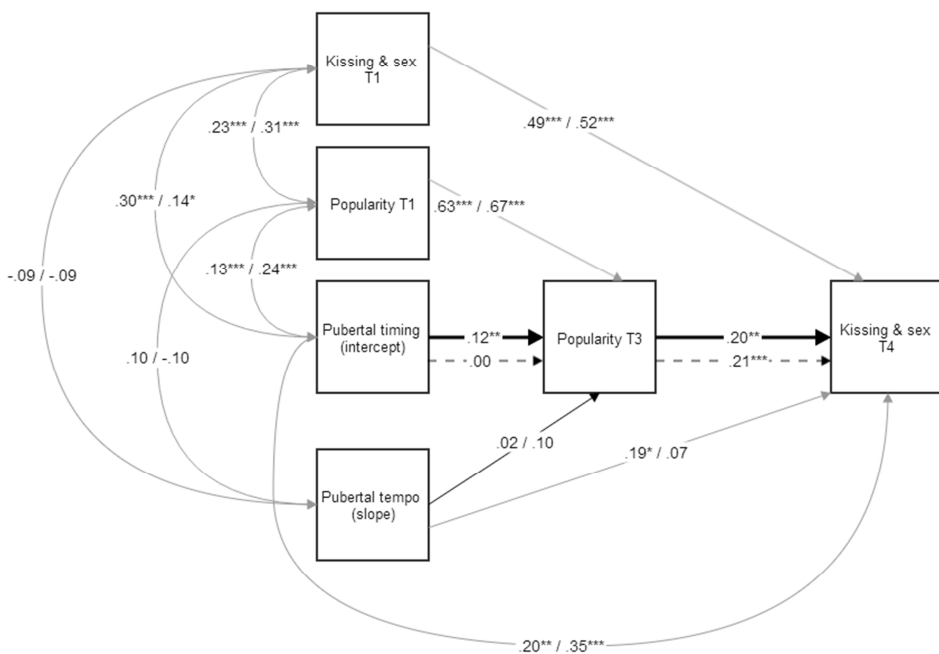


Figure 2. The direct relations are presented for boys before the slash, and girls after the slash. The significant indirect path for boys is presented in a bold solid line. The non-significant indirect effect for girls is presented in a dashed line.

Discussion

The results show that for boys, an early pubertal timing was associated with an increase in popularity and through this more sexual involvement. For girls, a more rapid pubertal tempo was linked to increased popularity which was, in turn, related to a higher likelihood of being involved in a romantic relationship. These findings confirm and extend previous research on the link between popularity and romantic and sexual involvement (Carlson & Rose, 2007; Connolly & McIsaac, 2011; de Bruyn et al., 2012; Franzoi, Davis, Vasquez-Suson, 1994; Furman, Low, & Ho, 2009; Mayeux et al., 2008) by showing that popularity is an important factor in romantic and, for boys, sexual development during early adolescence and that it partially mediates the link between pubertal development and sexual behavior. The current findings show the important role of social mechanisms in studying the link between adolescent pubertal development in relation to romantic and sexual development. With a measure of reputation-based popularity, our results show that pubertal tempo operates on romantic involvement through popularity for girls, and that pubertal timing operates on sexual behavior through popularity for boys.

The current study shows sex differences in the relations between pubertal development and romantic and sexual involvement, and mediation by popularity. Consistent with strategic pluralism theory, our findings suggest that early maturing boys have an advantage in same-sex competition and have more opportunities to engage in sexual relations (Gangestad & Simpson, 2000) by having a higher level of popularity among peers. We did not find this same link for boys' romantic involvement suggesting that adolescent males may primarily focus on a short-term mating strategy. A more comprehensive assessment of mating strategies and the meaning of sexual and romantic involvement for early adolescent boys and girls is needed to confirm this suggestion. Further, our results suggest that popularity functions differently in relation to sexual behavior among girls. Consistent with social role theory, girls may be more encouraged to engage in romantic relationships as opposed to sexual relationships, whereas for boys intimate relations are expected to be more about sexual behavior (sexual double standard; Reiss, 1960).

In addition to examining the role of popularity in the link between pubertal development and romantic/sexual relations, the current study adds to a small but growing body of literature that examines pubertal tempo effects. In contrast to the research by Marceau and colleagues on sexual risk behavior (2011) that did not find a link between pubertal tempo and sexual behavior for either boys or girls, the current results show that pubertal tempo was directly related to sexual involvement for boys, and romantic involvement for girls. In other words, in the

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current study, boys with a more rapid pubertal development were more likely to engage in sexual behavior and girls with a more rapid pubertal development were more likely to be involved in a romantic relationship.

Further, consistent with previous research on pubertal timing and adolescent sexual behavior (e.g., Baams et al., 2014), our results show that boys and girls with an early pubertal timing were more likely to engage in sexual behavior. Additionally, confirming previous research on pubertal timing (Friedlander et al., 2007; Ivanova et al., 2012), girls with an early pubertal timing were more likely to be involved in a romantic relationship. For boys, we did not find a relation between pubertal development and romantic involvement in the full model although the simple correlations did show some associations. This may indicate a different or less important role of physical maturity for boys' romantic involvement.

Limitations and future research

The current study has some limitations that offer suggestions for future research. First, with the current study we examined romantic relationship status and sexual involvement separately. Because previous research has shown that during adolescence, romantic relationships differ greatly in duration, intensity, and quality (Connolly & McIsaac, 2011), and that sexual relations can vary in relational context (Tolman & McClelland, 2011), for future research we would suggest including a more comprehensive measure of romantic and sexual involvement, such as measures of the relational context of sexual experiences, the motives of engaging in sexual behavior, and relationship intensity or quality. Second, popularity was assessed with a reputation-based measure of popularity as opposed to likeability or attractiveness. Overall, reputation-based measures of popularity have been linked to social dominance and prestige (Cillessen & Rose, 2005; Parkhurst & Hopmeyer, 1998). Given the role of attractiveness and fluctuating asymmetry in potential mate value (Gangestad & Simpson, 2000) future research could extend these findings by comparing the function of reputation-based popularity versus physical attractiveness or fluctuating asymmetry.

Conclusion

To conclude, the present findings underline the notion that pubertal timing and tempo are important concepts in adolescent romantic and sexual involvement. The current study extends this literature by showing that popularity may be a potential mechanism through which the influence of puberty operates on psychosexual development.

Chapter 5

Adolescents' and their friends' sexual behavior and intention – selection effects of personality type

Using simulation investigation for empirical network analyses (in RSiena) we examined how personality and sexual behavior and intention were related to peer processes in Dutch adolescents. Our main research questions were: (a) do adolescents cluster together in friendship networks based on personality, sexual behavior, and/or sexual intention? And (b), do adolescents influence each other in their sexual behavior and intention? Results showed that adolescents clustered together based on dissimilarity in agreeableness, and similarity in gender and sexual intention. Further, we found that adolescents with lower levels of emotional stability had friends with more similar levels of sexual intention. The limited variance and low base rates of sexual behavior and intention did not allow us to explicitly test socialization effects.

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Adolescents are found to group together in friendships based on their personality characteristics (Selfhout et al., 2010). Both personality characteristics and peer influences have been related to adolescent sexual behavior and the intention to have sex (Baams, Overbeek, Dubas, & van Aken, 2013, 2014; Eysenck, 1976; Hoyle, Fejfar, & Miller, 2000; Van de Bongardt, Reitz, Sandfort, & Deković, in press). However, no research has examined how personality relates to sexual development and peer processes. Using a network-analytic approach we examined how personality relates to the development of sexual behavior and intention in adolescent friendship networks.

Personality and sexual behavior

Several studies, including two systematic reviews (Bogg & Roberts, 2004; Hoyle et al., 2000), indicate a consistent linkage between the Big Five personality dimensions and (risky) sexual behavior in adolescence and young adulthood. Findings show that individuals with higher levels of extraversion engaged in more sexual behaviors, reported higher rates of sexual satisfaction, more promiscuity, infidelity, and unprotected sex (Bogg & Roberts, 2004; Eysenck, 1976; Hoyle et al., 2000; Miller et al., 2004; Raynor & Levine, 2009; Schmitt, 2004). One possible explanation for this extraversion effect is that extraverts may seek more stimulation because they are suggested to have less cortical arousal (Eysenck, 1976). Further, those high on neuroticism (or low emotional stability) are found to have lower levels of promiscuity and sexual satisfaction (Eysenck, 1976)— perhaps because those high on neuroticism are thought to feel more uncomfortable with intimate (sexual) social behaviors (Eysenck, 1976). Low agreeableness is only moderately linked to high-risk encounters, number of sexual partners, and unprotected sex (Hoyle et al., 2000). Finally, conscientiousness is also moderately linked to less unprotected sex (Hoyle et al., 2000). Those high on conscientiousness are generally more organized and show more constraint, thus it could be that they are more conscious of, or prepared for, potentially risky sexual interactions (Hoyle et al., 2000). Those low on agreeableness could also be described as high on antagonism—the negative pole of agreeableness—these individuals may have less of an interest or concern for their sexual partner’s health and well-being (Hoyle et al., 2000). However, the links between these latter two personality dimensions (agreeableness and conscientiousness) and sexual behavior are only moderate, and suggested explanations have not been tested.

In a recent study we found that adolescents with higher levels of extraversion, and lower levels of agreeableness engaged in more sexual behavior, and more casual and risky sexual behavior. Further, those with higher levels of emotional stability and openness, and lower levels of agreeableness, developed sexually at a faster rate (Baams et al., 2014). Further, in another recent study on the same sample as in

the current study (Baams et al., 2013), we found that extraversion and emotional stability were related to higher levels of sexual intention, whereas agreeableness, conscientiousness, and openness were related to lower levels of sexual intention. Thus, findings from the past four decades showed that personality dimensions were related to the development of sexual behavior and intention. However, no study has viewed this in light of adolescent peer processes—more specifically whether personality plays a role in the formation of friendships and the influence of friends on adolescents' sexual behavior and intention.

Adolescent friendships, sexuality, and social networks

Adolescent sexual behavior has several biological and social aspects (Zimmer-Gembeck & Helfand, 2008). With the onset of physical maturation and the environment's response, adolescents' opportunities for sexual involvement increases. During this time adolescents become more interested in sexuality and sexual behavior (Graber, Petersen, and Brooks-Gunn, 1996). Adolescence is also a time when youth move from being most attached to their parents, to forming close bonds with peers (Furman, Brown, & Feiring, 1999). As more time is spent with peers, both in school, as well as during after-school activities, the frequency of peer interactions increases (Brown, Dolcini, & Leventhal, 1997; Larson et al., 1996).

It is not surprising to find that adolescents seek out groups of like-minded or behaviorally similar peers—in domains such as sexual behavior (DiIorio et al., 2001; Prinstein, Meade, & Cohen, 2003; Udry, 1987; Van de Bongardt et al., in press). How can this similarity in behavior be explained? Previous research indicates that it may be explained in terms of peer selection and socialization effects—thus it may be due to similar individuals selecting each other as friends (selection effects), but also that friends become more similar to each other over time through either modeling, imitation, and/or learning (socialization effects) (Brechwald & Prinstein, 2011). To tease apart these effects, longitudinal analysis and the simultaneous examination of selection and socialization processes is necessary (Veenstra, Dijkstra, & Steglich, 2013).

The similarity-attraction hypothesis describes how similarity in personality traits is important for the formation of friendships (e.g., Byrne et al., 1971, 1997; Byrne & Nelson, 1965). Similarity can act as a reinforcement of one's own ideas and feelings (reinforcement-affect, Byrne, 1997). According to the reinforcement-affect model individuals are not only attracted to each other based on similarity (Byrne & Nelson, 1965), but they also look to others for validation of their beliefs (Byrne et al., 1971; Morry, 2005) and those who validate these beliefs (i.e., are similar) reinforce them (Byrne & Nelson, 1965; Clore & Byrne, 1974). First-year university students have been found to form friendships based on similarity of several Big

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Five personality dimensions (openness, extraversion, and agreeableness; Selfhout et al., 2010).

Gender, too, plays an important role in friendship formation among adolescents. Selfhout and colleagues (2010) found that boys and girls cluster together in friendships—in other words, friendship networks of adolescents are similar in gender. This has also been found in other studies (e.g., Dijkstra, Berger, & Lindenberg, 2011; Steglich, Snijders, & West, 2006). Although cross-gender friendships become more common as adolescents grow older, similarity of gender plays an important role in the formation and continuation of adolescent friendships (Hussong, 2000; Poulin & Pedersen, 2007).

Indeed, the literature shows that friendships are often formed based on similarity in certain characteristics or behaviors such as gender and age (Burk, Steglich, & Snijders, 2007), personality (Selfhout, Denissen, Branje, & Meeus, 2009), delinquency (Knecht, Snijders, Baerveldt, Steglich, & Raub, 2010), music preference (Selfhout, Branje, ter Bogt, & Meeus, 2009), and substance use (Mercken, Candel, Willems, & De Vries, 2007; Overbeek et al., 2011; Sieving, Perry, & Williams, 2000). Further, individuals select friends based on their own personality characteristics, for example, those high on extraversion are found to select more friends (Selfhout et al., 2010). Also, some personality characteristics seem more popular, for example, those high on agreeableness are selected more often as friends (Selfhout et al., 2010).

Overall, previous studies have shown that individuals select others as their friends based on their own (ego-effects), other's (alter-effects) characteristics, based on similarity in a certain behavior or characteristic, and individuals influence each other in behaviors and attitudes (influence effects). In the present study, we focus on similarity between friends in terms of their personality background and development of sexual behavior and intention and we also examine both ego and alter effects in friend selection.

Our rationale for the current study comes in three parts. First, consistent support has been found for the linkage between personality dimensions and adolescent sexual behavior and intention (e.g., Baams et al., 2013, 2014; Eysenck, 1976; Hoyle et al., 2000). Second, late adolescents are found to cluster together in friendship networks based on similarity in personality dimensions (Selfhout et al., 2010). Thus, considering that personality dimensions are related to sexual intention and behavior, and there is selection (clustering) based on similarity in personality dimensions, this may point toward the simultaneous clustering of adolescents based on sexual intention and behavior. Third, similarity in friendships of personality and/or sexual intention and behavior may result in stronger

socialization dynamics. That is similarity in personality characteristics or sexual behavior and intention may affect the selection of friends and influence by friends.

The present study

With the current study we aim to move beyond an individual development perspective by including the evidently important peer-context. To our knowledge, no study has related adolescent personality and sexual development to peer processes by examining both selection and socialization effects.

Drawing from the first three waves of a longitudinal study among Dutch adolescents, the current research addressed five major questions: Do adolescents select each other as friends based on (a) similarity in personality dimensions and/or (b) based on similarity in sexual intention and behavior? (c) Do personality dimensions and sexual intention and behavior interact in predicting the friendship network? And finally, assuming that individuals with similar characteristics are socially more attractive, and reinforce beliefs and ideas (Byrne & Nelson, 1965; Byrne et al., 1971; Selfhout et al., 2010), (d) do adolescents influence each other in their sexual behavior and intention, and (e) do these processes interact with personality dimensions? Questions a through c address selection effects and questions d through e address socialization effects.

Considering that friendships are at least partly based on personality dimensions (e.g., Selfhout et al., 2010), and that these same dimensions are related to adolescent sexual behavior and intention to have sex (e.g., Baams et al., 2013, 2014; Eysenck, 1976; Hoyle et al., 2000), we hypothesized that adolescents would cluster together in friendships based on similarity in personality dimensions (a) and sexual behavior and intention (b). Thus, we expected both personality and sexual behavior and intention to be related to the formation of friendship networks (i.e., selection processes). Further, considering that high extraversion, and low agreeableness and emotional stability are linked to earlier, more risky, and more casual sexual behavior (Baams et al., 2014; Bogg & Roberts, 2004; Eysenck, 1976; Hoyle et al., 2000; Miller et al., 2004; Raynor & Levine, 2009; Schmitt, 2004), we hypothesized that adolescents would cluster together based on their personality dimensions in interaction with sexual behavior or intention (c) (interaction, of ego personality-effect \times similarity sexual intention/behavior effect; selection processes).

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It should be noted that our intention was also to look at socialization effects (questions d and e), but because of limited prevalence and variance of behaviors we were unable to do so.¹

Previous studies on the role of personality in friendships were often based on dyadic friendships, ignoring the embeddedness of these dyads in larger social networks (Carrington, Scott, & Wasserman, 2005; Selfhout et al., 2010). Thus, studying only the dyad ignores the network and network processes that affect multiple dyads within a network. For the current study we have therefore chosen to study friendships from a social network approach, considering multiple friendships (ties) between adolescents.

Method

Procedure

Participating adolescents were recruited from eight elementary and four secondary schools in several large cities and small municipalities throughout the Netherlands. Prior to the first measurement, both adolescents and their parents received letters, brochures, and flyers describing the aims of the study and describing the possibility to decline participation. 9.2% of the approached adolescents decided not to participate or was not allowed by their parents to take part in the study.

The first wave was conducted in the Fall of 2011. Adolescents were followed up across three waves, with six-month intervals between waves. At each measurement wave, adolescents completed the questionnaire on computers at their school, during regular school hours. Researchers and trained research assistants were present to supervise the data collection at schools (i.e., introduce the project and the procedure, answer questions, and ensure maximum privacy from teachers and other students). Confidentiality of responses was guaranteed, as well as the option to stop participation at any time. Adolescents received book gift certificates of increasing value after each completed questionnaire. Permission for this study was granted by the ethics board of the Faculty of Social and Behavioural Sciences of Utrecht University, the Netherlands.

¹ When running the influence models we came across large estimates and standard errors, preventing the model to converge or resulting in uninterpretable estimates and standard errors. This occurred in a logistic regression model (sex vs. no sex, kissed vs not kissed) but also with the three category sexual behavior measure (kissing and sex). Considering our already limited sample of networks for the selection models we decided to not test the influence-models, and to limit the analyses to the selection models, including sexual intention and sexual behavior as varying covariates.

Participants

Data for this study were collected as part of the larger Project STARS (Studies on Trajectories of Adolescent Relationships and Sexuality; Deković, van Aken, ter Bogt, & van Geert, 2010), a four-wave longitudinal research project on romantic and sexual development of Dutch adolescents. For the current study the first three waves of data were available. The longitudinal sample consisted of 1297 participants (53.3% boys), and represents five age cohorts of adolescents in the last year of elementary school and first four years of secondary school (6th - 10th grade). Based on several statistical assumptions (see Data analyses) for the social network analyses we were able to include 380 participants (across 16-17 *included* networks). Table 1 presents the demographic characteristics and key variables for the included sample.

In waves 1, 2, and 3 the number of participants was 1230, 1200, and 1095, respectively. Because of the transition or graduation of 6th and 10th graders after T2, and some changes in class-composition, some of our participants could not complete subsequent questionnaires at their school. Despite various invitations by mail or phone to complete these questionnaires at home, it was not possible to retain all baseline participants in the study. For our included sample we had 380 participants at T1, 376 at T2, and 381 at T3. These participants were from three 7st grade classes, eleven 8th grade classes, and three 10th grade classes, across four secondary schools. Overall, our included networks did not differ from the excluded networks in sexual behavior or intention ($ps > 0.5$). They did, however differ in level of personality dimensions ($ps < .05$). Adolescents in the included networks scored higher on agreeableness ($M_{incl} = 5.74$, $M_{excl} = 5.58$), conscientiousness ($M_{incl} = 4.44$, $M_{excl} = 4.29$), and openness ($M_{incl} = 4.67$, $M_{excl} = 4.86$) compared to adolescents in the excluded networks.

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Table 1
Demographics and Key Variables for Included Networks

	<i>M (SD) / %</i>
Age	13.85 (1.09)
Gender (boys)	44.8
Ethnic background (Western or Dutch)	85.5
Sexual behavior T1	
% kissed	23.4
% had sex	8.6
Sexual behavior T2	
% kissed	26.2
% had sex	11.4
Sexual behavior T3	
% kissed	25.6
% had sex	15.5
Sexual intention (range 1–5)	
Sexual intention T1 (<i>M, SD</i>)	1.66 (0.89)
Sexual intention T2 (<i>M, SD</i>)	1.74 (0.96)
Sexual intention T3 (<i>M, SD</i>)	1.93 (1.05)
Personality dimensions (range 1–7)	
Extraversion	4.47 (1.17)
Agreeableness	5.74 (0.60)
Conscientiousness	4.44 (1.12)
Emotional stability	4.49 (1.05)
Openness	4.86 (0.90)

Note. For the kissing and sexual experience items, adolescents could indicate whether they had experience with the behavior. We combined these two items resulting in three categories (0 = no experience, 1 = kissed, 2 = had sex). Here, percentages for category 1 and 2 are presented. For sexual intention higher scores indicate more intention to have sex in the next school year. For sexual intention, 17 networks were included, for sexual behavior, 16 networks were included.

Materials

Personality dimensions. Personality dimensions were assessed with the Quick Big Five (Vermulst, 2005). This instrument includes six items for every big five personality dimension. Internal reliability for every dimension was reasonable to good; extraversion, $\alpha = .79$, agreeableness; $\alpha = .82$; conscientiousness, $\alpha = .84$; emotional stability, $\alpha = .77$; and openness, $\alpha = .61$. Adolescents were presented with the items and asked to rate the degree to which the characteristic applied to them on a 7-point scale (1 = *does not apply to me at all* and 7 = *applies to me fully*). An example item is “Talkative” for extraversion, “Helpful” for agreeableness, “Careful” for conscientiousness, “Irritable” for emotional stability (re-coded), and “Creative” for openness.

Sexual behavior. To assess adolescents’ sexual behavior we combined two items, the first on kissing (“Have you ever kissed anyone?”) and the second on sexual behavior (“Have you ever had sex with someone? By sex we mean everything from

caressing to sexual intercourse”). For both items, adolescents could indicate whether they had experience with the behavior (0 = no, 1 = yes). We combined these two items resulting in three categories (0 = no experience, 1 = kissed, 2 = had sex).

Sexual intention. Adolescents who reported not having had sex, received the following question: “Would you want to have sex in the next school year?”. Adolescents were asked to rate their answer on a 5-point scale (1 = *yes, definitely* and 5 = *no, definitely not*)—adapted from Beadnell et al. (2007). Scores were reversed, so that a higher score indicated a stronger intention to have sex.

Friendship nominations. At each wave, adolescents were asked to name who their best friends were in their class ($k = 53$) (in the Netherlands, students are placed in a class with whom they follow all of their courses). Adolescents could name as many friends as they wanted. On average, from one measurement wave to the next (T1 to T2 and T2 to T3), 29.44 (range 2 to 53) friendship dyads (ties) were formed, 36.09 (range 15 to 89) existing friendship ties were discontinued, and 51.09 (range 18 to 112) friendship ties remained stable.

Data analyses

To simultaneously examine selection and socialization processes, we used the simulation investigation for empirical network analyses (SIENA) software as an extension in R (RSiena; Snijders, 2001; Ripley, Snijders, & Preciado, 2013). We used the changes in friendship ties (from T1 to T2, and from T2 to T3) to estimate selection effects in friendship networks across these time intervals (see Figure 1 for an example of network changes). Finally, their personality at T1, and sexual behavior and intention over time were used to estimate selection, socialization, and interacting effects over each of the time intervals.

Assumptions. There are several important considerations of the data on friendship networks, covariates and behaviors. First, we needed to assess drop-out of participants from one measurement wave to the next. In addition, although some students did not drop-out of the study they were moved to a class that did not fully participate, leading to either (a) nominations of students as friends who did not participate or (b) leading to a loss of selections as friends. Total attrition in the current study (from T1 to T3) was low (16%), however, class composition changes made it difficult and in some cases impossible to track students in their original class (network). Similar to drop-out in participants, we saw some irregularities in the report of sexual behavior and intention (due to drop-out some classes seemed to decrease in overall sexual behavior or intention—we therefore excluded these networks).

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Second, an assumption of RSiena pertains to the relative stability of the friendship network. Although changes between observations are necessary for the data to be informative, too many changes do not allow the study of a gradually changing network (Veenstra et al., 2013). The Jaccard index can be used to infer the fraction of stable friendship nominations. If the Jaccard index is very low this may indicate that the changes in the networks are too large—then the SIENA method is less useful (Snijders, Van de Bunt & Steglich, 2010). It is recommended to exclude networks (classes) that are relatively unstable in friendship networks—this is represented in a Jaccard lower than 0.3 (Veenstra et al., 2013). Together with the exclusion of regressing classes this lead to the exclusion of 35 classes for sexual intention and 36 for sexual behavior—resulting in a final selection of classes for personality ($k = 17$), sexual intention ($k = 17$), and sexual behavior ($k = 16$) on which the analyses were performed. Our included networks had an average Jaccard of .439 (range .310-.600).

Analyses. The output in RSiena gives two types of parameters: network effects and covariate effects. First, the network effects, namely (a) density, the number of outgoing ties; (b) reciprocity, the extent to which friendship nominations are mutual or reciprocated; and (c) transitivity, the tendency for two adolescents who share a third friend, to become friends as well. Second, covariates are divided into constant and varying covariates. As constant covariates we included gender (0 = male, 1 = female) and personality dimensions at T1 (Big Five dimensions). For every covariate we estimated three parameters: the attribute ego parameter (EgoX, the effect of the covariate on selecting friends); the attribute alter parameter (AltX, the effect of the covariate on being selected as a friend), and finally the attribute similarity parameter (SimX, the tendency for adolescents to select friends that have similar levels of the covariate).

Following the constant covariates, we also included varying covariates for sexual intention and sexual behavior separately. Here, RSiena estimates change in these covariates from T1 to T2, and from T2 to T3. Unfortunately, the prevalence of sexual behavior and intention and variance was too low to estimate socialization (of sexual intention and behavior) effects. Thus, we included sexual intention and behavior as varying covariates in our selection models. Finally, to assess the interaction of personality dimensions and sexual intention and behavior on friendship networks we included EgoX \times SimX interactions for adolescents' personality dimensions and similarity of sexual intention and behavior separately.

We estimated the effects for every network (class) separately, after which we used the meta-analysis procedure provided in RSiena to analyze the average parameter

estimates and standard errors across the networks (Snijders & Baerveldt, 2003).² We then used a Fisher's combination procedure with two one-sided tests to test the significance of each parameter (Hedges & Olkin, 1985). When combining a small number of networks, the Fisher's combination procedure is preferred (Ripley et al., 2013). For this test, the null hypothesis is that a parameter estimate is zero in all networks. A right- and left-sided test is used—in the right-sided test the null hypothesis is that a parameter is zero or less than zero in all networks, with the alternative hypothesis being that the parameter is greater than zero in at least one network. In the left-sided test the null hypothesis is that a parameter is zero or greater than zero in all networks, with the alternative hypothesis being that the parameter is less than zero in at least one network (Ripley et al., 2013).

Results

Preliminary analyses

Pearson correlations between personality dimensions and sexual intention and behavior for the included sample showed that extraversion was related to higher levels of sexual intention (r_s .10 to .15; p_s .05 to .008) while conscientiousness was related to lower levels of sexual intention (r_s -.12 to -.19, p_s .02 to < .001). For sexual behavior we found fewer significant results, only extraversion ($r =$.24 to .28, $p_s <$.001) was related to higher levels of sexual behavior (see Table 2).

² In RSiena, several networks can be combined to inspect the overall effects. There are three methods for doing so: 1) combining the different networks into one large network, 2) combining the different networks into a multi-group project, and 3) using a meta-analytic approach. Using a meta-analytic approach offers several advantages. Option 1 and 2 assume that the parameters of the actor-based models for the included networks are the same (Ripley et al., 2013). The meta-analytic approach can be used without assuming that the parameters are the same but still using the same model specification. Although option 1 and 2 may have higher power, option 3 is safer in that it does not require the parameters to be the same (Ripley et al., 2013). Given the expected differences between networks in age and sexual behavior and intention we preferred the meta-analytic approach (option 3).

Table 2
Pearson Correlations Between Personality Dimensions and Sexual Intention and Behavior for the Overall Sample and the Included Sample

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Overall sample											
1. Extraversion	--										
2. Agreeableness	.09**	--									
3. Conscientiousness	-.12**	.33**	--								
4. Emotional stability	.45***	-.06*	-.08**	--							
5. Openness	.03	.50***	.23***	-.23***	--						
6. Sexual intention T1	.13***	-.12***	-.19***	.06	-.08**	--					
7. Sexual intention T2	.12**	-.15***	-.19***	.10**	-.09**	.64***	--				
8. Sexual intention T3	.15***	-.16***	-.18***	.11**	-.06	.58***	.70***	--			
9. Sexual behavior T1	.23***	-.07*	-.10***	.10**	-.01	.42***	.42***	.40***	--		
10. Sexual behavior T2	.24***	-.05	-.09**	.07*	-.02	.40***	.40***	.37***	.77***	--	
11. Sexual behavior T3	.26***	-.06	-.07*	.11***	-.01	.41***	.44***	.39***	.71***	.80***	--
Included sample											
1. Extraversion	--										
2. Agreeableness	.15**	--									
3. Conscientiousness	-.03	.29***	--								
4. Emotional stability	.32***	.05	.03	--							
5. Openness	.14**	.39***	.19***	-.15**	--						
6. Sexual intention T1	.10*	-.02	-.12*	.00	-.01	--					
7. Sexual intention T2	.06	-.09	-.19***	.06	-.02	.63***	--				
8. Sexual intention T3	.15**	-.10	-.17**	.11	-.00	.54***	.74***	--			
9. Sexual behavior T1	.26***	.09	.05	.06	.06	.37***	.29***	.32***	--		
10. Sexual behavior T2	.24***	.06	-.01	.05	.02	.41***	.32***	.37***	.84**	--	
11. Sexual behavior T3	.28***	.05	-.02	.10	.01	.37***	.38***	.35***	.74***	.79***	--

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

In Figure 1 we present a friendship network and its changes over time (from T1 to T3). The first network was observed during the first semester of the school year. It shows that many friendships are reported (there are several outgoing and reciprocated ties), but also that there are only two adolescents who select and are selected by many friends (the two circles in the center of the network). By the end of the school year (T2), more friendships have been formed (the network has become more dense) and there are now four adolescents with many incoming and outgoing ties. The friendship network at T3, just after the summer holidays when many classes change in composition, again shows a less dense network, with fewer nominations and selections compared to T2. At all three measurement occasions there is an indication of a gender similarity effect, where boys (white circles) and girls (black circles) tend to cluster together.

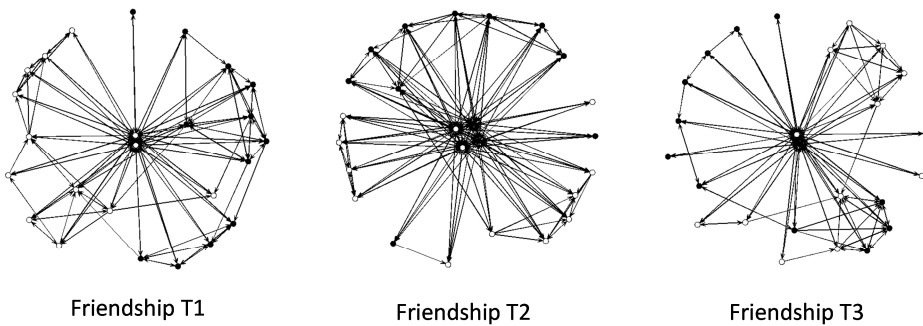


Figure 1. Three observations of one friendship network over time. White circles represent male students, black circles represent female students. Reciprocated friendships are represented by a double-headed arrow, otherwise an arrow indicates the direction of nomination. This network is a class in the 8th grade (year 2 in the Dutch secondary school system).

Personality model

To answer our first research question of whether friendship networks were based on personality dimensions, we examined the network effects and covariate effects of gender and personality dimensions (see Table 3). The significant parameter for density showed that the networks tended to be non-random: Adolescents had the tendency to be selective in their nominations of friends. Further, there was reciprocity in friendships, and friends of friends became friends (transitive triplets). As expected, we also found a significant gender effect of similarity—boys tended to cluster with boys and girls tended to cluster with girls.

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Table 3
Meta Analysis of Effects of Personality Dimensions on Friendship Selection (17 Networks)

Parameters	<i>b</i>	<i>SE</i>	Fisher's combination test <i>p</i> -value	
			Left one-sided	Right one-sided
Network effects				
Density	-2.55	1.14	< .001	1
Reciprocity	1.33	0.11	1	< .001
Transitivity	0.34	0.03	1	< .001
Ego effects				
Gender (1 = female)	-0.06	0.13	.070	.306
Extraversion	-0.06	0.03	.085	.924
Agreeableness	-0.04	0.08	.161	.635
Conscientiousness	0.10	0.06	.783	.002
Openness	0.06	0.10	.280	.006
Emotional stability	0.07	0.05	.922	.020
Alter effects				
Gender (1 = female)	-0.03	0.13	.070	.306
Extraversion	0.00	0.03	.371	.561
Agreeableness	-0.02	0.06	.367	.729
Conscientiousness	-0.04	0.03	.108	.850
Openness	0.02	0.04	.730	.388
Emotional stability	0.03	0.04	.881	.111
Similarity effects				
Gender (1 = female)	0.90	.11	1	< .001
Extraversion	0.28	0.15	.896	.056
Agreeableness	-0.30	0.19	.036	.818
Conscientiousness	0.07	0.21	.521	.114
Openness	0.05	0.14	.596	.477
Emotional stability	-0.04	0.14	.606	.491

Note. Bold estimates are significant (right- or left-one sided *p*-value < .05). *b* = unstandardized coefficients according to the Snijders-Baerveldt method (2003); *SE* = standard error.

Concerning the results of the personality effects we found that adolescents with higher levels of conscientiousness, openness, and emotional stability tended to select more friends (EgoX). Further, we did not find that adolescents with certain personality characteristics were selected more often as best friends than others (AltX). Finally, we found that adolescents tended to have dissimilar levels of agreeableness in their friendships (SimX).

Sexual behavior model

To answer our second research question on whether adolescents clustered together based on sexual behavior we ran a model with networks effects and covariate effects of gender and sexual behavior (see Table 4). The results showed that adolescents did not select more friends based on their sexual behavior (EgoX). However, adolescents with lower levels of sexual behavior were selected more

often as friends (AltX), but did not cluster together based on similarity of sexual behavior (SimX).

To answer our third research question on whether the selection effects of sexual behavior and personality would interact, we included interactions between personality dimensions and similarity in sexual behavior (EgoX × SimX)—no significant interactions were found ($ps > .05$), indicating that the level of personality dimensions was not related to the selection of friends who were similar in sexual behavior.

Table 4
Meta Analysis of Ego, Alter, and Similarity Effects of Sexual Behavior on Friendship Selection (16 Networks)

Parameters	<i>b</i>	<i>SE</i>	Fisher's combination test <i>p</i> -value	
			Left one-sided	Right one-sided
Network effects				
Density	-2.31	0.11	< .001	1
Reciprocity	1.16	0.09	1	< .001
Transitivity	0.33	0.03	1	< .001
Ego effects				
Gender (1 = female)	0.01	0.12	.319	.070
Sexual behavior	-0.07	0.10	.064	.580
Alter effects				
Gender (1 = female)	-0.11	0.11	.008	.683
Sexual behavior	0.00	0.07	.417	.636
Similarity effects				
Gender (1 = female)	0.83	0.94	1	< .001
Sexual behavior	0.10	0.08	.899	.383

Note. Bold estimates are significant (right- or left-one sided p -value < .05). We also ran this model excluding the older adolescents resulting in three classes of 6th graders, this did not alter the results. *b* = unstandardized coefficients according to the Snijders-Baerveldt method (2003). *SE* = standard error.

Sexual intention model

To answer our second research question on whether adolescents clustered together based on sexual intention we ran a model with networks effects and covariate effects of gender and sexual intention (see Table 5). The results showed that adolescents with higher levels of sexual intention selected fewer friends (EgoX), were less often selected as friends (AltX), and clustered together in friendship networks based on similar levels of sexual intention (SimX).

To answer our third research question on whether the selection effects of sexual intention and personality would interact we estimated interactions between personality dimensions and similarity in sexual intention (EgoX × SimX). We found a significant negative interaction effect of sexual intention and the personality

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dimension emotional stability (see Figure 2), such that adolescents with lower levels of emotional stability had friends with more similar levels of sexual intention (estimate = -0.36, $SE = 0.15$, right Fisher's $p = .995$, left Fisher's $p = .006$). We did not find interaction effects for the other personality dimensions and sexual intention ($ps > .05$).

Table 5
Meta Analysis of Ego, Alter, and Similarity Effects of Sexual Intention on Friendship Selection (17 Networks)

Parameters	<i>b</i>	<i>SE</i>	Fisher's combination test <i>p</i> -value	
			Left one-sided	Right one-sided
Network effects				
Density	2.41	0.12	< .001	1
Reciprocity	1.21	0.10	1	< .001
Transitivity	0.34	0.03	1	< .001
Ego effects				
Gender (1 = female)	-0.02	0.12	.321	.152
Sexual intention	-0.08	0.07	.002	.291
Alter effects				
Gender (1 = female)	-0.16	0.10	.005	.911
Sexual intention	-0.03	0.06	.011	.344
Similarity effects				
Gender (1 = female)	0.87	0.10	1	< .001
Sexual intention	0.10	.19	.310	.012

Note. Bold estimates are significant (right- or left-one sided p -value < .05). We also ran this model excluding the older adolescents (3 classes of 6th graders), this did not alter the results. b = unstandardized coefficients according to the Snijders-Baerveldt method (2003). SE = standard error.

To probe the negative interaction between EgoX emotional stability \times SimX sexual intention, we constructed ego-alter selection tables for each category of sexual intention for the lowest and highest level of emotional stability (see Table 6). This was done with the following equation:

$$y' = b1(\text{emo_V} - \text{emo_av}) + b2(\text{vi} - \text{SI_av}) + b3(\text{vj} - \text{SI_av}) + b4(1 - \text{abs}(\text{vi}-\text{vj})/\text{ran_v} - \text{sim_av}) + b5((\text{emo_V} - \text{emo_av}) * (1 - \text{abs}(\text{vi}-\text{vj})/\text{ran_v} - \text{sim_av}))$$

where $b1$ is the emotional stability EgoX estimate, $b2$ is the sexual intention EgoX estimate, $b3$ is the sexual intention AltX estimate, $b4$ is the sexual intention SimX estimate, and $b5$ is the interaction estimate of EgoX emotional stability \times SimX sexual intention. emo_V is the level of emotional stability (either 1 or 7 for this purpose), emo_av is the mean of emotional stability, vi is the sexual intention of the adolescent, vj is friends' sexual intention, SI_av is the mean of sexual intention, ran_v is the range of sexual intention minus 1, and sim_av is the average similarity of sexual intention. This equation (see Ripley et al., 2013 for more details) produces

two alter-ego selection tables (see Table 6)—one for low and one for high emotional stability of which the extreme values are plotted in Figure 2.

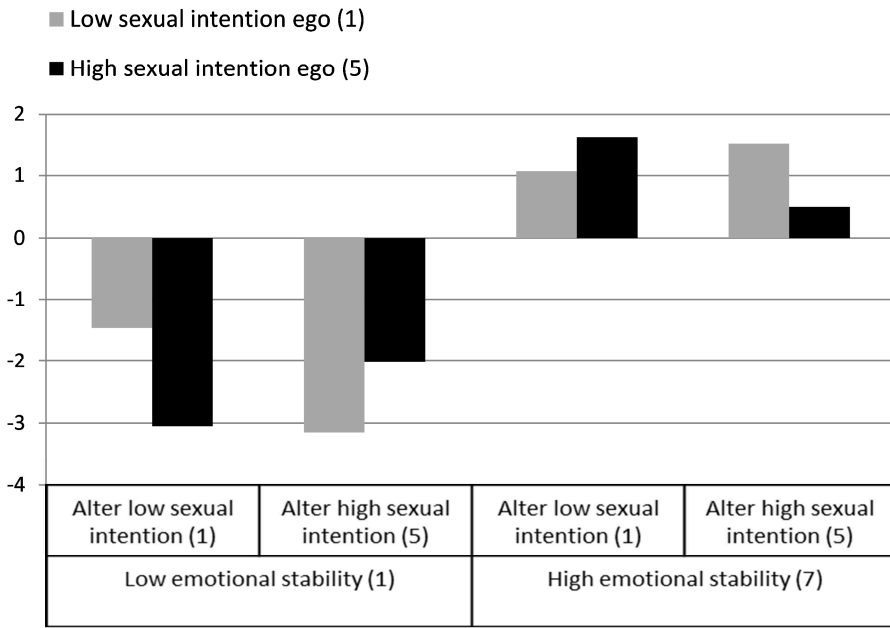


Figure 2. The contribution of emotional stability (EgoX, low and high) and sexual intention levels (low and high; EgoX and AltX) to the log odds that friendship ties will change (see Ripley et al., 2013 for further details on how to obtain these values). Positive values indicate an increase in log odds of a friendship tie, and negative values indicate a decrease in the log odds of a friendship tie.

The negative interaction between EgoX emotional stability × SimX sexual intention indicates that adolescents with lower levels of emotional stability had friends with more similar levels of sexual intention. Figure 2 shows that although low emotionally stable adolescents generally tend to not select friends (negative values), when they do select friends they are more likely to select friends similar to them with respect to sexual intention. More specifically, among low emotionally stable adolescents, those with a low sexual intention level (grey bars) are more likely to select friends with a low level of sexual intention (=1). In contrast, those with a high sexual intention level (black bars) are more likely to select friends with a high sexual intention level (=5). Among high emotionally stable adolescents we see a different pattern. Adolescents with a low sexual intention level (grey bars) prefer friends who have a high sexual intention (=5), whereas those with a high sexual intention (black bars) prefer friends with a low level of sexual intention (=1).

Table 6
Alter-Ego Selection Tables of Sexual Intention for Low and High Emotionally Stable Adolescents

Low emotional stability (=1)					
Sexual intention of friend					
	1	2	3	4	5
Sexual intention of adolescent					
1	-1.46	-1.88	-2.30	-2.73	-3.15
2	-1.85	-1.60	-2.02	-2.44	-2.87
3	-2.25	-2.00	-1.74	-2.16	-2.59
4	-2.65	-2.40	-2.14	-1.88	-2.30
5	-3.05	-2.79	-2.54	-2.28	-2.02
High emotional stability (=7)					
	1	2	3	4	5
1	1.07	1.18	1.30	1.42	1.53
2	1.21	0.93	1.04	1.16	1.27
3	1.35	1.07	0.79	0.90	1.02
4	1.49	1.21	0.93	0.64	0.76
5	1.63	1.35	1.07	0.78	0.50

Note. Values in bold are presented in Figure 2. Positive values indicate an increase in log odds of a friendship tie, and negative values indicate a decrease in the log odds of a friendship tie.

Discussion

In the current study we aimed to examine personality, sexual intention and behavior, and their link to adolescent peer processes. Our hypotheses pertained to selection and socialization processes—who are selected as friends, and how does socialization affect sexual behavior? Our hypotheses were partly confirmed. We found that high conscientious, open, and emotionally stable adolescents selected more friends, and that those with higher sexual intention selected fewer friends. Also, those with higher levels of sexual intention and girls were selected less often as friends. Further, we found that adolescents clustered together in friendships based on similarity in gender, and sexual intention, but dissimilarity in agreeableness. We did not find any selection effects of sexual behavior. Finally, including an interaction between sexual intention and behavior and the personality dimensions, we found that adolescents with lower levels of emotional stability had friends with more similar levels of sexual intention.

We had expected that the developmental tendency to engage in more or less sexual behavior, that is associated with individuals' personality traits, would be further stimulated by socialization in friend-networks. However, given the low prevalence of sexual behavior and variance of this behavior we were unable to test the hypothesis on socialization of sexual behavior and intention.³

Personality effects

In the personality models, our results differed somewhat from a previous study by Selfhout and colleagues (2010). They found that those similar in openness, extraversion, and agreeableness tended to cluster together in friendship networks. In contrast to their findings on late adolescents and young adults we found that adolescents who are dissimilar in agreeableness tended to cluster together in friendship networks, we found no other similarity effects of personality. Further, whereas Selfhout and colleagues found that those high on extraversion selected more friends, we found that those high on conscientiousness, openness, and emotional stability tended to select more friends. Finally, Selfhout and colleagues found that those high on agreeableness were selected more as friends. In contrast to their findings we found no alter effects of personality, meaning that personality characteristics did not determine whether adolescents were selected more as friends.

There are several possible explanations for these differences in personality effects. First, the different findings could be explained by differences in sample composition. The study by Selfhout and colleagues (2010) was done among just-acquainted first-year university students. In contrast, our study included adolescents of heterogeneous age groups and in longer-term friendships. In the Netherlands secondary schools form classes of individuals based on school year and educational track. Thus, adolescents will spend at least a whole school year and most of the day with the same classmates, often forming friendships that persist throughout the rest of their time in school. Our data collection was timed in the Fall and Spring, when adolescents had spent a minimum of 2-3 months with their classmates and many would have already known each other from previous years or schools—thus there is considerable variability in the duration of friendships within the studied networks. This enabled them to form close bonds, that are perhaps less dependent on first impressions such as the ties that were investigated in the study by Selfhout and colleagues (2010).

³ From the low baseline levels of sexual behavior and intention in the current sample, and the limited amount of development over time, one can infer that peer socialization does not play a role in the sexual domain, at least in the specific age range covered in our study. It is important, however, to consider this a preliminary answer—the limited variance and low base rates did not allow us to explicitly test any socialization effects.

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Second, in our study adolescents will have had more time to express their personality in the classroom network. The positioning of adolescents with different personality characteristics may change over time and within one class (i.e., who is most popular? what characteristics are appreciated?). The continuation of friendships may therefore be dependent on different personality characteristics than the initiation of friendships. For future research it may be beneficial to focus on how the impact of personality differs in friendship with different characteristics: stage of formation and quality.

Finally, it is important to mention the need for replication of these findings. Although the above-mentioned differences in age and level of acquaintance between our study and the study by Selfhout and colleagues (2010) may explain the differences in findings, it would be important to replicate this research by investigating both younger and older adolescents. In this way, one could then investigate how differences in age and level of acquaintance can impact selection effects in friendship networks.

Sexual intention and behavior effects

The current study is the first to show how sexual intention and behavior develop in friendship networks, and how these interact with personality. From our previous study we already knew that higher levels of extraversion and lower levels of agreeableness were related to more sexual behavior, and more casual and risky sexual behavior (Baams et al., 2014). In the current study we also found that for the included sample, lower levels of agreeableness were related to higher levels of sexual intention, but the effects of extraversion were more strongly present in relation to sexual behavior than in relation to sexual intention. This may be explained by the relatively sexually inexperienced sample in our study which caused some statistical issues with the socialization analyses. However, the relations with sexual intention moderately showed the expected linkage: higher levels of extraversion were related to higher sexual intention, whereas higher levels of agreeableness were related to lower levels of sexual intention.

Our study adds to previous findings by showing that sexual intention is related to peer processes—adolescents with higher levels of sexual intention are selected less often as friends and select fewer friends. Further, adolescents are found to cluster together based on similarity in sexual intention. We also found that adolescents with lower levels of emotional stability were more likely to have friends with similar levels of sexual intention. With the current analyses we were not able to examine whether this is an socialization or selection effect. However, it does indicate a role of personality. Low emotionally stable adolescents may be more likely to adopt their friends' attitudes toward sex, or feel more comfortable around friends with similar intentions. From previous research we know that mid

adolescents with low levels of emotional stability develop at a slower rate sexually (Baams et al., 2014), engage in less promiscuous behaviors, and report lower levels of sexual satisfaction (Eysenck, 1976). It may be that those with low levels of emotional stability feel more uncomfortable with social behaviors—including sexual behavior (Eysenck, 1976) and therefore seek friends who have similar intentions to start engaging in these behaviors.

We did not find selection-effects for sexual behavior, indicating that sexual behavior and intention function differently in friendship networks. There are several explanations for this. First, it is possible that our relatively young sample (mean age is 13.85), is not as sexually developed such that friends or others do not affect the initiation of behaviors—perhaps they are simply not “ready” to start engaging in sexual behavior. Second, the adolescents in the current sample often knew each other. It could be the case that over time the attitudes and behaviors of others may weaken in influence. This could be because they are not as novel, but also because there are other more interesting or powerful “role-models” (Byrne, Clore, & Smeaton, 1986; Kenrick & Gutierrez, 1980). These other “role-models” could be other adolescents, but also media sources (e.g., celebrities; L’Engle, Brown, & Kenneavy, 2006). Perhaps then, the peer group is not limited to the classroom setting, but instead has an extended presence in schools, communities, and through media.

One important contextual factor, that we did not examine in the current research, is whether having a romantic partner in the friendship network was linked to either the size of the network or to sexual intentions and behavior. For many adolescents, partners may fulfill some of the functions of friendships. In a serious relationship, adolescents may become closer to their partner and distance themselves from the friendship network (Laursen & Williams, 1997) and perhaps this change is even more apparent when their sexual intention and behavior increases. This suggestion is consistent with our finding that those with greater sexual intentions select fewer friends. Also, the friendship network may not be as interested in those who prefer to spend their time with their partner. For future research we would suggest expanding the network, and including questions about whether the romantic partner is part of the friendship network.

Gender and network effects

Considering that gender is an important indicator of friendship networks (e.g., Hussong, 2000; Poulin & Pedersen, 2007) and that several studies have previously found that similarity in gender is an important characteristic of friendships (e.g., Burk et al., 2007; Dijkstra et al., 2011; Kupersmidt, DeRosier, & Patterson, 1995; Selfhout et al., 2010; Steglich et al., 2006), we examined these effects in the tested models. Confirming previous research we found that boys tended to cluster with

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boys, and girls with girls (e.g., Dijkstra et al., 2011; Kupersmidt et al., 1995; Selfhout et al., 2010; Steglich et al., 2006). Further, we found that (in two out of three models) boys were selected more often than girls, thus seeming more popular. This finding is not readily explained, but similar to previous research (Pearson, Steglich, & Snijders, 2006).

Similar to previous research, we found that friendships were characterized by reciprocity and transitivity (Holland & Leinhardt, 1970; Van de Bunt, Van Duijn, & Snijders, 1999; Selfhout et al., 2010). Not only were friendships reciprocated (across time), they were also dynamic—characterized by processes such as forming triadic relationships (i.e., transitivity). Further, our negative density showed that as in most social network studies, networks tend to be non-random. As such, it describes the tendency of adolescents to selectively nominate friends (Snijders et al., 2010).

Taken together, these effects confirm that our analyses had sufficient power to find effects and that our null findings concerning sexual intention and behavior are not a function of an overall problem with the sample.

Limitations

The current study is the first large longitudinal study that uses a network-analytic approach to examine personality and development of sexual behavior and intention among adolescents, and their relation to adolescents' social peer context. Despite the additions of the current study to the fields of personality, peer socialization, and adolescent sexuality research, there are some limitations to note. The first limitations are methodological ones—our data did not meet the requirements to reliably run socialization models to assess socialization effects. This prevented us from investigating our last two research questions on socialization effects. Second, the network stability across waves was low for the majority of networks possibly because so many students switched classes. For future research we would recommend monitoring expected class composition change (Veenstra et al., 2013). Some large-scale studies on peer processes have included an entire community to examine peer processes (e.g., Van Zalk, Van Zalk, Kerr, 2011), enabling researchers to examine effects of adolescents inside *and* outside of the school. This would enable adolescents to select friends who may be more important or influential in their lives, but not currently a student at their school. Third, although using a meta-analytic approach enabled us to model different estimates across the networks, using more homogeneous networks (e.g., similar in age) may enable researchers to directly replicate findings from one model to another, or recognize that inconsistent effects are not confounded by large between-network heterogeneity.

Fourth, the low levels of sexual behavior and intention may have affected our findings. Although previous studies with similar levels of skewness in the data and similar number of participants tested in the models were able to detect network effects (bullying behavior: Caravita, Sijtsema, Rambaran, & Gini, 2014; substance use: Mathys, Burk, & Cillessen, 2013; direct aggression: Rulison, Gest, & Loken, 2013), coupled with the fact that we used a meta-analytic approach to account for potential differences between networks, the effects we report here may have been suppressed due to heterogeneity in networks. Thus, having the same amount of networks that are more homogeneous may be more informative.

Fifth, our measures of sexual behavior and intention were one-item self-report instruments that do not fully capture the complexity of sexual development in adolescence. High quality survey instruments and qualitative methods such as interviews are necessary to better understand the complex mechanisms behind sexual development. Finally, the sample in the current study has a predominantly Dutch or Western ethnic background and heterosexual orientation (85.5%). Despite the size of our sample, ethnicity and sexual orientation are likely key factors in sexual development (Diamond, Savin-Williams, & Dubé, 1999; Zimmer-Gembeck & Helfand, 2008), and thus may play a role in selection and socialization effects of sexual behavior. Among more diverse groups we would be able to examine the effects of ethnicity and sexual orientation both in sexual development and peer processes.

Future research

Our limitations point toward several suggestions for future research. First, given the low levels of sexual experience in the current sample, it would be important to follow a group of adolescents over a longer time period in order to trace their sexual debut and development or alternatively, it may be important to follow adolescents who are more experienced sexually. Second, it would be important to replicate the current study—perhaps with more nuanced questions about sexual behavior and the context in which this occurs. We would then be able to examine the effects of sexual development on peer processes and the influence of peers on adolescents' sexual development in more detail. Third, it would also be important to incorporate other individual characteristics that would predict sexual development and peer processes such as pubertal development and physical attractiveness.

Fourth, in the current study we found an interaction of emotional stability and sexual intention, perhaps in future research factors such as the mechanism by which these factors interact would expand on these findings. Fifth, in the current study we only had information on adolescents' best friends in their class, not the quality or importance of these specific friendships (Ojanen, Sijtsema, Hawley, &

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Little, 2010; Way & Greene, 2006). By adding in factors like these, or by increasing the size of the networks, we would be able to weigh the impact of different friends and their behavior on adolescents.

Conclusions

With the current study we showed that adolescents cluster together in friendships based on similarity in personality and sexual intention. Further, those adolescents who are more emotionally unstable were more likely to have friends with similar levels of sexual intention. Our findings confirm the commonly found links between personality dimensions and sexual behavior and intention in that those high on extraversion and low on conscientiousness engaged in more sexual behavior and had lower levels of sexual intention. We were able to extend these findings by showing the relation to peer processes. This study is one of the first to illustrate that even among the sexually inexperienced, adolescents are beginning to form friendships based on their sexual intention.

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Supplementary material available:

<http://www.sciencedirect.com/science/article/pii/S0092656614000762>

Chapter 6

Perceived realism moderates the relation between sexualized media consumption and permissive sexual attitudes in Dutch adolescents

This study examined whether the development of sexualized media consumption and permissive sexual attitudes would be more strongly interrelated when adolescents perceived sexualized media images as highly realistic. We used data from a three-wave longitudinal sample of 444 Dutch adolescents aged 13-16 years at baseline. Results from parallel process LGM multigroup analyses showed that higher initial levels of sexualized media consumption were associated with higher initial level of permissive sexual attitudes. Moreover, increases of sexualized media consumption over time were associated with increases of permissive sexual attitudes over time. Considering the moderation by perceived realism, we see these effects only for those who perceived sexualized media as more realistic. Findings for male and female adolescents were similar except for the relations between initial levels and subsequent development. Among male adolescents who perceived sexualized media images to be realistic, higher initial levels of permissive sexual attitudes were related to subsequent less rapid development of sexualized media consumption. For male adolescents who perceived sexualized media to be less realistic, higher initial levels of sexualized media consumption were related to a subsequent less rapid development of permissive sexual attitudes. These relations were not found for female adolescents. Overall, our results suggest that in middle adolescence, among male and female adolescents, those with a high level of perceived realism showed a correlated development of sexualized media consumption and permissive sexual attitudes.

This chapter was based on "Perceived realism moderates the relation between sexualized media consumption and permissive sexual attitudes in Dutch adolescents" by Baams, L., Overbeek, G., Dubas, J. S., Doornwaard, S. M., Rommes, E., & van Aken, M. A. G. (in press) *Archives of Sexual Behavior*.

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Adolescents in Western cultures are confronted daily with sexual images and storylines in magazines, television shows and on the Internet (Wolak, Mitchell, & Finkelhor, 2007). Among an American national sample of 13-18 year olds, 63% of boys and 40% of girls reported actively seeking sexual content in their media choices (Bleakley, Hennessy, & Fishbein, 2011). Sexualized media consist not only of explicit or pornographic images, but also of a narrative through which a representation of the “ideal”, mostly heterosexual, sex life is depicted—also referred to as a sexual script (Kim et al., 2007; Simon & Gagnon, 1986). Further, storylines and images in sexualized media are commonly not reflective of “real life” or avoid showing potential risks of certain behaviors (Cope-Farrar & Kunkel, 2002; Kunkel, Eyal, Finnerty, Biely, & Donnerstein., 2005). For example, media rarely provide information about sexual health and sexualized media often oversimplify or stereotype gender differences (Collins, 2011; Huston, Wartella, & Donnerstein; Lowry & Shidler, 1993). While many studies have examined the possible negative consequences of sexualized media use (e.g., Strasburger, 2012; Strasburger, Donnerstein, & Bushman, 2014), only recently have studies evaluated the reciprocal relation between media use and sexual outcomes (Hennessy, Bleakly, Fishbein, & Jordan, 2009; Peter & Valkenburg, 2010). Consuming sexualized media is a normal aspect of an increasing interest in sexuality during adolescence, but it has also been suggested to relate to risky sexual behavior (Strasburger, 2012; Strasburger et al., 2014). However, research is now also looking at potential positive effects of incorporating “responsible” messages about sexuality in popular media (Strasburger, 2012). In contrast to the plethora of previous cross-sectional work, the current study is the first to examine interrelated, intra-individual development of sexualized media consumption and permissive sexual attitudes over time.

Sexualized media consumption and sexual outcomes

Adolescents’ interest in and consumption of sexualized media content increases during adolescence (Crockett, Raffaelli, & Moilanen, 2003; Savin-Williams & Diamond, 2004) and with age adolescents’ attitudes toward sexuality tend to become more permissive (Crockett et al., 2003). In the current study we combine several forms of sexualized media ranging from “sexy” magazines to porn websites. Further, we examine permissive sexual attitudes—these describe liberal and more tolerant attitudes concerning sexual behavior (i.e., casual sex, cheating, showing nudity online).

Several theories outline how and why adolescents’ sexualized media consumption and permissive sexual attitudes may be related. Social cognitive theory describes (Bandura, 1977; 1994) that adolescents acquire knowledge and a set of expected behaviors, role models, and scenarios by observing others in social interactions.

These effects are thought to be most prominent when the role model is similar to the observer and attractive, and when the role model seems to be rewarded for the displayed behaviors. Specific to sexualized media, adolescents are thought to acquire models that include those behaviors, roles, and attitudes that are pervasive in sexualized media (Hald, Seaman, & Linz, 2012). The crux is that through these observations adolescents expect similar outcomes to what they see in the media (Bandura, 1994). Thus, the main idea is that sexualized media consumption is determined by expected outcomes, that have followed from previous consumption or from observing others (LaRose & Eastin, 2004). In the current study this would mean that those who consume more sexualized media are more likely to develop more permissive sexual attitudes.

However, not all adolescents blindly believe what they come across on television or on the internet. One of the proposed moderators of the effect of sexualized media is the extent to which adolescents perceive the material they see as realistic—perceived realism. Thus, when the popular media depict sex as fun and worry-free and adolescents perceive these notions as realistic, this may implicitly gear adolescents' behavior and norms toward higher levels of permissiveness (Herlitz & Ramstedt, 2005;), especially among those with a higher level of perceived realism (e.g., Rivadeneyra & Lebo, 2008; Taylor, 2005).

An alternative theory is the selective exposure hypothesis (e.g., Festinger, 1957; Zillman & Bryant, 1985). The model describes how media consumers select media that are supportive of or confirm their existing perceptions and that consumers avoid media that is incongruent with their perceptions. In the current study this would mean that those with more permissive sexual attitudes would select media that match these attitudes

The third theory that frames the current study is the media practice model. This is similar to the selective exposure hypothesis in that it assumes that individuals' existing attitudes or perceptions affect whether they select or avoid certain media. According to this model, adolescents actively select media content based on their interpretation and motivations (Brown, 2000). In this circular model, adolescents' sense of self (identity) is thought to affect their media choices (selection), their attention for these media leads to further interpretation and evaluation which then affects their sense of self (identity) (Brown, 2000).

Based on these theories, one might expect the developments (changes) in sexualized media consumption and permissive sexual attitudes to be interrelated in a reciprocal manner. From the social cognitive theory we would expect media to impact attitudes and vice versa, although this may be limited to certain circumstances such as perceiving media as more or less realistic. Similarly, from

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the selective exposure hypothesis and the media practice model we would expect adolescents to select media that “match” their existing attitudes and perceptions.

Previous cross-sectional research has shown that adolescents who consume more sexualized media also report more permissive sexual attitudes (e.g., Aubrey, Harrison, Kramer, & Yellin, 2003; Buhi & Goodson, 2007; L’Engle, Brown, & Kenneavy, 2006; Somers & Tynan, 2006). These studies assumed a unidirectional relation between sexualized media consumption and permissive sexual attitudes, suggesting that sexualized media forms a risk factor for adolescents’ sexual health by influencing attitudes. However, based on the media practice model and the selective exposure theory adolescents are active agents in selecting and consuming media and some adolescents might consciously seek out sexualized media more than others. If these perspectives hold, a reciprocal association between sexualized media consumption and permissive sexual attitudes would be expected.

Only a few studies have examined the bidirectionality of associations between sexualized media consumption and sexual development (Hennessy et al., 2009; Peter & Valkenburg, 2010; Vandenbosch & Eggermont, 2013). Among Dutch 13-20 year olds, Peter and Valkenburg (2010) found that reported exposure to sexually explicit material predicted higher self-report of instrumental sexual attitudes (i.e., viewing sex as primarily physical and casual rather than affectionate and relational) six months later. They also found that instrumental sexual attitudes predicted more exposure to sexually explicit material. Among American 14-16 years old youth, Hennessy et al. (2009) found correlated increases between reported exposure to sexualized media content and sexual experience. They also found that higher levels of initial exposure to sexualized media content predicted less rapid increases in sexual experiences. Among Flemish adolescents (aged 12-16 years old) use of sexually explicit websites was related to the initiation of sexual intercourse, but the reciprocal relation was not found (Vandenbosch & Eggermont, 2013).

Among Dutch adolescents in eighth through tenth grade, boys who had more permissive sexual attitudes at the beginning of the study, showed a stronger increase in their sexually explicit internet material (Doornwaard, van den Eijnden, Overbeek, & ter Bogt, 2014) but no such link was found for girls. Together, results from these studies underline the importance of examining these relations from a correlated change-perspective.

The role of perceived realism

According to both social cognitive theory and the media practice model, the relation between stimuli and behavior is not a “one size fits all” phenomenon. In the present study, we examine these over time bidirectional relations and investigate two factors that might moderate these links: perceived realism and sex of the adolescents.

Individuals are more likely to attend to or imitate stimuli when they perceive these stimuli to be realistic (Bandura, 1994). Thus, when adolescents consider media images as realistic, they may be more likely to imitate the modeled behavior (Peter & Valkenburg, 2010), with media taking on the role of a “sexual super peer” (Brown, Halpern, & L’Engle, 2005; Strasburger & Wilson, 2002). Results from several cross-sectional studies indicate that perceived realism moderates the relation between sexualized media and sexual outcomes. Perceiving sexual content on television as realistic was found to strengthen the relation between reported consumption of sexual media content and permissive sexual attitudes and beliefs among undergraduate students (Taylor, 2005), and more traditional dating role attitudes among adolescents (Rivadeneira & Lebo, 2008). Perceived realism is also found to predict relationship intimacy (Stulhofer, Busko, & Schmidt, 2012), recreational attitudes towards sex (Peter & Valkenburg, 2006), and pornography consumption (Hald, 2007). In contrast to expectations, in a sample of Danish young adults perceived realism of pornography did not moderate the relationship between exposure to pornography and sexist attitudes (Hald, Malamuth, & Lange, 2013).

In a recent longitudinal study, Peter and Valkenburg (2010) found that exposure to sexually explicit material predicted higher instrumental sexual attitudes and this link was mediated by social realism—a measure of individuals’ perceived realism of media images. However, the reverse relation, with higher levels of instrumental sexual attitudes predicting more exposure to sexually explicit material, was not mediated by social realism. Given earlier findings that media content and sexuality are linked, it could be that perceived realism can best be hypothesized to function as a moderator instead of a mediator. For adolescents scoring higher on perceived realism we would expect sexualized media to be more strongly related to permissive sexual attitudes compared to adolescents scoring lower on perceived realism.

Sex differences

Male adolescents and adults generally report more sexualized media use (Brown & L’Engle, 2009; Wolak et al., 2007) than female adolescents, react more positively to these media than their female peers (Allen et al., 2007; Hald & Malamuth, 2008),

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and find this material more entertaining and informative than female adolescents (Taris, Semin, & Bok, 1998; Ward & Rivadeneyra, 1999). Considering that sexualized media offer scripts that portray a more active or permissive role for men than for women (Aubrey, 2004; Tolman, 1999), it might be that the relation between sexualized media consumption and permissive sexual attitudes is stronger for male adolescents than for female adolescents. In addition, sexualized media may be consistent with society's scripts of male sexuality (Aubrey, 2004) and therefore impact or further encourage these scripts more in male adolescents than in female adolescents.

The present study

The present study is the first to examine the longitudinal moderator effect of perceived realism in a 3-wave prospective examination of adolescents' sexualized media consumption. Specifically, we examined whether the association between adolescents' sexualized media consumption and permissive sexual attitudes would be stronger among adolescents who perceive sexualized media images to be highly realistic. Using multi-group longitudinal growth modeling, we tested three hypotheses. First, we hypothesized that (a) adolescents who consumed larger amounts of sexualized media at baseline would also report higher initial levels of permissive sexual attitudes at baseline, that (b) adolescents who increased their sexualized media consumption over time, would show a related increase in permissive sexual attitudes over time, and that (c) adolescents who consumed larger amounts of sexualized media at baseline, would show a more rapid increase in permissive sexual attitudes over time, and *vice versa*. Thus, based on the media practice model, we hypothesized a reciprocal, correlated developmental pattern between sexualized media consumption and permissive sexual attitudes. Second, based on theoretical notions and empirical findings, we hypothesized that the above-mentioned relations would be stronger for adolescents with a high level of perceived realism compared to adolescents with a low level of perceived realism. Third, based on the notion that media portrays men as more sexually assertive and permissive than women, and higher consumption levels of sexualized media among men, we hypothesized stronger links between sexualized media consumption and permissive sexual attitudes among male adolescents than among female adolescents.

Method

Procedure and sample characteristics

Data were collected as part of a larger study, a four-wave longitudinal research project on romantic and sexual development. In the current study we used the first three measurement waves of this longitudinal study. The first wave of data collection (T₁) took place in October 2009; the second and third (T₂ and T₃) waves took place after six and twelve months, respectively. Paper-and-pencil survey data were collected from third year (U.S. 9th grade equivalent) students attending seven high schools in The Netherlands. Permission for the study was granted by the ethics board of the Faculty of Social and Behavioral Sciences at Utrecht University. Adolescents were included in the sample when they themselves agreed to participate and their parents had given passive consent (three parents did not want their child to take part in the study). Adolescents did not receive compensation for their participation. Data collection took place in a classroom setting. Two research assistants were present at all times to introduce the questionnaire, emphasize that data would be handled confidentially, and answer any questions. All participants could withdraw at any time, and were ensured of this in the introduction.

At baseline (T₁), 658 students filled in the questionnaire. Because class composition changed between T₂ and T₃ there was some attrition in sample size; our final 3-wave sample consisted of 444 adolescents (230 girls, 51.8%). Analyses of the key variables and demographics at T₁ showed no differences between participants who dropped out at T₃ and those who participated in the entire study. The mean age of this sample at baseline was 14.46 ($SD = 0.61$ | range 13-16). The sample consisted predominantly of youths from a Dutch background (83.3%), the remainders were either Turkish: 4.5%, Moroccan: 3.4%, Surinamese: 0.5%, Dutch Antilles: 1.1%, Indonesian: 0.5%, or other: 6.8%¹. These groups were too small to compare in the analyses. Mean level analyses and correlational analyses, however, showed no differences in the (relations between) key variables between the Dutch and non-Dutch ethnic groups. The majority of adolescents (66%, $n = 293$) were enrolled in vocational education programs. Most adolescents reported having a heterosexual orientation (89.9%), 3.2% had a homosexual orientation, 0.9% had a bisexual orientation, and 6.0% was unsure of their orientation.

Measures

Sexualized media consumption. Adolescents' sexualized media consumption was assessed with six items that tapped into the use of different media such as magazines, television programs, internet, and movies (Hawk, Vanwesenbeeck, De Graaf, & Bakker, 2006). The stem question was: "How often in the past six months have you...". The items are presented in Table 1. Answer categories ranged on a 5-

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point scale from 1 = *never* to 5 = *very often*. A principal component analysis on the six original items identified one factor that had an Eigenvalue > 1.0 at measurement T2 and T3. However, at T1, one item in the original scale (i.e., exposure to sexual content in magazines) had a high (.96) factor loading on a second component. We therefore decided to exclude this item from the analyses and conclude with a scale of five items (factor loadings ranged from .74 to .88). The explained variance of this scale was 64.06% at T1, 71.27% at T2, and 64.99% at T3. Internal consistency of the scale in the current sample was high ($\alpha = .85$ at T1, $\alpha = .90$ at T2, and $\alpha = .86$ at T3). The longitudinal correlations between T1 to T3 ranged between .38 and .71, $ps < .001$.

Permissive sexual attitudes. We assessed adolescents' permissive sexual attitudes by measuring the extent to which they agreed with eleven statements of a sexually permissive nature (De Graaf, Meijer, Poelman, & Vanwesenbeeck, 2005). Specifically, adolescents were asked to respond on a 5-point scale, ranging from 1 = *totally wrong* to 5 = *totally right*, to statements such as "Having sex with somebody you just met". A principal component analysis on these eleven items identified different components over time across the three measurement waves. Forcing the items to load on one component resulted in Eigenvalues ranging from 4.59 to 5.39 across waves, with factor loadings ranging from .44 to .83. The explained variance of the scale was 41.76% at T1, 49.01% at T2, and 43.73% at T3. Internal consistency of the scales was high ($\alpha = .85$ at T1, $\alpha = .89$ at T2, and $\alpha = .86$ at T3). The longitudinal correlations between T1 to T3 ranged between .50 and .56, $ps < .001$.

Perceived realism. Adolescents' perceived realism regarding sexualized media images was assessed with seven items (De Graaf et al., 2005), such as "The sex you see in porn is like in real life". Answer categories ranged on a 5-point scale from 1 = *totally disagree* to 5 = *totally agree*. A principal component analysis on these seven items identified one factor consisting of four items that had an Eigenvalue > 1.0. A second component of the remaining three items did not form a reliable factor ($\alpha = .58$ at T1); these items were therefore excluded from the analyses. The explained variance of the final scale was 56.98%, with factor loadings ranging from .69 to .83. Internal consistency of items in the current sample was adequate ($\alpha = .74$ at T1).

Table 1
Explained Variance, and Factor Loadings for the Sexualized Media Consumption Scale Across the Three Measurement Waves

	Factor loadings		
	T ₁	T ₂	T ₃
<i>How many times in the last 6 months have you...</i>			
read a sex- or porn magazine	.74	.85	.80
watched a sex movie on television	.82	.87	.84
watched a porn video or dvd	.84	.86	.87
watched an x-rated music video on the internet (a video with a	.75	.77	.74
visited a porn website	.85	.88	.78
Eigenvalue	3.20	3.56	3.25
Total variance	64.06%	71.27%	64.99%

Note. Answer categories ranged on a 5-point scale from 1 = *never* to 5 = *very often*.

Analysis strategy

To test our hypothesis that increases in adolescents' sexualized media consumption would be linked to increases in permissive sexual attitudes, we performed a parallel process linear growth model (LGM) analysis (see Figure 1 for the conceptual model) in Mplus, version 6 (Muthén & Muthén, 2010). With LGM analyses we obtained estimates of two latent variables (i.e., growth factors) that represent the initial level of a variable (i.e., intercept) and the rate of change of that variable (i.e., slope). Variance of these factors reflect individual variability in the initial level and rate of change (Duncan, Duncan, Strycker, Li, & Alpert, 1999). By correlating the growth factors of two processes, parallel (correlated) development can be examined.

Specifically, we estimated a multi-group model with two groups: youths characterized by low perceived realism versus youths characterized by relatively high perceived realism (i.e., a score below or above the composite median of 2.29 at the first measurement wave).

The parallel process model was run for the total sample and for male and female adolescents separately, using a Bayesian estimation technique due to the non-normally distributed variables (sexualized media consumption and permissive sexual attitudes). Convergence of models was checked by inspecting the trace plots and potential scale reduction (PSR) of the relevant parameters. We used the estimates and Bayesian credibility intervals (CI) to inspect parameters (interpreting CIs not containing zero as effects; for an overview on the differences between Bayesian credibility intervals and confidence intervals see Jaynes, 1976). To test for

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moderation by perceived realism, we compared parameters (and their CIs) of a fully constrained model, in which associations between growth factors were held equal for low versus high perceived realism groups, with parameters of an unconstrained model, in which these associations were freely estimated. The fit index deviance information criterion (DIC) was compared between the constrained and unconstrained models.

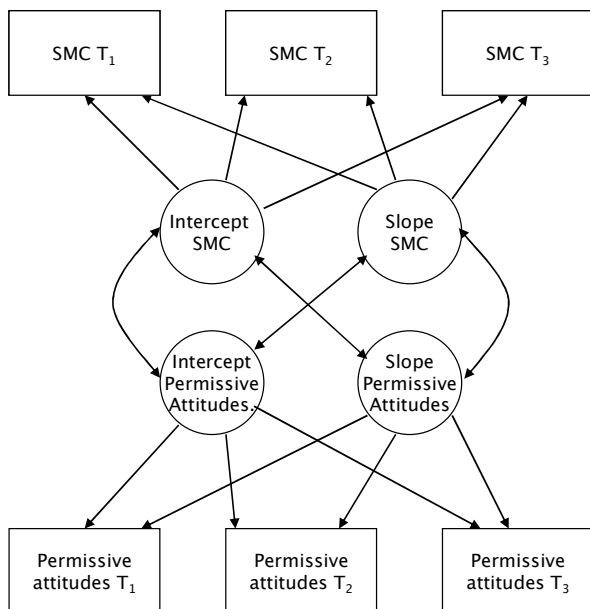


Figure 1. Conceptual parallel process linear growth model for the overall group.
Note. SMC = Sexualized media consumption. PSA = Permissive sexual attitudes.

Results

The ranges, means and standard deviations for sexualized media consumption, permissive sexual attitudes and perceived realism are presented in Table 2. Spearman rho correlations were computed to examine cross-sectional and longitudinal bivariate associations among these variables, separately for male and female adolescents (see Table 3). Cross-sectional correlations showed positive associations—for both male adolescents and female adolescents—between sexualized media consumption and permissive sexual attitudes. This indicated that adolescents reporting higher levels of sexualized media consumption also reported more permissive sexual attitudes. Longitudinally, from T1 to T2 and T3 higher levels of sexualized media consumption were related to higher levels of permissive sexual attitudes. The relations of perceived realism with sexualized media consumption and permissive sexual attitudes varied by gender. For male adolescents we found that higher levels of perceived realism at T1 were related to higher levels of both sexualized media consumption (except at T3) and permissive sexual attitudes. For female adolescents on the other hand, perceived realism was not related to sexualized media consumption (at T1-3), and only positively related to permissive sexual attitudes (at T1).

Table 2
Mean Scores and Standard Deviations of Key Variables for Males, Females and Total Sample

		Males	Females	Overall
	Range	Mean (SD)	Mean (SD)	Mean (SD)
Sexualized media consumption, T ₁	1–5	1.70 (0.76)	1.13 (0.22)	1.40 (0.63)
Sexualized media consumption, T ₂	1–5	1.79 (0.88)	1.12 (0.30)	1.44 (0.73)
Sexualized media consumption, T ₃	1–5	1.60 (0.72)	1.12 (0.24)	1.35 (0.58)
Permissive sexual attitudes, T ₁	1–5	2.30 (0.59)	1.99 (0.44)	2.14 (0.54)
Permissive sexual attitudes, T ₂	1–5	2.45 (0.68)	2.06 (0.54)	2.25 (0.64)
Permissive sexual attitudes, T ₃	1–5	2.45 (0.57)	2.02 (0.51)	2.22 (0.58)
Perceived realism, T ₁	1–5	2.64 (0.87)	2.05 (0.71)	2.34 (0.84)

Note. Mean-level changes in sexualized media consumption and permissive sexual attitudes were checked with repeated measures ANOVAs with between-subjects factor sex. No significant group differences were found.

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Table 3

Cross-sectional and Longitudinal Spearman's Rho Correlations for Males and Females

	1.	2.	3.	4.	5.	6.	7.
1. Sexualized media consumption, T ₁	--	.45***	.38***	.38***	.19**	.26**	.11
2. Sexualized media consumption, T ₂	.71***	--	.50***	.21**	.11	.22**	.08
3. Sexualized media consumption, T ₃	.65***	.63***	--	.26**	.24**	.23**	.04
4. Permissive sexual attitudes, T ₁	.46***	.42***	.32***	--	.65***	.62***	.18*
5. Permissive sexual attitudes, T ₂	.42***	.42***	.40***	.61***	--	.62***	.09
6. Permissive sexual attitudes, T ₃	.27**	.19*	.31***	.50***	.66***	--	.12
7. Perceived realism, T ₁	.32***	.34***	.15	.31***	.14**	.20*	--

Note. Correlations for females are presented in the upper right triangle of the matrix; for males in the lower left triangle. * $p < .05$. ** $p < .01$. *** $p < .001$.

Parallel process LGM analyses

To examine whether the developmental trajectories of sexualized media consumption and permissive sexual attitudes would be interrelated, we performed a series of parallel process LGM analyses, first for the overall sample and then for male and female adolescents separately. In these models, we tested several relations simultaneously: 1) we examined the relation between initial levels of sexualized media consumption and permissive sexual attitudes (intercept-intercept), 2) we examined the correlated developments of sexualized media consumption and permissive sexual attitudes (slope-slope), 3) we examined the relation between initial levels of sexualized media consumption and the development of permissive sexual attitudes over time, and finally 4) we examined the relation between initial levels of permissive sexual attitudes and the development of sexualized media consumption over time. Table 4 presents the associations between intercepts and slopes of sexualized media consumption and permissive sexual attitudes, both for the overall sample and for male and female adolescents separately. First, for the overall sample, results indicated that initial levels of sexualized media consumption and permissive sexual attitudes were positively related. Hence, those with higher levels of sexualized media consumption at the start of the study also showed higher levels of permissive sexual attitudes at the start of the study; this was also the case for both male and female adolescents separately. Second, results showed that developmental changes of sexualized media consumption and permissive sexual attitudes were positively related, for the overall sample and male and female

adolescents separately. Thus, those with a steeper change in sexualized media consumption over the course of the study also showed a steeper development of sexualized media consumption over time. Third, higher initial levels of sexualized media consumption were related to a less rapid development of permissive sexual attitudes (intercept-slope) for male adolescents and the overall sample—but not for female adolescents. Fourth, for the overall sample we found that higher initial levels of permissive sexual attitudes were related to a less rapid development of sexualized media consumption—this was not found for male and female adolescents separately.

In sum, results of the parallel LGM models showed that developments in sexualized media consumption were related to developments in permissive sexual attitudes, and also indicated some sex differences in these relations. To test our hypothesis about the moderating role of perceived realism, we conducted multi-group parallel process LGM analyses for the low and high perceived realism groups. A comparison of the fit index deviance information criterion (DIC) showed a better fit for the multi-group models compared to the constrained models and are thus interpreted further (see Tables 3-4 for fit statistics).

Table 4
Associations Between Growth Factors Derived from Parallel Process Models

	Males (<i>n</i> = 151)			Females (<i>n</i> = 164)			Overall (<i>n</i> = 315)		
	β	95% CI	<i>p</i>	β	95% CI	<i>p</i>	β	95% CI	<i>p</i>
Intercept SMC – Slope SMC	-.53	[-.69, -.33]	< .001	-.43	[-.62, -.15]	.002	-.48	[-.59, -.36]	< .001
Intercept PSA – Slope PSA	-.30	[-.55, .09]	.063	-.16	[-.38, .24]	.166	-.15	[-.36, .20]	.182
Intercept SMC – Intercept PSA	.63	[.47, .76]	< .001	.43	[.28, .58]	< .001	.59	[.49, .68]	< .001
Slope SMC – Slope PSA	.40	[.11, .68]	.003	.30	[.03, .65]	.013	.33	[.16, .53]	< .001
Intercept SMC – Slope PSA	-.34	[-.59, -.09]	.003	-.19	[-.40, .02]	.041	-.16	[-.33, -.02]	.015
Intercept PSA – Slope SMC	-.23	[-.48, .01]	.030	-.13	[-.35, .09]	.123	-.18	[-.33, -.01]	.007

Note. SMC = Sexualized media consumption. PSA = permissive sexual attitudes. CI = Credibility interval. The one-tailed *p*-value is the proportion of the posterior distribution below zero for a positive estimate, and the proportion of the posterior distribution above zero for a negative estimate. DIC overall = 3124.15; Males = 1876.06; Females = 579.60.

Table 5

Estimated Level and Rates of Change for Overall, Male, and Female Adolescents, and for the Low and High Perceived Realism Groups

	Sexualized media consumption		Permissive sexual attitudes		Sexualized media consumption		Permissive sexual attitudes	
	<i>M (SD)</i>	<i>p</i>	<i>M (SD)</i>	<i>p</i>	<i>M (SD)</i>	<i>p</i>	<i>M (SD)</i>	<i>p</i>
	Low perceived realism				High perceived realism			
	Males							
Mean intercept	1.42 (0.07)	< .001	2.12 (0.08)	< .001	1.84 (0.07)	< .001	2.40 (0.05)	< .001
Variance intercept	0.29 (0.07)	< .001	0.25 (0.08)	< .001	0.67 (0.09)	< .001	0.29 (0.05)	< .001
Mean slope	0.05 (0.06)	.218	0.12 (0.05)	.007	-0.04 (0.03)	.143	0.08 (0.03)	.006
Variance slope	0.14 (0.05)	< .001	0.06 (0.02)	< .001	0.09 (0.03)	< .001	0.06 (0.02)	< .001
	Females							
Mean intercept	1.10 (0.02)	< .001	1.93 (0.04)	< .001	1.15 (0.03)	< .001	2.07 (0.05)	< .001
Variance intercept	0.03 (0.01)	< .001	0.18 (0.03)	< .001	0.06 (0.01)	< .001	0.18 (0.04)	< .001
Mean slope	.001 (0.01)	.312	0.02 (0.02)	.130	-0.02 (0.02)	.129	0.02 (0.03)	.222
Variance slope	0.01 (0.00)	< .001	0.02 (0.01)	< .001	0.02 (0.00)	< .001	0.06 (0.01)	< .001
	Overall							
Mean intercept	1.21 (0.03)	< .001	1.99 (0.04)	< .001	1.56 (0.05)	< .001	2.26 (0.04)	< .001
Variance intercept	0.13 (0.02)	< .001	0.18 (0.03)	< .001	0.54 (0.05)	< .001	0.27 (0.03)	< .001
Mean slope	0.02 (0.02)	.198	0.05 (0.02)	.007	-0.03 (0.02)	.094	0.06 (0.02)	.004
Variance slope	0.04 (0.01)	< .001	0.03 (0.01)	< .001	0.07 (0.01)	< .001	0.06 (0.01)	< .001

Note. The one-tailed *p*-value is the proportion of the posterior distribution below zero for a positive estimate, and the proportion of the posterior distribution above zero for a negative estimate.

Multi-group analyses: Low and high perceived realism

The multi-group parallel process LGM models were fit for the overall sample and for male and female adolescents separately. Table 5 presents mean intercepts and slopes of sexualized media consumption and permissive sexual attitudes, as well as variances around these growth factors, for the overall sample and for male and female adolescents separately. As can be seen from this table, mean initial levels of both sexualized media consumption and permissive sexual attitudes deviate from zero. More importantly, the mean slopes of sexualized media consumption and permissive sexual attitudes differ from zero dependent on sex of the sample and level of perceived realism. In other words, not all groups show on average a change in levels of sexualized media consumption and permissive sexual attitudes over time. However, in all groups, the variance of the slope of sexualized media consumption and permissive sexual attitudes deviated from zero (in both male and female adolescents and high and low perceived realism groups). Thus, adolescents showed individual differences in their rate of development of sexualized media consumption and permissive sexual attitudes. Table 6 shows the associations between growth factors of sexualized media consumption and permissive sexual attitudes for the overall group, and for male and female adolescents separately, across low and high perceived realism groups. Because the findings among male and female adolescents differ substantially, we will discuss them separately.

Multi-group analyses for male and female adolescents separately. The multi-group LGM parallel process model (see Table 6) showed that: 1) For both male and female adolescents in both the high and low perceived realism group, the initial levels of sexualized media consumption and permissive sexual attitudes were positively related. In other words, those with higher levels of sexualized media consumption at the start of the study also showed higher levels of permissive sexual attitudes at the start of the study; 2) For both male and female adolescents, but only in the high perceived realism group, we found that the development of sexualized media consumption and permissive sexual attitudes were positively related—indicating correlated change. Thus, among those who perceived sexualized media to be relatively realistic, a steeper change in sexualized media consumption was related to a steeper change in permissive sexual attitudes; 3) For male adolescents in the low perceived realism group, we found that higher initial levels of sexualized media consumption were related to a less steep development of permissive sexual attitudes—this was not found among male adolescents in the high perceived realism group, and not among female adolescents; 4) For male adolescents in the high perceived realism group, we found that higher initial levels of permissive sexual attitudes were related to a less steep development of sexualized media consumption—this was not found among male adolescents in the low perceived realism group, and not among female adolescents.

Table 6. Associations Between Growth Factors Derived from Unconstrained Parallel Process Models Multigroup for Low and High Perceived Realism

	Males			Females			Overall		
	β	95% CI	p	β	95% CI	p	β	95% CI	p
Low perceived realism									
Intcept SMC – Slope SMC	-.40	[-.67, -.04]	.014	-.23	[-.56, .34]	.187	-.37	[-.56, -.16]	.001
Intercept PSA – Slope PSA	-.34	[-.66, .15]	.080	-.09	[-.43, .46]	.360	-.07	[-.37, .38]	.357
Intercept SMC – Intercept PSA	.66	[.37, .85]	< .001	.51	[.30, .73]	< .001	.56	[.41, .70]	< .001
Slope SMC – Slope PSA	.18	[-.31, .62]	.229	.11	[-.39, .59]	.324	.18	[-.11, .52]	.107
Intercept SMC – Slope PSA	-.53	[-.81, -.14]	.004	-.24	[-.66, .17]	.121	-.29	[-.56, -.06]	.008
Intercept PSA – Slope SMC	.11	[-.29, .47]	.229	-.09	[-.45, .26]	.308	.10	[-.15, .34]	.210
High perceived realism									
Intercept SMC – Slope SMC	-.58	[-.79, -.37]	< .001	-.52	[-.70, -.25]	.001	-.52	[-.65, -.37]	< .001
Intercept PSA – Slope PSA	-.34	[-.58, .01]	.029	-.28	[-.51, .07]	.050	-.24	[-.42, .00]	.026
Intercept SMC – Intercept PSA	.60	[.45, .74]	< .001	.39	[.16, .58]	.001	.60	[.49, .69]	< .001
Slope SMC – Slope PSA	.48	[.16, .79]	.002	.34	[.02, .62]	.020	.37	[.17, .56]	.001
Intercept SMC – Slope PSA	-.24	[-.49, .03]	.043	-.17	[-.43, .11]	.116	-.11	[-.29, .08]	.127
Intercept PSA – Slope SMC	-.44	[-.72, -.16]	.002	-.15	[-.42, .13]	.149	-.33	[-.50, -.14]	< .001

Note. PSA = Permissive sexual attitudes. SMC = Sexualized media consumption. CI = Credibility interval. The one-tailed p -value is the proportion of the posterior distribution below zero for a positive estimate, and the proportion of the posterior distribution above zero for a negative estimate. Multigroup models were better supported by the data than constrained (non-multigroup) models DIC multi-group overall = 3031.27; Males = 1873.87; Females = 566.81.

Discussion

In the present study we examined relations between the development of sexualized media consumption and the development of permissive sexual attitudes and whether these were moderated by perceived realism of sexualized media content. We found partial support for our hypotheses. Specifically, findings indicated that adolescents who reported consuming larger amounts of sexualized media at the start of the study also reported higher initial levels of permissive sexual attitudes. Further, we found that for adolescents who perceived sexualized media as relatively realistic, the change in sexualized media consumption was correlated to the change in permissive sexual attitudes—those who showed a steeper development in sexualized media consumption also showed a steeper development in permissive sexual attitudes. Thus, as hypothesized, those who viewed sexualized media as realistic were more likely to develop permissive sexual attitudes than those who perceived these media to be unrealistic. As social cognitive theory posits, adolescents may be more likely to select media based on the expected outcomes—select media that “matches” their level of realism—and at the same time these media have a part in further creating adolescents’ social models (Hald et al., 2012; LaRose & Eastin, 2004). Further, these findings also support the notion that adolescents may select media based on existing attitudes (Festinger, 1957; Zillman & Bryant, 1985) and sense of self (Brown, 2000).

In contrast to our hypothesis, we found that male adolescents who reported consuming higher levels of sexualized media consumption at the start of the study, showed a less rapid development in permissive sexual attitudes over time, albeit only in the low perceived realism group. Similarly, male adolescents who reported higher levels of permissive sexual attitudes at the start of the study showed a slower development in sexualized media consumption over time, but only in the high perceived realism group. These results support previous findings by Hennessy et al. (2009). During adolescence increases in both sexualized media consumption and permissive sexual attitudes can be observed (Crockett et al., 2003; Savin-Williams & Diamond, 2004). This may point toward a correlated development of sexualized media consumption and permissive sexual attitudes that had its onset *before* middle adolescence. This would explain why adolescents who already consume sexualized media, and already have a relatively high level of permissive sexual attitudes (i.e., higher intercepts) showed less pronounced increases in these processes over time.

Perceived Realism

Our findings confirm the relevance of perceived realism for younger adolescents. In particular, the finding that perceived realism plays a role in both male and female adolescents, suggests that research needs to focus on the differential impact

of media on young adolescents. Considering that we only find relations between initial level and development of sexualized media consumption and permissive sexual attitudes in male adolescents, dependent on levels of perceived realism, our study indicates that there may be different processes at play for male and female adolescents.

Previous research has found that media consumption is related to different gender stereotypical attitudes for men and women (Aubrey, 2004; Tolman, 1999). Perhaps then, sexualized media has a different impact on them than on women. Assuming that individuals imitate media images that “match” their gender, it is possible that for female adolescents, sexualized media resonate less with their reality, seem less attractive, and thus have less impact. However, for both male and female adolescents, in the high perceived realism group, we find correlated developments of sexualized media consumption and permissive sexual attitudes. Thus, although the processes may be qualitatively different, the impact of sexualized media consumption seem similar for male and female adolescents. In future research, processes underlying different effects for men and women need to be explored further.

The current study used perceived realism to indicate the extent to which adolescents think that media portrayals reflect the real world—social realism (Busselle & Greenberg, 2000). Other relevant conceptualizations related to perceived realism include “plausibility” or “probability” (the likelihood of observations in the media existing in the real world), “identity” (incorporating media content into real life), and “utility” (usefulness of media content in real life) (Busselle & Greenberg, 2000). Extensions of the current study could include assessments of different forms of perceived realism to examine their potentially differential functioning in media impact among adolescents.

Sex differences

For both male and female adolescents, we found a correlated change between sexualized media consumption and permissive sexual attitudes, indicating that the development of these constructs over time are correlated. Perceived realism is an important construct to consider here—only in the high perceived realism group we found the correlated change of sexualized media consumption and permissive sexual attitudes. Further, for male adolescents the relation between the initial levels of permissive sexual attitudes and the development of sexualized media consumption was negative (dependent on level of perceived realism), while for female adolescents this relation was not found. These findings may partly be explained by the idea that men are more visually directed, and thus more interested in (or impacted by) sexualized media at a younger age. This would then explain a ceiling effect of sexualized media consumption development. However,

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there is little research on whether male and female individuals interpret and are impacted by sexual visual stimuli differently. A review by Rupp and Wallen (2008) showed that it is not visual sexual stimuli per se that men and women respond differently to, but more the content characteristics of such stimuli. Their results showed that men are more affected by the sex of the actors, whereas women are more influenced by the context they see (Rupp & Wallen, 2008).

Theoretical and practical implications

Our findings have potentially important implications for the area of adolescent sexual development. With the increasing pervasiveness of sexualized media in mind (Kunkel et al., 2005; Strasburger, 2012), it is easy to assume that adolescents will blindly copy what they come across in the media. For some adolescents this may be the case, and this warrants further research on media literacy and the interpretation of mass media (Brown, 2002; Pinkleton, Austin, Cohen, Chen, & Fitzgerald, 2008). For others, their media literacy may have enabled them to critically evaluate media content. This brings up the following questions: (1) How can we guide adolescents in the interpretation and critical evaluation of (sexualized) media messages? (2) Since sexualized media is present in daily life, the internet, social media, and television, how does sexualized media consumption become a part of normative sexual development? To answer these questions we need to apply the existing theories in this field to new situations where adolescents consume media at young ages, with more independence and often without parental supervision.

Further, for future research it is important to consider the operationalization of both permissive sexual attitudes and sexualized media consumption. For the current study we chose to include a range of permissive sexual attitudes that vary in “permissiveness”. Considering that permissive sexual attitudes can, but do not necessarily include potentially risky attitudes, it would be important to make this distinction in generalizing the results. Also, our measure of sexualized media consumption includes questions about mostly explicit sexualized media. Because we know that sexual content is pervasive in both explicit and mainstream media, it would be important to examine whether explicit and non-explicit sexualized media have differential effects. Moreover, for future research it would be necessary to also include more outcomes both of media consumption and sexual development, such as (risky) sexual behavior, gender role attitudes, and self-image.

Overall, our findings underline that adolescents’ level of perceived realism of sexualized media differs. This is something that could be addressed in future research by expanding the different ways of operationalizing this interpretation and including different forms of media.

Strengths and limitations

Strengths of this study include the use of three-wave longitudinal data from a sample of mid adolescents and the examination of relations between sexualized media consumption and permissive sexual attitudes from a developmental, correlated change perspective. Using such a perspective—as opposed to a traditional cross-lagged relations analysis—we were able to examine changes in one construct and simultaneous changes in another, while including the moderating role of perceived realism and potential sex differences. Several limitations, however, are also present.

The first limitation concerns the measurement of our key concepts. Although adolescents are shown to honestly indicate their thoughts and behaviors of sensitive issues (Brener, Billy, & Grady, 2003), the participants still may have under (or over) reported their sexualized media consumption or permissive sexual attitudes. For example, for girls it may be disadvantageous for their “reputation” to report sexualized media consumption and permissive sexual attitudes, whereas for boys it may advance their social status (e.g., Kreager & Staff; Ward, 2003). For future research, behavioral measures in which sexualized media consumption is tracked would reduce the number of self-report measures and prevent shared method variance. Further, it would be beneficial to examine how sexualized media are interpreted by boys and girls.

Second, our sample consisted of predominantly Dutch and vocationally trained adolescents—unfortunately other ethnic and educational groups were too small to reliably examine group differences. In addition, the generalizability of our findings to other cultures outside the Netherlands remains to be determined. Much of the research on sexualized media comes from scholars based in the U.S. and is conducted among U.S. samples. However, much of the sexualized media that is consumed in the Netherlands was produced in the U.S. Although the U.S. and the Netherlands are both well-developed wealthy countries there are some differences in sexual culture (Schalet, 2000). Thus, although adolescents consume largely similar sexualized media, its impact may be different due to differences in sexual culture. Unfortunately, cross-cultural comparisons between the Netherlands and other cultures in sexualized media consumption or interpretation are not available. However, because previous research suggests that the impact of media differs for different ethnicities (Hennessy et al., 2009), we note that for future research it would be important to take ethnic and cultural background into consideration.

Finally, despite our relatively young age group we did not find an overall mean increase in sexualized media consumption. When tracking adolescents’ development over longer periods of time, one may expect to find increases in the development of sexualized media consumption. That being said, at this young age

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respondents already differ in starting levels of both sexualized media consumption and permissive sexual attitudes (Hennessy et al., 2009). To get more insight into the start of adolescents' sexual careers, future research will need to focus on even younger adolescents followed over a longer period of time and including measures of romantic behaviors and cognitions.

Conclusions

Findings indicated that sexualized media consumption and permissive sexual attitudes are developmentally related, both at the initial level and in changes over time. Moreover, findings indicated that these relations tend to be strongest among those adolescents who perceive sexualized media as realistic. Hence, high perceived realism of media impacts the interpretation of sexualized media, and the development of permissive sexual attitudes.

The current study is the first to show that the relation between sexualized media consumption and permissive sexual attitudes is present during mid-adolescence, and is strongest for male adolescents who perceive sexualized media to be realistic. Our findings underline the importance of studying the parallel and interacting development of sexualized media consumption and sexual outcomes and the need to acknowledge that media does not affect all adolescents in the same way—how adolescents perceive the media plays a large role. Accordingly, our results support ongoing efforts to promote media literacy among adolescents.

Part 3: Sexual minority youth: Health and well-being

“It was the first time I'd ever considered that gay might not just be about whom we slept with but a kind of sensibility, what survives of feeling after all the fears and evasions of the closet” – Paul Monette, Becoming a Man (1992)

Chapter 7

Minority stress and mechanisms of risk for depression and suicidal ideation among lesbian, gay, and bisexual youth

The experience of minority stress is often named as a cause for mental health disparities among lesbian, gay, and bisexual (LGB) youth, including higher levels of depression and suicidal ideation. The processes or mechanisms through which these disparities occur are understudied. The interpersonal-psychological theory of suicide posits two key mechanisms for suicidal ideation: perceived burdensomeness and thwarted belongingness (Joiner, 2009). The aim of the current study is to assess the mental health and adjustment among LGB youth emphasizing the minority stress model (Meyer, 2003) and the interpersonal-psychological theory of suicide (Joiner et al., 2009). With a survey of 799 LGB self-identified youth, levels of coming-out stress, sexual orientation victimization, perceived burdensomeness, thwarted belongingness, depression, and suicidal ideation were examined. The results of two multigroup mediation models showed that for all gender and sexual identity groups, the association of sexual orientation victimization with depression and suicidal ideation was mediated by perceived burdensomeness. For gay, lesbian, and bisexual girls coming-out stress was also found to be related to depression and suicidal ideation, mediated by perceived burdensomeness (and thwarted belongingness for suicidal ideation). The results suggest that feeling like a burden to “people in their lives” is a critical mechanism in explaining higher levels of depression and suicidal ideation among LGB youth. These results have implications for community and social support groups, many of which base their interventions on decreasing social isolation rather than addressing youths’ beliefs of burdensomeness. Implications for future research, clinical and community settings are discussed.

This chapter was based on “Minority stress and mechanisms of risk for depression and suicidal ideation among lesbian, gay, and bisexual youth” by Baams, L., Grossman, A. H., & Russell, S. T. Revise & resubmit. *Developmental Psychology*. Please do not cite.

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Among U.S. youth, suicide is the third leading cause of death (CDC, 2010). Suicide attempts are nearly two and a half times more likely to occur among lesbian, gay, and bisexual individuals than among heterosexual individuals (King et al., 2008; McDaniel, Purcell, & D'Augelli, 2001). Although studies have been criticized for methodological limitations (Savin-Williams, 2001ab), higher levels of suicidality and depression have been documented for sexual minority youth compared to heterosexual peers using multiple methods and for youth in multiple countries (e.g., King et al., 2008; Marshal et al., 2013; Russell & Joyner, 2001). Moreover, adolescence and young adulthood are times when suicidality among sexual minority people is most common (Marshal et al., 2013). Although stress and victimization related to sexual identity have been shown to predict decreased well-being and mental health among sexual minority individuals (Cochran, Sullivan, & Mays, 2003; Meyer, 2003), the mechanisms through which these occur are understudied. In the current study we employ two theories: first, the minority stress model describes stressors that are unique to lesbian, gay, and bisexual (LGB) individuals (Kelleher, 2009; Meyer, 2003), and second, the interpersonal-psychological theory of suicide identifies key mechanisms or pre-conditions for suicidality (Joiner et al., 2009). Together these provide a compelling framework examining mental health and adjustment among LGB youth.

Minority stress model

The minority stress model identifies processes through which minority stress influences mental health for sexual minority people (Meyer, 2003). Mechanisms include experiences of prejudice events, expectation of rejection or discrimination, concealment of one's sexual orientation, and internalized homophobia. The experience of these stressors is related to lower well-being and higher levels of depression and suicidal ideation (Cochran et al., 2003; Meyer, 2003). Minority stress is unique to sexual minority people and reflects society's negative reactions and attitudes toward them (Meyer, 2003; Rosario, Rotheram-Borus, & Reid, 1996). The experience of stress associated with "coming out" is often related to actual or expected negative reactions from friends, family, and peers. For example, sexual minority youth may face victimization, exclusion, unfair treatment in school (Horn, 2007; Meyer, 2003), or may even be asked to leave the family home and become homeless as a result (Cochran, Stewart, Ginzler, & Cauce, 2001). Thus, being out to others is a key factor that may shape the social relations of LGB youth; and coming out is often paired with a high level of stress, which is then related to higher levels of depression and suicidal ideation (Cochran et al., 2003; Meyer, 2003).

In addition to stressors associated with coming out, victimization because of one's actual or perceived sexual identity may be more tangible, and occurs frequently among LGB youth. Results from the 2011 National School Climate Survey showed

that over 80% percent of LGB and over 60% of transgender students reported being verbally harassed, and almost 40% reported having experienced physical harassment at school during the past year (Kosciw, Greytak, Bartkiewicz, Boesen, & Palmer, 2012). Experiences such as being threatened or injured is directly related to health-risk behaviors among sexual minority youth (Bontempo & D'Augelli, 2002), and victimization across the life span occurs more often among sexual minority than among heterosexual people (Balsam, Rothblum, & Beauchaine, 2005).

Interpersonal–psychological theory of suicide

Over the past few decades many studies have confirmed the impact of coming-out stress and victimization on depression and suicidal ideation (e.g., Cochran et al., 2003; Meyer, 2003). The interpersonal-psychological theory of suicide (IPT; Joiner et al., 2009) may shed some light on the mechanisms that drive these associations. According to this theory, the desire for death results from the presence of two interpersonal states: perceived burdensomeness and thwarted belongingness. These joint pre-conditions may result in a desire to die (Joiner et al., 2009). Although both perceived burdensomeness and thwarted belongingness are thought to jointly predict suicidal ideation (Joiner et al., 2009), several studies have found that thwarted belongingness operates primarily in conjunction with perceived burdensomeness. A study among undergraduates (Van Orden et al., 2008) and one among a community sample of young adults (Joiner et al., 2009) found that the interaction of perceived burdensomeness and thwarted belongingness predicted current suicidal ideation, controlling for depressive symptoms.

Perceived burdensomeness is one of the two theorized predictors of depression and suicidal ideation in the IPT: It is best explained by the person's perception of himself or herself as a burden to others. In prior studies, some informed by IPT, perceived burdensomeness has been found to predict suicidal ideation (DeCatanaro, 1995; Joiner et al., 2002; Van Orden, Lynam, Hollar, & Joiner, 2006). Most prior research has been conducted using clinical or adult populations, however, several recent studies have extended these findings to young adults (Joiner et al., 2009) and vulnerable populations such as young adults in the army (Ribeiro et al., 2012). For sexual minority individuals, some scholars have described feelings of being a burden to friends and family (e.g., Diaz, 1998; Diaz, Ayala, Bein, Henne, & Marin, 2001), and one prior study has documented an association with higher levels of suicidal ideation for LGB individuals (Hill & Pettit, 2012).

The second mechanism central to the IPT is thwarted belongingness, explained as alienation from friends and family—not feeling like a part of a community (Joiner et al., 2009; Ribeiro & Joiner, 2009). Social isolation seems to be one of the largest

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contributions to suicidal risk (Roberts, Roberts, & Chen, 1998). Among sexual minority people, social isolation is a predictor of psychologic symptoms (Diaz et al., 2001) and suicidal ideation (Hill & Pettit, 2012). Further, there is an extensive body of research (e.g., Eisenberg & Resnick, 2006; Hatzenbuehler, Nolen-Hoeksema, & Dovidio, 2009; Hatzenbuehler, Phelan, & Link, 2013; Pachankis, 2007) that points to the ways that social isolation is produced for sexual minority people. Belongingness is often thwarted for LGB youth through LGBT-related victimization and bullying (e.g., Kosciw et al., 2012), experiences which have been linked to suicide risk (Bontempo & D'Augelli, 2002).

Few prior studies have explicitly applied the IPT in examining suicide risk among sexual minority people. One exception is a recent study of 198 college students, 50 of whom were LGB: Perceived burdensomeness and thwarted belongingness were related to suicidal ideation; this relation was conditional on the level of perceived or anticipated rejection due to sexual orientation (Hill & Pettit, 2012). This finding suggests that perceived or anticipated rejection plays a role in the development of perceived burdensomeness and thwarted belongingness. Considering that both concepts are related to the perception of support and acceptance by the individual's family or friends, it is possible that LGB coming-out stress and sexual orientation victimization are related to the experience of feeling like a burden to others (perceived burdensomeness) and to the experience of social isolation (thwarted belongingness).

Minority stress, interpersonal–psychological theory of suicide, and LGB youth

Over the last two decades scholars have identified minority stressors associated with suicidality among sexual minority individuals, including stressors associated with coming out, as well as (potentially related) experiences of family rejection, substance use, victimization, and homophobic persecution (e.g., Friedman, Koeske, Silvestre, Korr, & Sites, 2006; Russell & Joyner, 2001; Ryan, Huebner, Diaz, & Sanchez, 2009). Such sexual identity-specific stressors may be distal predictors of depression and suicidal ideation through the mediation of general risk factors (Hatzenbuehler, 2009) such as those outlined in the IPT (Joiner et al., 2009). That is, LGB youth may be at an increased risk of experiencing thwarted belongingness and perceived burdensomeness due to LGB-specific stressors. For example, LGB-victimization may explain school social isolation that is often reported by sexual minority youth (Galliher, Rostosky, & Hughes, 2004); such a lack of belonging has been found to predict suicidal ideation, particularly among LGB youth (Hill & Pettit, 2012). Alternatively, stressors associated with coming out could lead to perceived burdensomeness; many gay and bisexual Latino men report feelings of hurt and embarrassment for family members due to their gay identity, and such feelings are associated with suicidal ideation (Diaz et al., 2001).

Based on prior theoretical and empirical studies, we expect both perceived burdensomeness and thwarted belongingness to be associated with higher levels of depression and suicidal ideation for LGB youth. There is especially strong evidence that LGB youth experience thwarted belongingness through minority stressors (for example, peer victimization (Bontempo & D'Augelli, 2002) and family rejection (Ryan et al., 2009), and that such minority stress predicts suicidal thoughts and behaviors.

Gender and sexual identities

Gender is an essential source of variation in mental health and health behavior among LGB as well as heterosexual adolescents. Studies have shown that girls experience more depressive symptoms and suicidality than boys (Cyranowski, Frank, Young, & Shear, 2000). Further, sexual minority girls are at a higher risk of substance use than heterosexual girls, while the difference between sexual minority boys and heterosexual boys is much less apparent (Dermody et al., 2014; Marshal et al., 2013). In a study among bisexual and homosexual adolescents, boys, compared to girls, were less likely to report substance use, and to rate themselves healthier than peers. Girls, however, were more likely to report a history with sexual abuse and more negative body image than boys (Saewyc, Bearinger, Heinz, Blum, & Resnick, 1998).

Several studies have found poorer mental health among bisexual individuals compared to lesbian and gay individuals (e.g., Jorm, Korten, Rodgers, Jacomb, & Christensen, 2002). Further, bisexual individuals are found to experience more internalized homophobia (Kuyper & Fokkema, 2011; Rosario, Schrimshaw, Hunter, & Gwadz, 2002) and are less open about their sexual identity compared to gay and lesbian individuals (Kuyper & Fokkema, 2011). The notion that people can only be attracted to one gender (either same- or other gender; monosexuality) creates discrimination and rejection of bisexual individuals (Ross, Dobinson, & Eady, 2010). Bisexual individuals are often labeled either straight or gay, depending on the gender of their current partner, further increasing the invisibility of bisexuality. Further, the legitimacy of bisexual individuals' sexual identity is often questioned when they are in long-term monogamous relationships (McLean, 2007; Ross et al., 2010). The assumptions in media and society that bisexual individuals are more promiscuous, hypersexual, or just confused about their sexual identity (Ross et al., 2010) characterize prejudice related to bisexuality.

The apparent but often unexplained differences between LGB groups are vital considerations when studying their mental health. Given the potential differences between gender and sexual identities in levels of depression and suicidal ideation, and their correlates, we explored differences among LGB youth based on gender and sexual identities.

Present study

The main objective of the current project is to test the hypotheses derived from the minority stress model (Meyer, 2003) and the interpersonal-psychological theory of suicide (Joiner et al., 2009). We hypothesized that: (1) stress related to coming out as LGB and sexual orientation victimization are related to higher levels of depression and suicidal ideation, and (2) that these relations are mediated by perceived burdensomeness and thwarted belongingness. We examined the hypothesized relations in a sample of 799 LGB youth, aged 15-21 years old ($M = 18.34$, $SD = 1.81$).

Method

Participants and design

The sample for the project on which this paper reports was drawn from the first panel of an on-going longitudinal study of 1176 lesbian, gay, bisexual, transgender, queer/questioning (LGBTQ) youth⁴. We included participants who reported male birth sex, gender identity as “man”, and sexual identity as “gay” ($n = 254$, “gay boys”) or “bisexual” ($n = 128$, “bisexual boys”), and participants who reported female birth sex, gender identity as “woman”, and sexual identity as “gay” or “lesbian” ($n = 176$, “gay / lesbian girls”), or “bisexual” ($n = 241$, “bisexual girls”). We excluded participants who reported a heterosexual sexual identity ($n = 97$), who reported their sexual identity to be ‘Questioning/Uncertain, don’t know’ ($n = 72$), or who reported a transgender identity or incongruent birth sex and gender identity ($n = 83$). Our final analytic sample includes those youth who identified as LGB ($N = 799$, 76.0% of total sample). The racial/ethnic make-up of participants was Hispanic (39.3%), non-Hispanic and black (19.2%), non-Hispanic and white (15.8%), non-Hispanic and multiracial (8.5%), or from another non-Hispanic background (17.2%).

Youth were recruited in three metropolitan areas in the U.S. and participated in paper-and-pencil surveys. The first panel was conducted for 12 months beginning in fall 2011. Participants were invited to participate through several community-based organizations (40.0% were a member of one of these organizations) and other groups (e.g., LGB-focused college groups); and snowball sampling was used to increase diversity in each metropolitan area. Participants received cash payments for their participation in the study. Approval of all procedures was

⁴ This research uses data from the *Risk and Protective Factors for Suicide among Sexual Minority Youth* study, designed by Arnold H. Grossman and Stephen T. Russell, and supported by Award Number R01MH091212 from the National Institute of Mental Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Mental Health or the National Institutes of Health.

granted by the IRB's of both U.S.-based universities involved. Because seeking parental consent could put youth at risk of exposure of their sexual orientation or gender identity and could lead to verbal or physical harm, parental consent was not required, and a federal certificate of confidentiality was obtained.

Measures

Background characteristics. Age, ethnicity, birth sex, and sexual identity were asked. Birth sex could be reported as "male," "female," or "intersex." Sexual identity could be reported as "gay," "lesbian," "bisexual, but mostly gay or lesbian," "bisexual, equally gay/lesbian and heterosexual/straight," "bisexual, but mostly heterosexual/straight," "heterosexual/straight," or "questioning/uncertain, don't know for sure." The three bisexual categories were combined for these analyses.

LGB coming-out stress. An expanded version of the gay-related stress scale (Rosario et al., 1996) was used to assess stress related to coming out as LGB—the scale comprised the mean score of 10 items ($\alpha = .90$). An example item is "For each event listed below, we would like you to rate how stressful the situation was for you. When you told your parents for the first time that you were LGB", participants could answer on 5-point scales (0 = *no stress* and 4 = *extremely stressful*).

Sexual orientation victimization. The frequency of life-time sexual orientation victimization (D'Augelli, Grossman, & Starks, 2006) was assessed with six items (i.e., verbal, physical, sexual). Prompted by an open-ended question, participants were asked the frequency with which they had experienced sexual orientation victimization in their life-time. An example item is "Punched, kicked, or beaten". Responses were coded on a 4-point scales (0 = *never* and 3 = *three or more times*). For the current analysis, we used a sum score of these items.

Perceived burdensomeness. Perceived burdensomeness was assessed with a seven item subscale of the Interpersonal Needs Questionnaire (Van Orden et al., 2008). An example item is "These days, I think the people in my life wish they could be rid of me." Participants could answer on 7-point scales (1 = *not at all true for me* and 7 = *very true for me*). A mean score of these items was used; internal reliability was high ($\alpha = .88$).

Thwarted belongingness. Thwarted belongingness was measured as the mean of five item subscale of the Interpersonal Needs Questionnaire (Van Orden et al., 2008; $\alpha = .75$). An example item is "These days, I feel disconnected from other people," participants could answer on 7-point scales (1 = *not at all true for me* and 7 = *very true for me*).

Depression. Depression level was measured as the mean of twenty items assessing how the youth thought or felt, especially in the last two weeks (Beck Depression Inventory - Youth (BDI-Y), Beck, Beck, & Jolly, 2001; $\alpha = .95$). An example item is “I have trouble doing things”; participants could answer on 4-point scales (0 = *never* and 3 = *always*).

Suicidal ideation. We assessed negative suicidal ideation as the mean of the eight item Negative suicide ideation subscale of the Positive and Negative Suicide Inventory (Muehlenkamp et al., 2005; $\alpha = .94$). An example item is “During the past two weeks, including today, how often have you seriously considered killing yourself because you could not live up to the expectations of other people”; participants could answer on 5-point scales (1 = *none of the time* and 5 = *most of the time*).

Others’ perceived knowledge of sexual identity. Participants reported whether their friends and family knew about their sexual identity with six items (D’Augelli, Grossman, & Starks, 2008; mean score, $\alpha = .88$). An example item is “Do the people listed below know that you are LGB? Mother (adoptive mother, foster mother, stepmother, etc.)”; participants could answer on 4-point scales (1 = *definitely not* and 4 = *definitely*).

Statistical analyses

To test the hypothesized relations we first checked Pearson correlations. To examine group differences based on biological sex/gender (and because they are congruent for the youth in the analytic sample we refer to “gender” in our written results), sexual identity and ethnic backgrounds we used several multivariate analyses of variance (MANOVA) with follow-up post hoc group comparisons (Bonferroni). The software package Mplus (Muthen & Muthen, 2010) was used to conduct multigroup bootstrap mediation analyses, controlling for age, others’ perceived knowledge of sexual identity, and membership in a community-based organization. Indirect effects were tested using the MODEL INDIRECT option in Mplus. We used three goodness-of-fit indices: CFI, TLI, and RMSEA (Brown & Cudeck, 1993) to compare constrained, partially constrained, and unconstrained models. CFI and TLI values above .95 and RMSEA less than or equal to .06 usually indicate acceptable fit (Hu & Bentler, 1999). Given the large sample size in the current study, chi-square statistics were not suitable.

Results

Associations between key variables

Table 1 presents descriptive statistics and the correlations between the key variables for the overall group of participants. As expected, there were positive associations for LGB coming-out stress and sexual orientation victimization with depression and suicidal ideation. Further, perceived burdensomeness and thwarted belongingness were positively related to levels of LGB coming-out stress, sexual orientation victimization, depression, and suicidal ideation. Thus, participants with higher levels of LGB coming-out stress and victimization also showed higher levels of perceived burdensomeness, thwarted belongingness, depression and suicidal ideation. Further, older participants reported higher levels of LGB coming-out stress, sexual orientation victimization, and others' perceived knowledge of sexual identity, but lower levels of perceived burdensomeness and depression. Finally, others' perceived knowledge of sexual identity was related to higher levels of sexual orientation victimization, but lower levels of perceived burdensomeness, thwarted belongingness, depression, and suicidal ideation.

Table 1
Pearson Correlations Between Key Variables and Means, Standard Deviations, and Range

	1.	2.	3.	4.	5.	6.	7.	8.	<i>M (SD)</i>	Range
1. LGB coming-out stress	--								1.47 (1.08)	0-4
2. Sexual orientation victimization	.22***	--							3.81 (4.29)	0-18
3. Perceived burdensomeness	.09*	.12**	--						2.53 (1.36)	1-7
4. Thwarted belongingness	.10**	.08*	.51***	--					3.04 (1.41)	1-7
5. Depression	.22***	.15***	.66***	.42***	--				0.80 (0.63)	0-3
6. Negative ideation	.17***	.17***	.59***	.34***	.63***	--			1.56 (0.84)	1-5
7. Others' perceived knowledge of sexual identity	.00	.14***	-.16***	-.19***	-.17***	-.12**	--		3.19 (0.89)	1-4
8. Age	.17***	.14***	-.14***	.00	-.13***	-.04	.08*	--	18.34 (1.81)	15-21

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

Minority stress, depression, and suicidal ideation

To examine differences between gender and sexual identity groups in the key variables, we conducted several MANOVAs (see Table 2 for means and standard deviations). Mean levels of LGB coming-out stress and sexual orientation victimization differed across gender and sexual identities (Pillai's Trace = .10, $F(6, 1532) = 12.69, p < .001$). Univariate analyses of variance showed that the gender and sexual identity groups differed in levels of LGB stress ($F(3, 766) = 7.72, p < .001$) and victimization ($F(3, 766) = 22.10, p < .001$). Post-hoc group comparisons (Bonferroni) showed that bisexual girls reported lower levels of LGB coming-out stress and victimization than the other groups, and that gay boys reported more LGB victimization compared to gay and lesbian girls. Mean levels of perceived burdensomeness also differed across gender and sexual identities (Pillai's Trace = .02, $F(6, 1582) = 2.62, p < .001$). Univariate analyses of variance showed that the gender and sexual identity groups differed in levels of perceived burdensomeness ($F(3, 791) = 4.05, p = .007$), but not in levels of thwarted belongingness ($F(3, 791) = 2.18, p = .090$). Post-hoc group comparisons (Bonferroni) showed that gay boys reported lower levels of perceived burdensomeness than bisexual girls.

Table 2

Means and Standard Deviations of Key Variables for Gender and Sexual Identity Groups

	Boys		Girls	
	Gay	Bisexual	Lesbian and Gay	Bisexual
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Age	18.81 (1.65) ^a	18.41 (1.79) ^a	18.45 (1.70) ^a	17.72 (1.88)
LGB coming-out stress	1.56 (1.05) ^a	1.72 (1.16) ^a	1.50 (1.07)	1.20 (1.02)
Sexual orientation victimization	5.22 (4.66) ^{ab}	4.58 (4.47) ^a	3.84 (4.36) ^a	2.21 (3.10)
Perceived burdensomeness	2.36 (1.32) ^a	2.61 (1.33)	2.43 (1.25)	2.76 (1.47)
Thwarted belongingness	2.88 (1.44)	3.25 (1.38)	3.09 (1.38)	3.09 (1.40)
Depression	0.68 (0.63) ^a	0.84 (0.57)	0.72 (0.61) ^a	0.95 (0.67)
Suicidal ideation	1.44 (0.73) ^a	1.66 (0.86)	1.52 (0.88)	1.66 (0.92)
Others' perceived knowledge of sexual identity	3.37 (0.90) ^{ac}	2.97 (0.87) ^b	3.47 (0.71) ^a	2.91 (0.90)

^a Significant univariate comparison to bisexual girls ($ps < .05$)

^b Significant univariate comparison to gay or lesbian girls ($ps < .05$)

^c Significant univariate comparison to bisexual boys ($ps < .05$)



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Mean levels of depression and suicidal ideation differed across gender and sexual identities (Pillai's Trace = .03, $F(6, 1578) = 4.52, p < .001$). Univariate analyses of variance showed that the gender and sexual identity groups differed in levels of depression ($F(3, 789) = 8.59, p < .001$) and suicidal ideation ($F(3, 789) = 3.38, p = .018$). Post-hoc group comparisons (Bonferroni) showed that bisexual girls reported higher levels of depression than gay and lesbian girls, and gay boys. Gay boys reported lower levels of suicidal ideation compared to the bisexual girls.

Age ($F(3, 795) = 16.22, p < .001$) and level of others' perceived knowledge of sexual identity ($F(3, 791) = 20.91, p < .001$) differed across gender and sexual identities. Post-hoc group comparisons (Bonferroni) showed that the bisexual girls were youngest compared to our other groups. Further, bisexual girls reported the lowest levels of others' perceived knowledge of sexual identity compared to gay boys and girls. Bisexual boys also reported lower levels of others' perceived knowledge of sexual identity compared to gay boys and girls.

Levels of depression differed across different ethnic backgrounds ($F(3, 780) = 4.60, p < .001$). Post hoc group comparisons (Bonferroni) showed that non-Hispanic black youth reported lower levels ($M = 0.66, SD = 0.59$) compared to Hispanic youth ($M = 0.85, SD = 0.65$), and non-Hispanic White youth ($M = 0.96, SD = 0.61$). Mean levels of LGB coming-out stress, sexual orientation victimization, perceived burdensomeness, thwarted belongingness, and suicidal ideation did not differ across different ethnic backgrounds ($ps > .05$).

Mediating role of perceived burdensomeness and thwarted belongingness

Considering the differences in mean levels of LGB coming-out stress, victimization, perceived burdensomeness, depression, age and others' perceived knowledge of sexual identity across the different gender and sexual identities, we tested a multigroup mediation model across groups (gay boys, bisexual boys, gay and lesbian girls, bisexual girls) controlling for age, others' perceived knowledge of sexual identity, and membership in a community-based organization. For both the depression and suicidal ideation models, a two-group model showed the best fit, compared to a fully constrained and unconstrained model (see Table 3). The best-fitting models were defined by differences in gender rather than by differences in sexual identity. The two-group models consisted of (1) gay boys and bisexual boys, and (2) lesbian girls, and bisexual girls.

Minority stress, depression, and suicidal ideation

Table 3

Fit Statistics for Unconstrained, Constrained, and Partially Constrained Models of Depression and Suicidal Ideation

	Depression			Suicidal ideation		
	RMSEA	CFI	TLI	RSMEA	CFI	TLI
Constrained	.057	.953	.944	.051	.953	.945
Partially constrained	.050	.971	.958	.039	.978	.968
Unconstrained	.062	.974	.934	.055	.975	.935

Note. In the partially constrained model, all paths are constrained for (1) gay and bisexual boys, (2) and gay, lesbian, and bisexual girls.

For the depression model, the results are shown in Figure 1ab. For gay and bisexual boys ($p < .001$) and gay, lesbian, and bisexual girls ($p < .001$), the relation between sexual orientation victimization and depression is mediated by perceived burdensomeness (specific indirect effect for gay and bisexual boys, $p < .001$; for gay, lesbian, and bisexual girls, $p = .018$). Only for the girls did perceived burdensomeness also mediate the relation between LGB coming-out stress and depression (indirect effect, $p = .005$; indirect effect through perceived burdensomeness, $p < .007$). For no groups was mediation through thwarted belongingness significant ($ps > .05$).

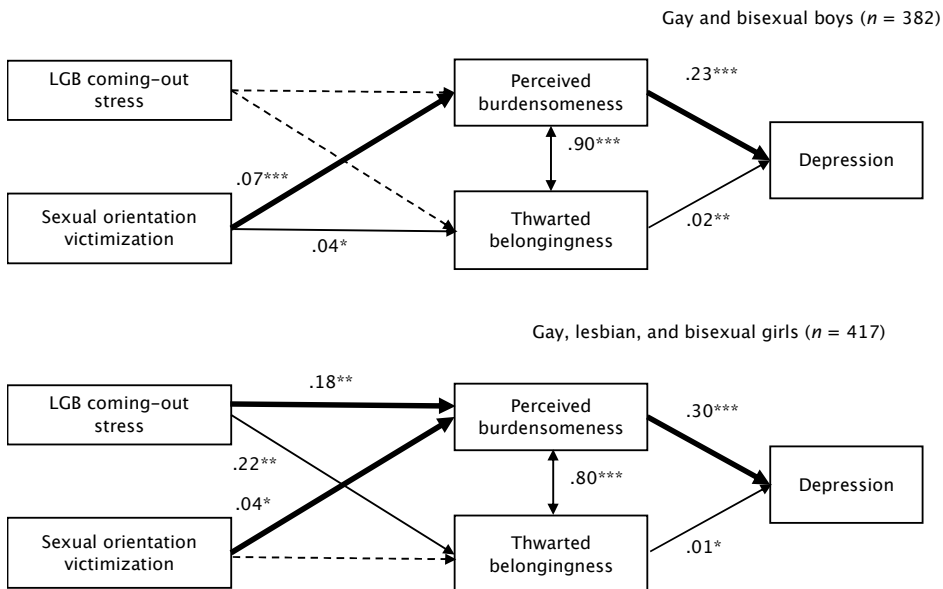


Figure 1ab. Partially constrained multigroup mediation model of depression. Controlling for age, others' perceived knowledge of sexual identity, and membership to a community-based organization. Indirect mediation effects are presented in solid bold arrows. Direct significant relations are presented in solid arrows, direct non-significant relations are presented in dashed arrows. Significant indirect relations are presented in solid arrows. Unstandardized regression coefficients are shown. *** $p < .001$, ** $p < .01$, * $p < .05$

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Analyses of suicidal ideation showed a similar pattern for constraints across groups. The results are shown in Figure 2abc. For gay and bisexual boys ($p < .001$), gay, lesbian, and bisexual girls ($p = .019$) the relation between sexual orientation victimization and suicidal ideation was mediated by perceived burdensomeness (specific indirect effect for gay and bisexual boys, $p = .001$; for gay, lesbian, and bisexual girls, $p = .022$).

In addition, for the gay, lesbian, and bisexual girls, perceived burdensomeness also mediated the relation between LGB coming-out stress and suicidal ideation (indirect effect, $p = .005$, specific indirect effect through perceived burdensomeness, $p = .010$). Further, in contrast to the other groups, thwarted belongingness also mediated the relation between LGB coming-out stress and suicidal ideation for girls (specific indirect effect through thwarted belongingness, $p = .019$).

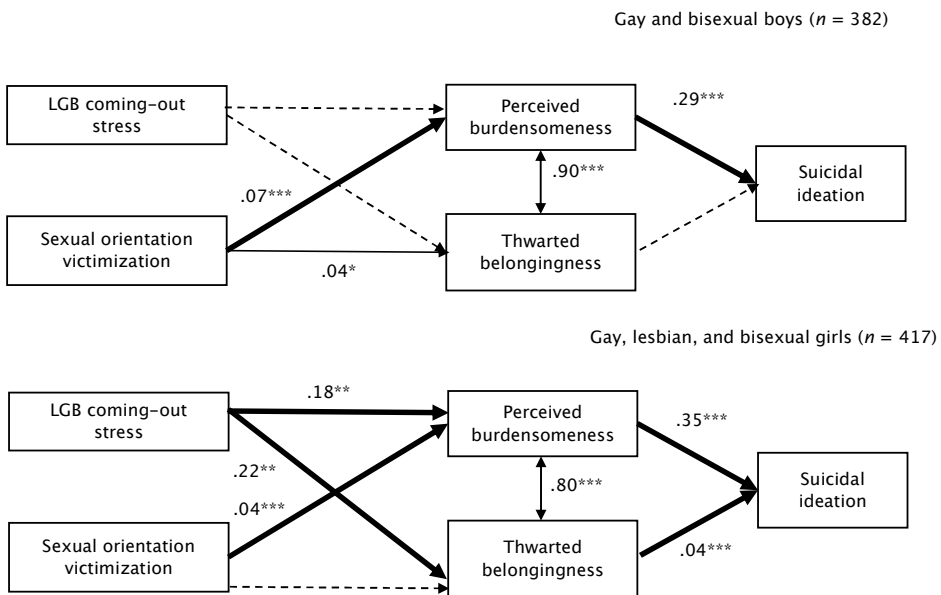


Figure 2ab. Partially constrained multigroup mediation model of suicidal ideation. Controlling for age, others' perceived knowledge of sexual identity, and membership to a community-based organization. Indirect mediation effects are presented in solid bold arrows. Direct significant relations are presented in solid arrows, direct non-significant relations are presented in dashed arrows. Significant indirect relations are presented in solid arrows. Unstandardized regression coefficients are shown. $^{***} p < .001$, $^{**} p < .01$, $^* p < .05$

Discussion

Our study brings together the minority stress model (Meyer, 2003) and interpersonal-psychological theory of suicide (Joiner et al., 2009) in an effort to understand the mechanisms associated with minority stress and its association with depression and suicidal ideation in a sample of LGB youth. For all LGB youth in the study, we found that sexual orientation victimization negatively impacts levels of depression and suicidal ideation, and this relation can be explained by the experience of feeling like a burden to others in their lives. The benefit of combining the minority stress model and IPT is that both have been crucial for studies of minority stress and suicidality: Bringing them together has significant potential to advance understanding of mental health and suicide among LGB youths.

Our findings indicate, regardless of gender or sexual identity, the link between sexual orientation victimization and depression and suicidal ideation was mediated by perceived burdensomeness. These findings are consistent with literature on suicidal behavior (Joiner et al., 2009; Hill & Pettit, 2012; Van Orden et al., 2008) as well as the unique impact of minority stressors (Meyer, 2003). Although both “preconditions” of the IPT are individually correlated with depression and suicidal ideation, several studies have shown that the feeling of being a burden to others (perceived burdensomeness) is the key mechanism when both are included in multivariate analyses (Hill & Pettit, 2012; Van Orden et al., 2008). Thus, the results are consistent with emerging research on the mechanisms of the IPT theory. However, of these two risk factors, the LGB mental health literature has emphasized factors consistent with thwarted belongingness explanations over perceived burdensomeness: The dominant discourse in the literature on LGB youth mental health has focused on social isolation, family rejection, and victimization or lack of belonging in school as the key mechanisms for understanding mental health risk (e.g., Hatzenbuehler, 2013; Meyer, 2003; Mustanski, Birkett, Greene, Hatzenbuehler, & Newcomb, 2014). With few yet notable exceptions (Diaz, 1998; Diaz et al., 2001), much less attention in the LGB mental health literature has focused on perceptions of feeling like a burden to other people in their lives. Minority stress may not have its greatest function through thwarted belonging, but through the ways it makes LGB young people feel that they are a burden to their loved ones due to their stigma and victimization.

Patterns in the indirect pathways show distinct differences based on gender and sexual identity groups. First, it is only for girls that stressors associated with coming out are mediated for depression by perceived burdensomeness, and mediated for suicide ideation by thwarted belongingness as well. Notably, both groups of girls (especially bisexual, but also lesbian and gay girls) reported lower average coming-out stress compared to boys. Second, for boys, sexual orientation

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victimization is the key factor, mediated by perceived burdensomeness. It may be that for boys, experiences of victimization matter to the extent that they simply overpower the role of coming-out stress. Or it may be that, despite their lower average levels of coming-out stress, girls are more attuned to others' reactions to their coming out, so that stressors associated with coming out play a stronger role in the effect of perceived burdensomeness on depression and suicidal ideation (and in the role of thwarted belongingness on suicide ideation). These contrasting findings indicate gender and sexual identity differences both in average levels of these concepts, but more importantly also in the mechanism that helps explain the development of health disparities. Longitudinal follow-up of this sample will allow further exploration of these pathways of influence and their temporal order.

The current study includes several strengths and limitations. We obtained data from a relatively large sample of LGB youths; however, all the data were obtained through self-report rather than objective measures (e.g., others' perceived knowledge of sexual identity). Additionally, the data were obtained from self-identified LGB youth in three metropolitan areas in the U.S.; and the data may not generalize to similar youth outside of these areas in the U.S. or in other countries (due cultural contexts, especially related to sexuality and youth).

Implications

Consistent with previous research we found different patterns for LGB boys and girls in levels of minority stress and depression and suicidal ideation (D'Augelli et al., 2005; Kuyper & Fokkema, 2011; Rosario et al., 2002). Girls seem to experience lower levels of LGB coming-out stress and victimization, but higher levels of depression and suicidal ideation compared to boys. Although girls experience lower levels of stress related to their coming out, these stressful experiences are related to feelings of thwarted belongingness and of being a burden to friends and family, and in turn to depression and suicidal ideation. Stressful experiences concerning coming out may play a distinct role for LGB girls compared to GB boys. This raises several suggestions for future research and implications for potential interventions.

First, several recent studies point to the ways that discriminatory victimization undermines youth well-being (Russell, Sinclair, Poteat, & Koenig, 2012) and our findings further underline the role of discriminatory victimization in depression and suicide ideation among LGB youth. Advocates should identify contexts where victimization occurs and implement strategies and policies to reduce victimization. Community programs can emphasize support and resources for victimized youth, and in particular may address feelings of being a burden to others that may result when a youth must seek help following discriminatory victimization. Further, schools can implement LGB-inclusive curricula and in-school bullying and

harassment policies that specifically address LGB identities (Kosciw et al., 2012; Toomey, McGuire, & Russell, 2012).

Second, the current findings suggest that specific attention to stress related to “coming out” or disclosure of sexual identity for girls may be warranted. Although girls experienced lowest levels of coming-out stress, this affected their sense of being of burden to others and increased their level of depression. Further, such stress impacted their sense of belonging, and through this increased their level of suicidal ideation. Girls, and especially bisexual girls, appear to experience coming-out stress differently than boys. Perhaps the rejection of lesbian and bisexual girls differs from the rejection of gay and bisexual boys. The current emphasis on victimization and overt rejection in policies, programs, and support groups, may not validate girls’ experiences of stress. Bisexual girls may experience different forms of stress and discrimination (biphobia versus homophobia) and perhaps more covert forms of rejection that affect their mental health and suicidality, but were not captured in our measure of coming-out stress.

Finally, our results strongly indicate that it is the notion of being a burden to others that is underlying the adverse effects of minority stress on depression and suicidal ideation among LGB youth. Perceived burdensomeness is considered both an interpersonal experience and an intrapersonal belief, and previous research suggests that the interpersonal cognitions of burdensomeness take precedence over the intrapersonal beliefs (Joiner et al., 2002). It follows that people may have a general need to contribute, which may be more important than the need to belong in the development of depression and suicidal ideation. While decreasing victimization, discrimination, and providing social support is important, added attention should be given to ways of reducing the experience of feeling like a burden. Not only does it aid clinicians in suicide risk assessment (Joiner et al., 2009), it may also offer room for intervention; behavioral approaches have been suggested to decrease feelings of burdensomeness (Joiner et al., 2009). Although intervening in risk factors is important to eliminating suicidal behaviors among LGB youth, clinicians also must enhance resilience and protective factors.

Conclusions

Despite the significant additions to the field of LGB-health, further study will enable an understanding of how the mechanisms of suicide risk may operate over the course of adolescence for LGB youth: Future longitudinal studies may allow identification of potential developmental trajectories of both stress and victimization, and subsequent depression and suicidal ideation. Although longitudinal studies have shown that stress and victimization impact sexual minority youth’s health (e.g., Rosario et al., 2006), it would be relevant to investigate the dynamic, longitudinal interplay of these domains in association

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with feelings of burdensomeness and belonging. In a broader model, it would also be possible to include potential protective factors, such as school safety (Eisenberg & Resnick, 2006), and involvement in the LGB community (Meyer, 2003).

The current study provides new knowledge about the negative impact of sexual orientation-victimization and coming-out stress, and related health disparities. Further, the current study is one of the first to look at the mechanism that may help explain the development of depression and suicidal ideation. In doing so, we have brought together two theories (minority stress and IPT) that provide more insight into the negative and harmful experiences of some LGB youth.

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How a romantic relationship can protect same-sex attracted youth from the impact of expected rejection

Same-sex attracted youth's well-being is jeopardized by components of minority stress, but this stress can be buffered by social support. What is unknown is whether a romantic relationship can also serve as a buffer. With an online survey we examined the link between components of minority stress, psychological well-being, and its moderated relation by romantic relationship status among 309 Dutch same-sex attracted youth (16-24 years old, 52.9% female). The results showed that minority stress components (internalized homophobia, expected rejection, and meta-stereotyping) were negatively related to psychological well-being. Moderation analyses revealed that only the impact of "expected rejection" on psychological well-being was buffered for those involved in a romantic relationship. This shows the particular functional link of romantic support in rejection contexts.

This chapter was based on "How a romantic relationship can protect same-sex attracted youth from the impact of expected rejection" by Baams, L., Bos, H. M. W., & Jonas, K. J. (2014). *Journal of Adolescence*, 37, 1293–1302.

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Romantic relationships during adolescence and young adulthood support the development of interpersonal skills, and promote a sense of identity (Furman & Shaffer, 2003). Yet, for same-sex attracted (SSA) youth and young adults (aged 16-24 years old) the picture is less clear. They may be confronted with stressors that are related to a minority group membership or being involved in a same-sex romantic relationship (Meyer, 2003). For example, the internalization of negative ideas about homosexuality has been related to relationship problems and depression (Frost & Meyer, 2009; Otis, Rostosky, Riggle, & Hamrin, 2006). It is evident from literature on protective factors in the lives of SSA youth and young adults that support from family, friends, and school can act as a buffer against the negative impact of stressors on well-being (e.g., Baiocco, Laghi, Di Pomponio, & Nigito, 2012; Mustanski, Birkett, Greene, Hatzenbuehler, & Newcomb, 2014; Poteat, Sinclair, DiGiovanni, Koenig, & Russell, 2013; Ryan, Russell, Huebner, Diaz, & Sanchez, 2010). However, whether being involved in romantic relationship can offer the same protection from minority stress is currently unknown. The present study therefore examines the relation between specific types of minority stress and psychological well-being, and assesses whether a romantic relationship buffers the impact of minority stress.

Minority stress among LGB youth and young adults

Since there is little research on SSA youth and young adults that makes use of the minority stress concept, we mostly draw on research on lesbian, gay, and bisexual individuals (LGB), to develop our argument. The unique stressors LGB individuals are confronted with are described as “minority stress” (Meyer, 2003). Minority stress contains several components. Above and beyond general experiences of negative reactions due to the sexual minority status, the unique stressors include the following: expected rejection, meta-stereotyping, internalized homophobia, and in-group blame. Worries about being rejected based on one’s sexual orientation (expected rejection), and the feeling that most heterosexual individuals have negative attitudes towards homosexuality (meta-stereotyping) are also aspects of minority stress (Meyer, 2003; Vorauer, Main, & O’Connell, 1998). LGB individuals may also internalize the negative attitudes toward homosexuality in society, leading to being less positive about one’s own sexual orientation (internalized homophobia) or being less positive about other same-sex attracted individuals (in-group blame) (Sandfort, 1997).

Stressors such as those described in the minority stress model (Meyer, 2003) have been shown to impact psychological well-being (e.g., Hatzenbuehler, 2009; Hatzenbuehler, Nolen-Hoeksema, & Dovidio, 2009; Kelleher, 2009; Marshal et al., 2013). Minority stress may, in part, operate through deficits in emotion-regulation strategies such as social isolation and rumination (Hatzenbuehler et al., 2009).

What is currently missing is the investigation of the differential impact of minority stress components and potential protective factors (Hatzenbuehler, 2009).

Positive factors in the lives of SSA youth and young adults

Social support can play an important role in same-sex attracted adolescent's development and self-concept (Wright & Perry, 2006). A recent review of the current literature by Kwon (2013) showed that having a social network that affirms one's sexual orientation and same-sex relationships may be particularly important for LGB adolescents. Social support has also been shown to buffer minority stress. For example in a study among LGB youth, support for coping with their sexuality buffered the impact of sexuality stress on emotional distress (Doty, Willoughby, Lindahl, & Malik, 2010).

Adolescence and young adulthood is a time when many sexual minority youth experience notable milestones such as same-sex attraction, sexual identity development, and disclosing one's orientation to others (Floyd & Stein, 2002; Rosario, Schrimshaw, Hunter, & Braun, 2006). At the same time, peers groups are often the main source of social support for youth (Wentzel, 2011). Thus, it is not surprising that friends are seen as an important buffer against the effects of victimization (Baiocco et al., 2012; D'Augelli, 2003). For example, research has shown that cross-gender and cross-orientation friendships may offer support or a "safer" perception of contact with cross-gender and -orientation individuals (Baiocco et al., 2014).

In addition to the role of friends, the family (e.g., Eisenberg & Resnick, 2006; Hershberger & D'Augelli, 1995) and school-context (e.g., Goodenow, Szalacha, & Westheimer, 2006; Ryan et al., 2010) have also been found to have implications for LGB youth. In previous research, family acceptance was shown to protect LGBT adolescents against depression, substance use, and suicidal ideation (Ryan et al., 2010) and sexual minority adolescents that have access to LGB support groups in school, were found to report less victimization and suicide attempts (Goodenow et al., 2006). Protection from minority stress may also come in the form of support from the LGB community—connectedness in the LGB community is related to higher self-esteem and lower internalized homophobia, and even predicts increased psychological and social well-being (Frost & Meyer, 2012).

There are only a few studies that consider the role of a romantic partner (e.g., Bauermeister et al., 2010; D'Augelli, Rendina, Sinclair, & Grossman, 2007; Frost, 2012; Frost & Meyer, 2009). For example, it has been suggested that being involved in a same-sex relationship can help affirm one's sexual identity (Savin-Williams, 1996). A study by Frost (2012) examined the pursuit of intimacy goals amongst LGB and heterosexual individuals. No differences were found between LGB and

heterosexual individuals in regard to their intimacy goals. However, the results did show that LGB individuals experienced more devaluation and barriers to achieving those intimacy goals than heterosexuals—LGB individuals reported experiencing minority stressors that were specific to their relational pursuits (Frost, 2012). In other words, although the potentially positive role of a romantic relationship is thought to be similar across sexual orientations, the barriers that people face may be different. To our knowledge, no studies tested the specific link between the components of minority stress and well-being, buffered by being involved in a romantic relationship

Romantic relationships as a buffer

Throughout adolescence, the formation of romantic relationships is an important developmental task (Floyd & Stein, 2002; Furman & Shaffer, 2003; Roisman, Masten, Coatsworth, & Tellegen, 2004). Being involved in a romantic relationship gives youth opportunities to gain skills in the expression and regulation of emotions, empathy and intimacy (Collins, 2003; O'Sullivan & Thompson, 2013). Romantic relationships can offer a different kind and level of intimacy in comparison to friendships (Steinberg, 1987), and as adolescents grow into young adults romantic partners fulfill different roles than friends. For example, young adults are more likely to seek proximity from a romantic partner than from their friends (Markiewicz, Lawford, Doyle, & Haggart, 2006). Further, romantic relationships offer forms of support and quality of interaction that other relations (e.g., friends, parents) may cease to offer (e.g., Furman & Shaffer, 2003; Furman & Shomaker, 2008; Sharabany, Gershoni, & Hofman, 1981; Zimmer-Gembeck, 2002). However, as same-sex attracted adolescents are less likely to find like-minded peers in their proximal environment they are suggested to have fewer opportunities to find romantic partners (Mustanski et al., 2014). In addition, being involved in a same-sex relationship may also “out” youth and force them to deal with potential social repercussions from being involved in a same-sex relationship (Diamond, Savin-Williams, & Dubé, 1999; Frost & Meyer, 2009).

In contrast to the negative impact factors, some work has suggested that being involved in a same-sex relationship can improve psychological well-being (Isay, 2009) and decrease anxiety and depression (Russell & Consolacion, 2003). A study on the effects of relationships among young sexual minorities examined the positive effects of several relationship trajectories (Bauermeister et al., 2010). Their longitudinal findings suggested that the involvement in a same-sex relationship was associated with increases in self-esteem in males, and decreases in internalized homophobia in females (Bauermeister et al., 2010). Thus, their findings emphasize the potential positive function of same-sex relationships among sexual minority youth, and the potentially differential impact of minority stress components. Put

differently, romantic partners may act as a buffer to the experience of minority stress.

Although previous studies have shown that social support and being accepted by others can protect LGB youth and young adults from the negative impact of minority stress (e.g., Kwon, 2013), the potential protective role of being involved in a same-sex romantic relationship has not been examined.

Present study

Considering support functions of friends, family, and the school-context, we hypothesized that being involved in a romantic relationship would protect SSA youth and young adults from the negative impact of minority stress on psychological well-being. In the current study four components of minority stress were assessed (1) internalized homophobia, (2) expected rejection, (3) meta-stereotyping, and (4) in-group blame. There is limited research on the differential impact of different minority stress components on psychological well-being, and potential gender differences, further many studies do not include both men and women, or multiple measures of minority stress. Therefore, we did not hypothesize gender differences or specific hypotheses for the relations between different minority stress components and psychological well-being.

In the present study we investigated whether romantic relationship status moderated the relations between four minority stress components (expected rejection, internalized homophobia, in-group blame, meta-stereotyping) and psychological well-being among Dutch SSA youth and young adults aged 16-24 years old. To examine the protective role of being involved in a romantic relationship in addition to other sources of social support, we controlled for offline and online social support in the analyses. Previous research on gender differences in relation to minority stress and psychological well-being is limited. However, research does show that lesbian and bisexual women are found to experience less homonegativity, but lower mental health, compared to gay and bisexual men (Kuyper & Fokkema, 2011). Considering the potential gender and sexual identity differences in minority stress and psychological well-being, we controlled for gender and same-sex attraction in the analyses.

The current study is unique in its sample composition because it was conducted in the Netherlands. In the Netherlands and in many other Western European countries relatively positive attitudes toward same-sex relationships prevail, and the laws pertaining to same-sex marriage are less conservative than in many other countries (Kuyper, Iedema, & Keuzenkamp, 2013). However, research in the Netherlands has also shown that, similar to other countries, Dutch same-sex attracted individuals experience minority stress and like in other cultures, and

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minority stress negatively impacts their well-being and mental health (Kuyper & Fokkema, 2011). Thus, with the current study we examine the previously found relation between minority stress and psychological well-being among Dutch youth (Kuyper & Fokkema, 2011), and the potentially protective role of a romantic relationship in a relatively positive, liberal societal climate.

Method

Procedure and sample characteristics

Data for this study were collected through an online survey. Individuals who experienced same-sex attraction were invited to participate, by means of announcements on several Dutch lesbian, gay, bisexual -oriented community websites. We used the term “same-sex attracted”, as this better captured the variation of identities and behaviors in our young group of participants. The survey was administered in Dutch. The Ethics Committee of the University of Amsterdam, approved the proposed study and participants younger than 16 years old were prevented from participation.

We selected a sample of 16-24 year old youth and young adults to test the hypothesized relations because they are expected to be involved in their first romantic relationships (Furman & Shaffer, 2003), and minority stress is thought to impact them more than adults (D’Augelli, 2005). In a previous paper (Baams, Jonas, Utz, Bos, & Van Der Vuurst, 2011) the complete sample was used (16-59 years old).

In total, 325 youth and young adults participated in the study. Of those, 65 were involved in a romantic relationship with someone of the same sex (20%; average duration: 11.38 months, $SD = 11.96$, min = 0 | max = 54 months, median = 7 months). 239 were not involved in a romantic relationship (73.5%). Five participants reported being unsure of the status of their romantic relationship, these were included in the analyses but recoded as missing for romantic relationship status variable. Those who reported being involved in a relationship with someone of the other sex were excluded from the analyses ($n = 16$). In total, 309 participants were included in the current analyses.⁵ The majority of participants had finished elementary school (23.6%), and were most likely still enrolled in secondary school. Smaller groups had finished secondary school—21.4% had finished the pre-vocational track; 17.8% had finished the general secondary education track; 20.1% had finished the pre-university track; 7.1% had finished the vocational track; 3.6% had finished the higher general education track;

⁵ Of the 309 participants all filled out the question on gender. 99.4% filled out the item about same-sex attraction. 79.6% reported their well-being. 84.7%–87.9% reported on the minority stress items. 83.2% reported offline social support and 75.1% reported online social support.

4.9% had finished a Bachelor or Master degree at university; 1.6% of participants did not fill out this question or reported having finished a different form of education. The majority of participants (96.1%) was born in the Netherlands, and the majority (70.8%) of participants reported not being religious (22.9% reported having a Christian religion).

Measures

Minority stress. The components of minority stress that were studied (expected rejection, meta- stereotyping, internalized homophobia, and in-group blame) were assessed with shortened versions of standardized instruments (Sandfort, 1997; Bos, van Balen, & van den Boom, 2004). Expected rejection was assessed with 8 items; an example item was “I am afraid to be made fun of because of my sexual orientation”. Answers ranged on 5-point scales (1 = *not worried at all* and 5 = *very worried*) ($\alpha = .89$; min = 1 | max = 5). Internalized homophobia was assessed with 5 items; an example item “Because I have homosexual/lesbian/bisexual feelings, I don’t feel like myself” ($\alpha = .79$; min = 1 | max = 5). In-group blame was assessed with 4 items; a sample item was “Some gays and lesbians ask to be discriminated against” ($\alpha = .79$; min = 1 | max = 5). Meta-stereotyping was assessed with 5 item; a sample item was “Most straight people reject homosexuality” ($\alpha = .82$; min = 1 | max = 5). Answers ranged on 5-point scales (1 = *fully disagree* and 5 = *fully agree*).

Psychological well-being. We assessed psychological well-being with a European Social Survey scale (k = 15; Huppert, Marks, Clark, et al., 2009). Sample items were “How often do you feel lonely?” (reverse-scored) and “How often do you feel happy?” Answers ranged on 5-point scales (1 = *never* and 5 = *always*) ($\alpha = .90$; min = 1.53 | max = 5).

Romantic relationship status. We assessed romantic relationship status by asking the participants whether they were involved in a steady relationship (0 = no; 1 = yes; 2 = I am unsure of the status). Those participants who reported “I am unsure of the status” were recoded as missing.

Same-sex attraction. Same-sex attraction was assessed with one item: “Rate your sexual orientation on the following scale.” Answers ranged on a 10-point scale (1 = *attracted to males only* and 10 = *attracted to females only*). These scores were recoded so that higher scores indicated a higher level of same-sex attraction (see Table 1 for the distribution of this item).

Online social support. This question was preceded by an item about which website the participants visited the most. Subsequently, level of online social support was assessed with the following item: “How much social support related to your sexual orientation do you experience on this website (for example, from

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friends or family)?” Answers ranged on a 5-point scale (1 = *very little* and 5 = *a lot*) (min = 1 | max = 5).

Offline social support. Level of offline social support was assessed with the following item: “How much social support related to your sexual orientation do you experience outside of this website (for example, from friends or family)?” Answers ranged on a 5-point scale (1 = *very little* and 5 = *a lot*) (min = 1 | max = 5).

Table 1
Distribution of the Same-Sex Attraction Scale for the Overall Sample and Males and Females Separately

	Same-sex attraction <i>n</i> (%)							
	3	4	5	6	7	8	9	10
Overall	2(0.7)	6(2.0)	20(6.5)	12(3.9)	25(8.1)	58(18.9)	86(31.9)	98(31.9)
Males	--	1(0.7)	4 (2.8)	6 (4.2)	11(7.6)	25(17.4)	40(27.8)	57(39.6)
Females	2(1.2)	5(3.1)	16(9.8)	6 (3.7)	14(8.6)	33(20.2)	46(28.2)	41(25.2)

Note. The item on same-sex attraction was re-coded so that for both males and females a higher score indicated a higher level of same-sex attraction. No participants selected the value 1 or 2 to rate their same-sex attraction. Two participants did complete the item about same-sex attraction.

Results

Preliminary analyses

Table 2 presents the descriptive statistics of the minority stress components, psychological well-being, same-sex attraction, and offline and online social support for the overall sample and males and females separately. The results of a multivariate analysis of variance showed that male adolescents and young adults scored higher on the minority stress components compared to female adolescents and young adults (Pillai's trace = .155, $F(4, 255) = 11.72$, $p < .001$, $\eta^2_p = .155$). More specifically, the tests of between-subjects effects showed that males scored higher on internalized homophobia ($F(1, 258) = 9.09$, $p = .003$, $\eta^2_p = .034$, expected rejection ($F(1, 258) = 12.13$, $p = .001$, $\eta^2_p = .045$), meta-stereotyping ($F(1, 258) = 17.30$, $p < .001$, $\eta^2_p = .063$), and in-group blame ($F(1, 258) = 41.73$, $p < .001$, $\eta^2_p = .139$). A univariate analysis of variance showed that level of psychological well-being did not differ between males and females ($F(1, 243) = 0.92$, $p = .338$, $\eta^2_p = .004$). Further, the results of a univariate analysis of variance showed that male adolescents and young adults reported higher levels of same-sex attraction compared to female adolescents and young adults ($F(1, 305) = 12.66$, $p < .001$, $\eta^2_p = .040$). Finally, a multivariate analysis of variance showed no sex differences in online and offline social support (Pillai's trace = .006, $F(2, 221) = 0.68$, $p = .508$, $\eta^2_p = .006$).

The results of Pearson correlation analyses (see Table 2) showed that the minority stressors were positively related to one another, and all but in-group blame were negatively related to psychological well-being. The correlation analyses for males and females separately showed no gender differences in pattern or magnitude of correlations between minority stress components and psychological well-being. For females, the results showed that higher levels of same-sex attraction were related to lower levels of the minority stress components expected rejection, meta-stereotyping, and in-group blame. For males, same-sex attraction was not related to the minority stress components. For both males and females, higher levels of offline social support were related to lower levels of minority stressors, and for females only also to higher levels of psychological well-being. For males, online social support was related to higher levels of expected rejection, but not to the other minority stress components.

Table 2
Zero-Order Pearson Correlations Between Key Variables for the Overall Sample and Males and Females Separately

	1.	2.	3.	4.	5.	6.	7.	M (SD)
Overall								
1. Internalized homophobia	--							1.89 (0.88)
2. Expected rejection	.45***	--						2.65 (1.03)
3. Meta-stereotyping	.40***	.59***	--					2.85 (0.90)
4. In-group blame	.35***	.34***	.37***	--				2.39 (1.05)
5. Psychological well-being	-.34***	-.44***	-.36***	-.11	--			3.35 (0.67)
6. Same-sex attraction	-.19	-.11	-.11	-.05	.09	--		8.45 (1.63)
7. Offline social support	-.41***	.31***	-.37***	-.21**	.21**	.09	--	3.78 (1.16)
8. Online social support	.00	.16*	.02	-.02	-.06	.03	.04	3.56 (1.11)
Males								
1. Internalized homophobia	--							2.06 (0.95) ^a
2. Expected rejection	.42***	--						2.89 (1.00) ^a
3. Meta-stereotyping	.37***	.53***	--					2.80 (1.07) ^a
4. In-group blame	.32***	.33***	.36***	--				3.09 (.091) ^a
5. Psychological well-being	-.33**	-.53***	-.30**	-.12	--			3.30 (0.69)
6. Same-sex attraction	-.43	-.12	-.12	-.08	.06	--		8.80 (1.36) ^a
7. Offline social support	-.47***	-.27**	-.37***	-.20*	.15	.20*	--	3.76 (1.22)
8. Online social support	.04	.23*	.02	-.02	-.10	.00	-.05	3.65 (1.10)
Females								
1. Internalized homophobia	--							1.75 (0.80)
2. Expected rejection	.43***	--						2.45 (1.02)
3. Meta-stereotyping	.38***	.61***	--					2.65 (0.85)
4. In-group blame	.30***	.24**	.25**	--				2.04 (0.89)
5. Psychological well-being	-.33***	-.36***	-.41***	-.07	--			3.38 (0.66)
6. Same-sex attraction	-.10	-.20*	-.20*	-.18*	.14	--		8.15 (1.79)
7. Offline social support	-.37***	-.35***	-.39***	-.23**	.24**	.05	--	3.80 (1.12)
8. Online social support	-.06	.07	-.03	-.08	-.02	.02	.13	3.48 (1.13)

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. ^a A significant gender difference between males and females ($p < .05$).

To assess the potential interaction between gender and romantic relationship status on the minority stress components and psychological well-being we performed a factorial multivariate analysis of variance including the interaction term gender × romantic relationship status (see Table 3). The results revealed that this interaction was not significant for the minority stress components and psychological well-being (Pillai’s trace = .006, $F(5, 230) = 0.30$, $p = .913$, $\eta^2_p = .006$). Further, those involved and not involved in a romantic relationship did not differ in their mean levels of minority stress components and psychological well-being ($F(5, 230) = 1.72$, $p = .131$, $\eta^2_p = .036$).

Table 3
Means of Key Variables for Men and Women and Romantic Relationship Status

Sex	Males		Females	
	Not involved	Involved	Not involved	Involved
Romantic relationship status	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Internalized homophobia	2.08 (0.98)	1.70 (0.49)	1.85 (0.83)	1.47 (0.71)
Expected rejection	2.91 (0.99)	2.46 (0.91)	2.58 (0.97)	2.14 (1.11)
Meta-stereotyping	3.11 (0.92)	2.88 (0.86)	2.79 (0.86)	2.35 (0.77)
In-group blame	2.81 (1.10)	2.58 (0.93)	2.11 (0.92)	1.87 (0.81)
Psychological well-being	3.31 (0.68)	3.49 (0.69)	3.33 (0.70)	3.49 (0.55)

Note. The interaction of romantic relationship status × sex was not significant for any of the key variables.

Moderation model

To test our main hypothesis on the moderating role of romantic relationship involvement we conducted a multiple regression analysis (see Table 4). The results showed that higher levels of expected rejection and higher levels of internalized homophobia predicted lower levels of psychological well-being. In these analyses we controlled for offline and online social support, and same-sex attraction in this model—these variables did not significantly predict psychological well-being in this model.



Chapter 8

To test the moderation of minority stressors and psychological well-being by romantic relationship status we also included the interaction between romantic relationship status and the separate minority stressors in the same step (e.g., Harrell, 2001). We found a significant interaction between romantic relationship and expected rejection ($\beta = .31, p < .001$).⁶

Table 4
Hierarchical Regression Analysis Predicting Psychological Well-Being From Minority Stress and Romantic Relationship Status (N = 309)

Predictor	<i>B</i>	<i>SE</i>	β	<i>p</i>
Gender ¹	-.06	.10	-.05	.533
Same-sex attraction	-.00	.03	-.01	.924
Offline social support	-.02	.04	-.03	.688
Online social support	-.01	.04	-.02	.783
Internalized homophobia	-.15	.06	-.19	.022
Expected rejection	-.30	.06	-.46	< .001
Meta-stereotyping	-.05	.07	-.07	.461
In-group blame	.07	.05	.11	.160
Romantic relationship	.12	.12	.07	.331
Internalized homophobia × romantic relationship	-.19	.18	-.09	.308
Expected rejection × romantic relationship	.43	.13	.32	< .001
Meta-stereotyping × romantic relationship	.06	.16	.039	.699
In-group blame × romantic relationship	-.19	.13	-.12	.137
<i>R</i> ²	.28			
<i>F</i>	5.54			
Model <i>p</i> value	< .001			

Note. ¹ 0 = male; 1 = female. All continuous variables were centered. This regression analysis was also run excluding participants who had been involved in their relationship for less than three months—the analyses did not yield different results.

⁶ We also conducted the regression analysis for the complete sample (not excluding those involved in a romantic relationship with someone of the other sex)—this did not alter the results. The group of youth involved in a romantic relationship with someone of the other sex was too small to be examined separately ($n = 16$).

Minority stress and romantic involvement

A simple slope analysis following the procedure suggested by Aiken and West (1991) revealed that expected rejection predicted lower levels of psychological well-being when SSA youth and young adults were single ($\beta = -.54, p < .001$), but not when they were involved in a same-sex romantic relationship ($\beta = .03, p = .844$) (see Figure 1). The interactions between romantic relationship and the other studied components of minority stress were not significant ($ps > .05$).

Psychological well-being
1 = low; 5 = high

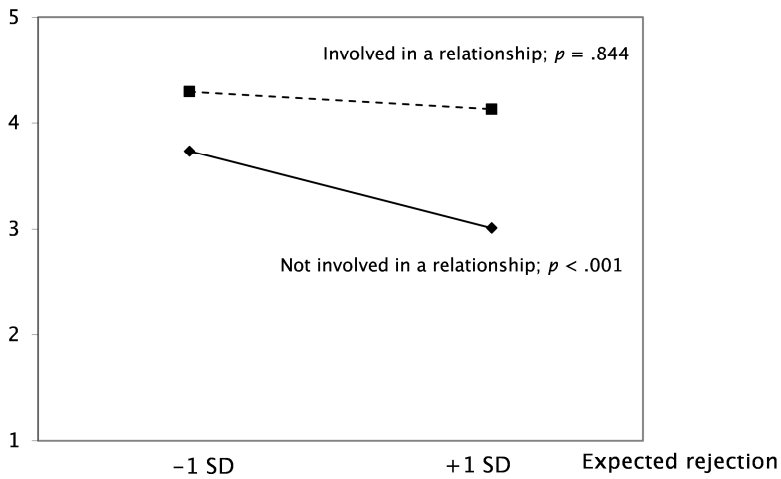


Figure 1. Graphic display of expected rejection \times relationship status interaction for psychological well-being. Simple slopes were computed following Aiken and West (1991)—we used 1 standard deviation above and below the mean to test the interaction.

Discussion

The findings of the current study partially confirmed our hypothesis, but in doing so deliver most relevant information on the relationship of romantic relationships and minority stress on the well-being of SSA youth among Dutch youth. Only the negative impact of the minority stressor “expected rejection” on psychological well-being was buffered by being involved in a romantic relationship, possibly by guaranteeing acceptance within the romantic relationship (Leary, 1999). However, the associations between the other studied components of minority stress and psychological well-being were not moderated by romantic relationship status.

The results of our study help to develop a future framework of linking minority stress components to socio-structural buffers and thereby increasing well-being. We found that rejection stressors were buffered by social embedding, in this case a romantic relationship. A romantic partner may help in maintaining a positive self-concept in the face of stressors (Meyer, 2003; Leary, 1999), and may be able to alleviate the effects of expected rejection.

The expectation of rejection (or perceived stigma; Meyer, 1995) has been described as the perception that others do not accept or respect someone based on a characteristic that cannot be changed (Goffman, 1963). Consequently, vigilance in interaction with the “majority” group is named as a common coping mechanism for “minority” groups but also suggested to cause further stress (Allport, 1954; Meyer, 1995) and to result in chronic stress (Meyer, 1995). A romantic partner may be particularly helpful in decreasing this stress. Having an affiliation with someone who experiences similar stigma can help to invalidate the “majority” group’s stigmatizing ideas or values (Crocker & Major, 1989; Meyer, 2003; Postmes & Branscombe, 2002).

For other minority stress components, such as overt rejection one could expect LGB community involvement and emotional resilience (Kwon, 2013) or (perceived) social support (Beals, Peplau, & Gable, 2009; Doty et al., 2010) to protect LGB youth from developing psychological problems. For example, perceived social support has been related to lower levels of depression and anxiety among sexual minority women (Lehavot & Simoni, 2011) and among gay (Smith & Brown, 1997) and lesbian (Jordan & Deluty, 2000) couples social support was related to greater relationship satisfaction. Thus, sufficient social support seems important for mental health and also interpersonal relations. Relating these findings back to the romantic relationship context, Otis and colleagues found that among same-sex couples, internalized homophobia negatively impacted relationship quality. They suggest that couples with high levels of internalized homophobia may, together, expect more rejection (expected rejection) and instability in their relationship (Otis et al., 2006). What follows is that individual expectations of negative events or

rejection may be easier to alleviate for a romantic partner, than shared minority stress such as internalized homophobia at the couple-level. Therefore it is important to assess both partners in the relationship, and whether partners differ in their coping strategies. In a longitudinal study including couples and not just individuals this would enable us to research the development of minority stress and well-being in a dyadic design.

For future research it would be advisable to include more components of the minority stress model, including emotion regulation and attributional styles, since these are found to be important determinants of the impact of minority stress on mental health and well-being (Burns, Kamen, Lehman, & Beach, 2012; Hatzenbuehler, 2009). Such information is relevant to be able to tailor SSA youth specific interventions.

Gender differences

Our findings showed that males experience more minority stress than females. However, we found no interactions between gender and romantic relationship status in relation to minority stress or psychological well-being, nor did we find an interaction between gender and minority stress component in relation to psychological well-being. An investigation of the mean differences showed that similar to previous research among Dutch youth (Kuyper & Fokkema, 2011) males reported higher levels of internalized homophobia than females. In addition, in the current study males were found to also report higher levels of expected rejection, meta-stereotyping, and in-group blame. Important to note here is that despite the lower levels of minority stress among girls, minority stress was still negatively related to psychological well-being among girls. A suggested explanation for the gender differences in minority stress is the different forms of rejection that male and female youth may perceive or expect. Perhaps females experience more covert forms of rejection while males are more likely to experience overt victimization. Also, it may be that male same-sex attracted youth's gender expression is met with more rejection, while gender nonconformity among females tends to be more accepted (Maccoby, 1998; Namaste, 1996; D'Augelli, Grossman, & Starks, 2006). Despite the discussed mean-level differences, the function of being involved in a romantic relationship did not differ for male and female adolescents and young adults.

Future research and limitations

Despite the novelty and additions of the current study there are some limitations to note. First, from the cross-sectional design we cannot infer temporal relations. Further longitudinal work would enable us to focus on the development of romantic relations over time, and how they are related to identity development from adolescence into adulthood. Second, the impact of expected rejection may differ from how experienced rejection would affect well-being. We did not measure experienced rejection, and for future research we would recommend including measures of both expected and experienced rejection since these experiences may have different outcomes, and thus require different buffers.

The third limitation pertains to the sample composition. The majority of youth was not involved in a romantic relationship. Those youth that were involved in a romantic relationship were often only involved in that relationship for a short period of time. With the current study we can unfortunately not infer the quality, stability, and health of that relationship. Yet one has to take type of romantic relationships that youth typically engage in into account, too, and not measure the time period by adult standards. In future research a more comprehensive measure of romantic involvement among a larger sample would extend the current findings. Further, the current sample reported a range of same-sex attractions, some reported being involved in a relationship with someone of the other sex, and some of our participants may identify as bisexual. Unfortunately, because we had no information about sexual identity we could not infer whether they identified as bisexual. Research has shown that bisexual individuals experience more minority stress (Kuyper & Fokkema, 2011; Rosario, Schrimshaw, Hunter, & Gwadz, 2002) and overall have lower levels of psychological well-being (e.g., Jorm, Korten, Rodgers, Jacomb, & Christensen, 2002) compared to lesbian and gay individuals. Further, research has shown that bisexual adolescents may have different relational developmental patterns (e.g., Floyd & Stein, 2002; Weinberg, Williams, & Pryor, 1994). Thus, for future research the unique experiences of bisexual individuals both in romantic relationships and minority stress need to be explored.

Finally, the current study is limited in its recruitment method. Participants were recruited through several LGB-oriented websites that may attract youth that are more open about their sexuality or in contrast, more closed. Further, we did not ask about participant's socio-economic status or living area. Therefore, the current study design may be limited in generalization of findings.

Conclusions

In the current study we found that being involved in a romantic relationship buffered the impact of expected rejection, but not the other factors components of minority stress. These findings underline that buffering minority stress is a multi-faceted endeavor. There are various types of support that may buffer minority stress, and there are various types of minority stress—our data indicated a specific link between buffer and stress type. It is highly relevant to consider this complexity in attempts to improve SSA youth and young adult's lives. Multiple sources of support are needed to protect against all of the components of minority stress.

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Summary and general discussion

Aims of this dissertation

The overall aim of the current dissertation was to apply a biopsychosocial model, in which physical, psychological, and social contextual factors are considered, to adolescent romantic and sexual development. In previous research several methodological issues hindered the study of developmental aspects of romantic and sexual involvement—there was a focus on cross-sectional research primarily focused on young adult and college samples. Further, in previous biopsychosocial models on adolescent development there was little attention for romantic and sexual development. Also, adolescent sexuality and romantic involvement was often viewed from a risk-perspective in which the predominant discourse was on risky behavior, STIs/HIV, and teen pregnancy. Clearly, adolescent romantic and sexual development is more complex than that. In **Chapter 1** several gaps in the literature are identified, and with the current dissertation an attempt was made to address these gaps. In this final chapter the results of the empirical studies in this dissertation are summarized and discussed. A new model extending the biopsychosocial model is proposed to study romantic and sexual development with a final section on suggestions for future research.

Summary of findings

In the current dissertation the studies are presented in three major sections. (1) The first section investigated biological and psychological factors, in which both personality and pubertal development were investigated as important predictors of adolescent sexual involvement. (2) The next section examined the role of peers and media in interaction with individual factors. For this section, friendship networks, peer-rated popularity, and sexualized media are considered as predictors of adolescent sexual development. Finally (3) in the third section the well-being of sexual minority adolescents and young adults was examined, with minority stress as an important predictor of sexual minority youth's well-being and including the role of romantic involvement. Here, the results of the different chapters across the three sections are presented (see Table 1 for the key findings).

Part 1: Biological and psychological factors in romantic and sexual development

The first goal of Part 1 was to relate pubertal status and timing to sexual (risk) behavior in a meta-analytic study in **Chapter 2**. The research question in this chapter was: *Is pubertal timing and status related to sexual (risk) behavior, and how are these relations moderated by gender, age, and ethnicity?* The results of the meta-analysis show that early maturing and physically more advanced adolescents engaged in more (risky) sexual behavior at younger ages. Further, the results show that the relation between pubertal development and sexual (risk) behavior was stronger for

girls, and stronger for younger adolescents. We were only able to examine the moderation by percentage of Black and White adolescents in the sample in the relations between pubertal development and sexual (risk) behavior. The findings of this moderation analysis were inconsistent. Overall, the relations were small to moderate in magnitude, which may indicate an important role of social context. Overall, the findings of this meta-analysis underline the importance of including sex, age, and ethnicity in studying pubertal development and its impact on adolescent sexual development. Despite the additions of this study, it also became clear that age, gender, and ethnicity did not explain all of the variance in the findings. Further, existing research on pubertal development and sexual development has rarely included contextual factors that may attenuate or increase the association of pubertal timing and status with adolescents' sexual development. Thus, the findings in Chapter 2 point to a need for further investigation of the social contexts in adolescent sexuality.

The second goal of Part 1 was to examine personality in relation to adolescent sexual development. The research question in **Chapter 3** was: *Is personality (dimensions and types) related to adolescent sexual development?* The findings show that undercontrolling adolescents engaged in more sexual behavior, more casual sexual behavior, and more risky sexual behavior compared to resilient and overcontrolling adolescents at baseline. However, adolescents with different personality types did not differ in terms of rate of sexual development over time. Further, concerning gender, only mean level differences were found between boys and girls (boys reported more casual sexual behavior than girls), but no interaction effects with personality dimensions or types were found. The findings in this study highlight the importance of personality in relation to adolescents' social relations, including sexual behavior.

Part 2: The role of peers and media in romantic and sexual development

In order to study transactional processes in romantic and sexual development in Part 2 the role of popularity, friendship networks, and sexualized media were examined in relation to individual factors. The first aim of Part 2 was to study whether pubertal development would affect early adolescent popularity and if this would then in turn affect their romantic and sexual involvement. The research question in **Chapter 4** was: *Are pubertal timing and tempo related to changes in romantic and sexual behavior of early adolescents, and can these relations be explained by popularity?* The longitudinal results show that adolescent boys with an early pubertal timing engaged in more sexual behavior, and that popularity partially explained this relation. For girls the findings show that those with a more rapid pubertal tempo were more likely to be involved in a romantic relationship, and this

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was partially explained by popularity. Further, for boys *and* girls, pubertal timing was directly linked to sexual involvement, and for girls pubertal timing and tempo was directly linked to romantic involvement. The direct link between pubertal development and romantic involvement was not found for boys. These findings underline how puberty affects boys and girls differently, both in peer social status and romantic and sexual involvement.

In order to explore the impact of peers and peer-relations, in **Chapter 5** friendship networks were examined as an important part of adolescent sexual development. The research question was: *Do adolescents select friends based on sexual behavior and intention in a social network? Are these relations moderated by personality?* The findings show that adolescents selected their friends based on similarity in sexual intention. However, this relation is moderated by emotional stability, such that low emotionally stable adolescents preferred friends similar to them in level of sexual intention, whereas those with high emotional stability levels preferred friends with dissimilar levels of sexual intention. This study also shows that adolescents clustered together in friendships on the basis of similarity in both personality and sexual development. These findings stress the importance of not studying adolescent sexuality in isolation from peers and friends, and of including individual factors such as personality that may moderate the impact of peers.

To broaden our focus on adolescent development with a more distal factor, potential media correlates of adolescents' sexual development were taken into account. Specifically, sexualized media was included as a potential correlate of adolescents' permissive sexual attitudes development over time. In **Chapter 6**, the research question was: *Are sexualized media consumption and permissive sexual attitudes reciprocally related and is this relation moderated by perceived realism?* The findings show that the mutually correlated development of sexualized media consumption and permissive sexual attitudes was stronger for those adolescents who perceived sexualized media to be more realistic. For those adolescents, a stronger increase of sexualized media consumption was paired with a stronger increase in permissive sexual attitudes. These relations were more prominent among boys. These findings emphasize the mutual interaction between sexualized media consumption development and the development of permissive sexual attitudes, and highlights that although media may impact adolescents, some adolescents also actively seek out sexualized media. Further, these findings stress the importance of perceived realism—a factor that may make adolescents more vulnerable to the impact of sexualized media, which should be addressed in media literacy interventions.

Part 3: Sexual minority youth: Health and well-being

In order to study the mechanism of the effects of minority stress on depression and suicidal ideation, the interpersonal psychological theory of suicide was used. The interpersonal psychological theory states that the perception of being a burden to others (perceived burdensomeness) and social isolation (thwarted belongingness) are predictive of depression and suicidal ideation. The research question in **Chapter 7** was: *Is minority stress related to depression and suicidal ideation among LGB youth, and can this relation be explained by perceived burdensomeness and thwarted belongingness?* The findings show that minority stress was related to LGB youth feeling more like a burden to the people around them and that this higher level of perceived burdensomeness was, in turn, related to higher levels of depression and suicidal ideation. Further, several specific indirect pathways were found based on gender and sexual identity groups and the operating minority stress component (either stress related to coming out as LGB or sexual orientation victimization). These findings stress the importance of examining underlying mechanisms that may help explain the relation between minority stress and mental health disparities among LGB youth.

In addition to the negative experiences sexual minority youth may face, it is important to investigate potentially protective or positive factors in the lives of same-sex attracted youth. As such, romantic development is assumed to be an age-normative process during adolescence, but rarely studied in the context of same-sex relationships (Mustanski, Birkett, Greene, Hatzenbuehler, & Newcomb, 2014). The research question in **Chapter 8** was as follows: *Does being involved in a romantic relationship protect same-sex attracted youth from the impact of minority stress on psychological well-being?* The findings show that being involved in a romantic relationship can protect sexual minority youth from the negative impact of expected rejection on their psychological well-being. These findings indicate that protecting youth from the negative impact of expected rejection can be fostered by romantic support, and that other components of minority stress may be better buffered by other sources of support.

Overall, the different chapters demonstrate the role of puberty and personality, and the role of peers and sexualized media in the development of romantic relationships and sexual behavior and attitudes, and transactions between these factors. Further, the role of a negative context in sexual minority adolescents' and young adults' well-being, and the protective role of a romantic relationship in relation to expected rejection was shown (see Table 1 for the key findings).

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Table 1
Key Findings of the Current Dissertation

Chapter	Research question	Key findings
Part 1: Biological and psychological factors in romantic and sexual development		
2	Are pubertal timing and status related to sexual (risk) behavior, and how are these relations moderated by gender, age, and ethnicity?	Early maturing and more advanced adolescents engaged in more (risky) sexual behavior at younger ages. These relations were stronger for girls, and stronger for younger adolescents. For several pubertal status measures links were stronger for White adolescents, whereas for the later-occurring menarche stronger links for Black girls were found.
3	Is personality (dimensions and types) related to adolescent sexual development?	Undercontrolling adolescents engaged in more sexual behavior, more casual sexual behavior, <i>and</i> more risky sexual behavior compared to resilient and overcontrolling adolescents.
Part 2: The role of peers and media in romantic and sexual development		
4	Are pubertal timing and tempo related to changes in romantic and sexual behavior of early adolescents, and can these relations be explained by popularity?	Adolescent boys with an early pubertal timing were rated as more popular and through this engaged in more sexual behavior. Rapidly maturing girls were rated as more popular and through this more likely to be involved in a romantic relationship.
5	Do adolescents select friends based on sexual behavior and intention in a social network? Are these relations moderated by personality?	Adolescents select their friends based on similarity in sexual intention. This relation was moderated by emotional stability, such that low emotionally adolescents preferred friends similar to them in level of sexual intention, whereas those with high emotional stability levels preferred friends with dissimilar levels of sexual intention.
6	Are sexualized media consumption and permissive sexual attitudes reciprocally related and is this relation moderated by perceived realism?	For those adolescents that perceived sexualized media as more realistic, a rapid increase of sexualized media consumption was paired with a rapid increase in permissive sexual attitudes. These relations were more prominent among boys.

Chapter	Research question	Key findings
Part 3: Sexual minority youth: Health and well-being		
7	Is minority stress related to depression and suicidal ideation among LGB youth, and can this relation be explained by perceived burdensomeness and thwarted belongingness?	Minority stress was related to a higher level of perceived burdensomeness and this explained the higher levels of depression and suicidal ideation.
8	Does being involved in a romantic relationship protect same-sex attracted youth from the impact of minority stress on psychological well-being?	Being involved in a same-sex romantic relationship can protect same-sex attracted adolescents and young adults from the negative impact of expected rejection (as part of the minority stress model) on their psychological well-being.

The biopsychosocial model in studying adolescent romantic and sexual development

Research from as early as the 1950s has shown the importance of considering biological, psychological, and social influences in adolescent development, and more importantly the reciprocal relations between these processes. Yet, in the field of adolescent development, this is rarely applied to romantic and sexual development. In the research on adolescent romantic and sexual development that has been done there was little attention for person-environment transactions and a one-sided focus on risk and vulnerability instead of on positive developmental trajectories. Whether by understandable restrictions in surveying adolescent sexual and romantic experiences, or because there has been a focus on risk, or because of biased views of adolescent romantic and sexual relations as “meaningless”, short-term, or precocious, scholars have not given sufficient attention to romantic and sexual relations as important contexts that can positively *and* negatively impact adolescent health (Collins, Welsh, & Furman, 2009).

In a response to this lacuna, the current dissertation applies a biopsychosocial model in relation to adolescent romantic and sexual development. This model was introduced in Chapter 1 and includes the individual factors pubertal development (biology) and personality (psychology). Considering these individual aspects, the findings in this dissertation show how personality and pubertal development directly relate to adolescent sexual development (Chapters 2 and 3). However, as stressed in the biopsychosocial model, it is important to incorporate the social context of adolescent development. As such, the research papers in the current dissertation stress that individual differences alone do not explain all of the behavior among adolescents, and a focus on individual characteristics can overshadow important contextual factors such as peers. When the social context was considered, the findings show that individual factors such as pubertal development can impact romantic and sexual involvement through a peer-perceived concept such as popularity (Chapter 4), but also that adolescents select their environment (friend network) based on individual factors (personality) and sexual development (sexual intention; Chapter 5). Further, the findings show that individual factors such as perceived realism can moderate the impact of a sexual context (sexualized media) on adolescent sexual development (permissive sexual attitudes; Chapter 6). Finally the impact of negative reactions to adolescent’s sexual identity (minority stress) was found to be related to mental health (Chapter 7), and the protective role of romantic involvement was shown (Chapter 8).

In sum, the findings of the current dissertation emphasize the importance of studying individual and social contextual factors (and the relations between them) that may aid adolescents in developing positive and healthy romantic and sexual relationships, and contextual factors that may facilitate positive and healthy

relationships. This dissertation contributes to a more comprehensive understanding of adolescent romantic and sexual development. However, from previous research on the biopsychosocial model (including the studies in the current dissertation) it becomes clear that there are also still significant gaps in the current understanding of adolescent romantic and sexual development.

The current dissertation proposes to go back to basics—back to the original biopsychosocial models in explaining adolescent development, and incorporating not just peer, friend, and parent relationships but also romantic and sexual relationships into existing adolescent developmental models. To do so, a theoretical basis of adolescent development is needed to form a better understanding of what constitutes adolescent sexuality and sexual health, combined with knowledge of what the implications are for adolescents developing into healthy, well-adjusted (young) adults.

To consider a new model of adolescent romantic and sexual development in a life-span perspective (Baltes, 1987; Baltes, Lindenberger, & Staudinger, 2006) using a biopsychosocial approach (Bronfenbrenner, 1979; Lerner & Foch, 1987) several assumptions are important to incorporate. These were adapted from Sigelman and Rider (2009) and Newman and Newman (2006) and applied to romantic and sexual development:

- (1) Development is viewed as a lifelong perspective—the proposed model assumes that adolescent romantic and sexual development are influenced by childhood events, and has implications for adult romantic and sexual development. Individuals will be stable across the life-span in some aspects while other aspects will change, develop, and grow.
- (2) Facets of the biopsychosocial model function reciprocally and have different developmental trajectories. When examining any part of development it is vital to consider all potential influences, and the transactions between them. Developmental processes have their own trajectory, some happen in sync with one another, some may be delayed or faster. For example, some may develop an understanding of their sexual identity at an earlier age than others, in different age-related contexts, with different reactions from the environment.
- (3) Development is characterized by plasticity. Individuals can change in response to positive and negative events. For example, experiencing a break-up can make adolescents more resilient in coping with rejection, it can also make adolescents more vulnerable to rejection. Individuals have agency in creating, selecting, and shaping different environments and significant relationships.

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- (4) Development is to be viewed in a historical-cultural context. Sexuality is viewed differently across cultures, generations, and genders (Nieto, 2004; Stenner et al., 2006). Some contexts offer more opportunities for change, whereas others are more restrictive or offer fewer resources. Thus, the implications and meanings of certain predictors or outcomes of romantic and sexual development can change over time and differ across cultures or societies.
- (5) Development is viewed in terms of person-environment transactions. In this dissertation we outline three person-environment transactions: evocative, reactive, and proactive $P \times E$ transactions. These different kinds of transactions are distinguished by Caspi and Roberts (2001) and extend work by Lerner and Foch (1987). According to these transactions, adolescents are described as (1) evoking reactions from others based on specific individual characteristics (adolescent as stimulus; Lerner & Foch, 1987), (2) reacting differently to environments (adolescent as processor; Lerner, 1987), and (3) selecting or creating their own environment (adolescent as agent, shaper, and selector; Lerner & Foch, 1987).

In life-span developmental psychology both constancy and change in behavior throughout the life course are studied. From this perspective, the proposed model includes aspects of interindividual differences and similarities in romantic and sexual development, as part of general adolescent development, and conditions under which certain aspects of those developments show more or less plasticity (Baltes, Reese, & Nesselroade, 1977). The proposed model could be applied to individuals of all ages, although some aspects may develop or occur only at certain time points during the life course.

In Figure 1 an extension to the biopsychosocial model in studying adolescent romantic and sexual development is proposed that targets the model of adolescent development (Caspi & Roberts, 2001; Lerner & Foch, 1987; Petersen, 1987), to focus on several aspects of romantic and sexual development (Collins, 2003; Fortenberry, 2013; Tolman, Striepe, & Harmon, 2003; WHO, 2010) and places the model within cultural, historical and developmental contexts (Baltes, 1987; Baltes, et al., 2006; Nieto, 2004; Stenner et al., 2006).

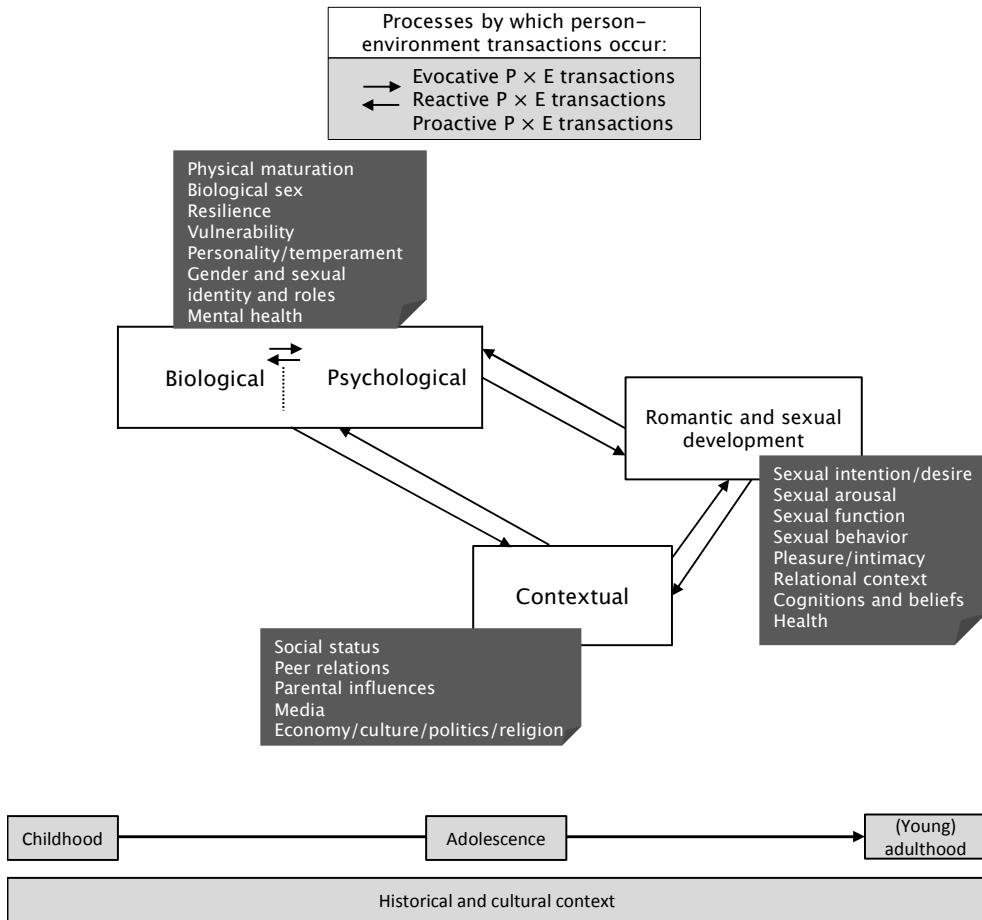


Figure 1. A proposed extended model from Caspi and Roberts (2001), Collins (2003), Fortenberry (2013), Lerner and Foch (1987), Petersen (1987), Tolman et al. (2003), WHO, and the findings in the current dissertation.

1. Evocative person-environment transactions. Adolescents have characteristics that can impact their development, by evoking specific reactions from their environment (Caspi & Roberts, 2001), including sexual behavior and decision-making (Michels, Kropp, Eyre, & Halpern-Felsher, 2005). For example, puberty can make adolescent’s physical appearance seem more adult-like or attractive. Their physical changes can, in turn, affect their peers’ evaluations. The current dissertation shows that an early pubertal timing increased sexual involvement (Chapter 2) and popularity for boys and girls, and for boys the link between pubertal timing and sexual involvement was mediated by popularity (Chapter 4). Another example of an individual characteristic that impacts adolescent development is temperament or personality. These characteristics can positively impact relations and interactions by making them easier, more comfortable, or

negatively by eliciting difficult interactions. Adolescent peer, parent, and teacher relations are impacted by these characteristics and in turn adolescents' adjustment and social development is dependent on these relations (Lerner & Foch, 1987). The current dissertation shows that personality is related to sexual experiences, and casual and risky sexual behavior (Chapter 3). In the proposed model (see Figure 1) several interdependent factors are described that could be seen as eliciting reactions from others, and thus impacting other aspects of adolescent development.

2. Reactive person-environment transactions. Lerner describes this second form of adolescents' role in their own development as "a consequence of their capabilities as a processor of the world" (Lerner & Foch, 1987, p. 15). In other words, adolescents differ in their way of interpreting, reacting to, and coping with developmental changes and processes and the timing of such developments (reactive person-environment transactions; Caspi & Roberts, 2001). These processes do not merely directly influence their environment, rather they affect the capability of handling changes during adolescence (e.g., physical changes, an increase in sexual interests, and more potentially risky situations). In the proposed model a concept such as resilience is considered as such a capability. For example, although adolescent sexual experiences are often paired with insecurity and novel situations, resilient adolescents are expected to cope well with these situations, to weigh pros and cons of decisions, and perhaps even enjoy these experiences more compared to their non-resilient counterparts. Cognitive factors also play a role in how adolescents develop sexually. The current dissertation shows that when adolescents have unrealistic expectations about sexual experiences (high perceived realism) the images and narratives in sexualized media are more strongly related to their permissive sexual attitudes (Chapter 6). Thus, in examining how individual factors relate to the environment it is important to consider the intensity and interpretation of such involvements (Collins, 2003).

3. Proactive person-environment transactions. The third factor in how adolescents "produce" their own development is agency (Lerner & Foch, 1987). Adolescents are flexible in who they interact with and how these transactions develop, for example in friendships and partner selection (Caspi & Roberts, 2001; Collins, 2003; Lerner & Foch, 1987). As children develop into adolescents they are given more freedom and fewer parental restrictions and consequently are more flexible in choosing their own peer groups and ways of interacting with them (Dornbusch et al., 1981). In particular during adolescence, youth need to become agentic in choosing their environment and coping with the stressors that adolescence can put on them (Lerner & Foch, 1987). Adolescent's agency in romantic and sexual development can be seen from their ability to set boundaries, weigh benefits, and communicate about their wants and needs (Michels, Kropp, Eyre, & Halpern-

Felsher, 2005). In the current dissertation, the findings in Chapter 5 show that adolescents select friends based on similarity in sexual intention, but only among those with low levels of emotional stability. This highlights that sexual development can play a role in how adolescents select friends, but also stresses the importance of incorporating person × environment transactional models into these studies.

Gender and sexuality

One of the individual factors that evokes different person-environment transactions is gender. Gender plays an important role in adolescent psychosexual development. Although gender and biological sex are used interchangeably here, it is important to note the distinction between the two. Biological sex is used to describe someone's secondary sex characteristics or reproductive anatomy while gender is often used as a description of someone's personal identification (which may be based on social roles and identity). For many individuals their gender overlaps with their biological sex, for some it does not.

In this dissertation studying gender differences was not one of the main aims. However, the results in this dissertation did show that gender can be an important factor for interpreting findings and generalizing results. The most prominent gender differences are outlined here.

Pubertal development and romantic and sexual involvement. Pubertal status and timing were more strongly related to sexual (risk) behavior among girls than among boys (Chapter 2). Further, popularity was related to romantic and sexual involvement for both boys and girls. However, popularity mediated the relation between an early pubertal timing and sexual behavior for boys, whereas for girls popularity mediated the relation between a more rapid pubertal tempo and romantic involvement (Chapter 4). In other words, there are clear gender differences in the impact of pubertal development on romantic and sexual involvement. Thus, these findings show an evocative person-environment transaction in which peer-rated popularity is impacted by adolescent's rate and timing of physical changes for boys and girls. The findings also show a potential proactive person-environment transaction in which physically mature adolescents seek out more romantic (for girls) and sexual involvement (for boys *and* girls). Further, although this was not studied in the current dissertation, evaluations of sexually active and physically mature boys may differ from the evaluations of girls, and boys and girls may themselves respond differently to physical changes and sexual interests.

Sexualized media and permissive sexual attitudes. For boys, stronger relations between sexualized media and permissive sexual attitudes were found than for

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girls. Further, boys consume more sexualized media than girls (Chapter 6). When perceived realism is taken into account these differences become smaller. In other words, among those who perceive sexualized media as more or less realistic, the results were more similar for boys and girls. This finding is an example of a reactive person-environment transaction in which perceived realism impacts the adolescent's capability or way of handling the sexualized media environment. Although the role of gender seemed to become less important when incorporating perceived realism into the model, boys were found to consume more sexualized media and report more permissive sexual attitudes. Perhaps the interpretation of sexualized media and permissive sexual attitudes is different for boys and girls. Despite the small quantitative differences between boys and girls, there may be qualitative differences in the interpretation and impact of sexualized media and permissive sexual attitudes.

Sexual minority youth. First, the findings in Chapter 7 point toward evocative person-environment transactions. Bisexual girls were found to experience less victimization than lesbian girls and gay and bisexual boys; and gay boys were found to report more victimization compared to gay and lesbian girls. Second, these findings may also point toward reactive person-environment transactions. In reaction to minority stress, bisexual girls were more likely to feel like a burden than gay boys. This may indicate a different or stronger response to stress and rejection for these girls. However, it may also be that bisexual girls experience different forms of rejection and minority stress compared to other sexual minority groups.

Taken together, these findings underline the importance of including gender and sexual identity in studies on sexuality, but more importantly these findings stress the importance of studying the meaning of gender in sexual identity and the environment's response to adolescents. A plea for further research is therefore to conduct more gender-inclusive studies of romantic and sexual development and its meaning among boys and girls.

On the path to "sexual health" or "positive sexual development", it becomes clear that boys and girls may experience different obstacles in different contexts. Because sexuality may have different meanings and developmental outcomes for boys and girls, it is important to consider gender in a comprehensive model of romantic and sexual development (Tolman et al., 2003). As such, in the proposed model (see Figure 1) gender identity and roles, and biological sex have been categorized as individual factors that are related to social contextual factors and romantic and sexual development.

Future directions

Much of the research on adolescent sexuality has used a narrow description of sexual behavior and has focused on risks. With the current dissertation an attempt was made to move beyond these limitations by including non-coital sexual behaviors, sexual attitudes, and romantic involvement. Starting from the model (see Figure 1) in which biopsychosocial predictors of romantic and sexual development were proposed, several future research directions can be formulated:

- (1) The findings in the current dissertation emphasize the importance of including both physical and psychological factors such as pubertal development and personality in the research. Moreover, these individual factors cannot be considered in isolation from its social context. As such, factors related to adolescents' agency in their own development, as well as social factors that stimulate or discourage a healthy sexual development (e.g., supportive peer relations and agency-stimulating cultural norms around sexuality) need to be included in future research.
- (2) The results of this dissertation show how adolescent sexual development is related to their friend's sexual development and the media environment in which they grow up. The current dissertation also points toward several unanswered questions. For example: For whom does media have a negative impact on sexual health? How can a realistic evaluation of media be encouraged? Which individual or developmental characteristics make adolescents more susceptible to the influence of friends, and in contrast, who may be more assertive in their peer group? How and when these contextual factors come into play should receive more attention in future research.
- (3) Considering that many developmental processes come together during adolescence and move on to affect adult life, it is important to examine what can positively and negatively affect individuals, and how adolescents can be encouraged or guided to shape and select their most adaptive and beneficial environment. Although the studies in the current dissertation aimed to examine adolescent development, this dissertation suggests that there may be precursors such as positive or adverse childhood events that need to be taken into consideration, and also that events during adolescence may impact individuals as they move into (young) adulthood. In previous research, adolescent sexuality was often studied with simplistic measures. More recently, theoretical work has described adolescent sexuality as involving aspects that were previously thought to matter only among adults, such as sexual desire, sexual arousal, and sexual function (Fortenberry, 2013). In order to examine a comprehensive

model of adolescent sexuality, it is important to include these factors and study their relations to biological, psychological, and social contextual factors at different time points. Thus, in future research it would be advisable to include participants at a younger age and follow them up into (young) adulthood.

- (4) The current dissertation emphasizes the importance of including gender in future work on romantic and sexual development by showing several evocative and reactive person-environment transactions of gender and adolescents' peer and media context (Chapters 2, 4, 6, and 7). The results of the current dissertation suggest that an understanding of sexuality and its context may be different across genders (Gagnon, 1990; McCabe, Tanner, Heiman, 2010). Much of the research on adolescent sexuality has assumed certain roles for boys and girls in their romantic and sexual development. For example, many stereotypes describe boys as having the assertive or dominant role, while girls are seen as having the responsibility of controlling and restraining their own and boys' sexuality (Wiederman, 2005). Contrasting these stereotypes, some qualitative work (e.g., McCabe et al., 2010; Tolman, Spencer, Harmon, Rosen-Reynoso, & Striepe, 2004; Way, 2013) has shown that boys report intense emotional bonds with their romantic and sexual partners and that for boys emotional experiences and sexual intimacy are often mixed. Further, for girls it is often difficult to acknowledge sexual desire and at the same time deal with potential social repercussions such as a "bad reputation" (Tolman, 2009). Including gender into a comprehensive model of adolescent romantic and sexual development challenges existing work and stereotypes. Instead of focusing on girls' risks for pregnancy, intimate partner violence, and STIs/HIV, a focus on access to contraception and condoms, acknowledging sexual agency, desire, and empowerment may work against stereotypes and at the same time be more beneficial for girls' sexual health (Impett, Schooler, & Tolman, 2006; Tolman et al., 2003). Similarly, for boys, redirecting the focus from risks to emotions and role models that do not objectify or have a predatory role in relation to girls may be more beneficial for their sexual health and overall well-being (Tolman et al., 2003; Way, 2013).
- (5) In order to study sexual and romantic development, comprehensive measures of sexual and romantic involvement are needed, including behaviors, intentions, risks, emotional experiences, relational contexts, cognitions, and beliefs.

Conclusion

At the beginning of this dissertation a claim is made that “the attainment of satisfactory romantic and sexual relationships is a developmental task in adolescence” (Chapter 1). The current dissertation can conclude that although this may be the case, currently romantic and sexual development have not been embedded in the existing adolescent development theories. The findings of this dissertation show that biological and psychological factors are important predictors for adolescent romantic and sexual development and overall well-being, and that it is vital to consider the peer- and media context in which adolescents often have their first romantic and sexual experiences. Taken together, the findings of this dissertation show the importance of using existing frameworks such as the biopsychosocial model in order to gain a better understanding of adolescent romantic and sexual development with its biological, psychological, and social contextual influences.

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Summary in Dutch (samenvatting)

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Tijdens de adolescentie beginnen veel jongeren aan hun eerste romantische relatie of hebben een eerste seksuele ervaring. Gedurende deze periode zijn er ook veel veranderingen op biologisch gebied, bijvoorbeeld fysieke veranderingen die te maken hebben met de puberteit, en ook psychologische veranderingen zoals een toename in autonomie. Adolescenten hebben in deze periode meer behoefte aan vrijheid van ouders, en ook gaan vrienden en andere leeftijdgenoten een grotere rol spelen. Hoewel eerder onderzoek heeft laten zien hoe de seksuele ontwikkeling van jongeren in Nederland eruitziet, weten we nog maar weinig over voorspellers van deze ontwikkeling. Sommige jongeren zullen eerder geïnteresseerd zijn in seksualiteit dan anderen. Ook zullen sommige jongeren romantische en seksuele relaties positiever ervaren dan anderen, en zullen sommigen misschien negatieve ervaringen hebben. In dit proefschrift wordt gekeken naar biologische, psychologische, en omgevingsfactoren in relatie tot de romantische en seksuele ontwikkeling van adolescenten en jongvolwassenen. In het eerste deel van dit proefschrift worden individuele factoren bekeken zoals puberteitsontwikkeling en persoonlijkheid. Daarna zijn drie omgevingsfactoren bekeken, namelijk vrienden, klasgenoten, en media. Ten slotte is in het derde deel onderzoek gedaan naar het welzijn van jongeren die zich (ook) aangetrokken voelen tot personen van hetzelfde geslacht.

Steekproeven

Voor de studies in dit proefschrift zijn verschillende datasets gebruikt. Ten eerste werd met een meta-analyse over 50 studies de relatie tussen puberteitsontwikkeling en seksueel gedrag onderzocht (hoofdstuk 1). Ten tweede is de studie SEXY gebruikt (hoofdstuk 2 en 6). Voor SEXY zijn onder ruim 400 adolescenten (13-16 jaar) tijdens vier meetmomenten een vragenlijst afgenomen. Elke zes maanden werden op verschillende middelbare scholen adolescenten gevraagd naar individuele aspecten en seksueel gedrag en attitudes. De derde dataset die is gebruikt (in hoofdstuk 4 en 5) betreft Project STARS (Dekovic et al., 2014). Voor deze studie hebben ruim 1200 jongeren van 10-17 jaar op zowel basisscholen als middelbare scholen vier keer een vragenlijst ingevuld, met telkens zes maanden tijd ertussen. Op elk meetmoment werden vragen gesteld over romantische en seksuele ontwikkeling, individuele factoren, en contextuele factoren. Ten slotte is in twee studies gekeken naar de gezondheid en het welzijn van jongeren die zich (ook) aangetrokken voelen tot personen van hetzelfde geslacht (hoofdstuk 7 en 8). Als eerste is bij Amerikaanse lesbische, homoseksuele, en biseksuele jongeren (15-21 jaar oud) gevraagd naar hun minderheidsstress, depressie, en suïcidale gedachten. Als tweede is onder Nederlandse jongeren (16-24 jaar oud) gevraagd naar hun minderheidsstress, psychologisch welzijn, en relatie-status.

Deel 1: Biologische en psychologische factoren in romantische en seksuele ontwikkeling

In het eerste deel van dit proefschrift werd de rol van puberteitsontwikkeling en persoonlijkheid in relatie tot seksuele ontwikkeling onderzocht.

Ondanks dat eerder onderzoek al aantoonde dat de puberteitsontwikkeling de interesse in seksualiteit aanwakkert, werd er nog niet eerder gekeken naar verschillen tussen jongens en meisjes en jongeren van verschillende leeftijden of etnische achtergronden. In hoofdstuk 2 zijn met een meta-analyse verschillende bestaande studies samengebracht die allemaal de relatie tussen puberteitsontwikkeling en seksueel (risico)-gedrag bestudeerden. Met deze meta-analyse is onderzocht of er in de relatie tussen puberteitsontwikkeling en seksueel (risico)gedrag verschillen zijn tussen jongens en meisjes, tussen jongeren van verschillende leeftijden, en tussen jongeren met verschillende etnische achtergronden. Uit de resultaten bleek dat wanneer jongeren verder ontwikkeld zijn (een later puberteits-stadium hebben bereikt) zij ook verder gevorderd zijn in seksueel gedrag en meer risicovolle seksuele ervaringen hebben. Daarnaast bleek dat wanneer jongeren vroeger in de puberteit komen dan hun leeftijdgenoten, zij ook geneigd zijn meer seksueel gedrag en seksueel risicogedrag te rapporteren, op jongere leeftijd. Ook werd gevonden dat puberteitsontwikkeling (risicovol) seksueel gedrag sterker lijkt te bepalen voor meisjes en voor jongere adolescenten.

In hoofdstuk 3 is gekeken naar de rol van persoonlijkheid in relatie tot seksuele ontwikkeling. Persoonlijkheid werd eerder al gerelateerd aan sociale relaties met leeftijdgenoten en ouders, maar nog niet eerder aan seksuele relaties. Onderzoek naar persoonlijkheid wordt vaak gedaan met de "Big Five" persoonlijkheidsfactoren, bestaande uit vijf dimensies waarmee personen beschreven kunnen worden: extraversie, zorgvuldigheid, aardigheid, openheid, en emotionele stabiliteit. In deze studie zijn deze vijf dimensies gerelateerd aan seksuele ervaring, casual seksueel gedrag, en risicovol seksueel gedrag onder een groep van 13-16 jarige adolescenten. Uit de resultaten bleek dat jongeren met een hoge mate van extraversie en een lage mate van aardigheid meer seksuele ervaring hadden, en meer casual en risicovol seksueel gedrag rapporteerden. Zorgvuldige jongeren rapporteerden juist minder casual seksueel gedrag. Vervolgens zijn uit de vijf persoonlijkheidsdimensies, drie persoonlijkheidstypen gemaakt, en zijn deze typen ook gerelateerd aan seksueel gedrag. Uit deze resultaten bleek dat jongeren ingedeeld konden worden in ondercontroleerende, overcontroleerende, en veerkrachtige persoonlijkheidstypen. Ondercontroleerende adolescenten worden beschreven als jongeren met problemen in hun emotieregulatie, en met een lage impulscontrole. Overcontroleerende adolescenten worden juist besproken als jongeren met een hoge impulscontrole maar met ook een lage emotieregulatie. Ten slotte, veerkrachtige jongeren hebben juist een relatief hoge mate van

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emotieregulatie, en kunnen hun impulscontrole aanpassen aan de omgeving. De resultaten lieten zien dat ondercontroleerende jongeren meer seksuele ervaring hadden en meer casual en risicovol seksueel gedrag rapporteerden dan veerkrachtige en overcontroleerende adolescenten.

Deel 2: De rol van leeftijdgenoten en media in romantische en seksuele ontwikkeling

In deel 2 van dit proefschrift is gekeken naar omgevingsfactoren (in het bijzonder klasgenoten, vrienden, media) in relatie tot romantische en seksuele ontwikkeling van jongeren.

In hoofdstuk 4 werd de puberteitsontwikkeling in relatie tot populariteit, en romantische en seksuele ervaring onderzocht. Hierbij werd populariteit gerapporteerd door klasgenoten van de adolescent. Deze relaties werden onderzocht met gegevens van vier opeenvolgende meetmomenten onder een groep jongeren die 10 tot 13 jaar oud waren op het eerste meetmoment. Uit de resultaten bleek dat jongens die vroeg in de puberteit komen als meer populair gezien worden, terwijl meisjes die een snellere puberteitsontwikkeling hebben als meer populair gezien worden. Daarnaast werd gevonden dat dit voor jongens bijdraagt aan meer seksueel gedrag, terwijl het voor meisjes bijdraagt aan het hebben van een romantische relatie.

In hoofdstuk 5 werd gekeken naar vriendschappen binnen klassen en hoe deze samenhangen met seksuele ontwikkeling. Met een sociometrisch model werd onderzocht of jongeren elkaar noemen als "vriend" op basis van persoonlijkheid (Big Five) en seksueel gedrag of seksuele intentie. Deze studie werd gedaan onder 10-17 jarige jongeren, met gegevens van drie meetmomenten. De resultaten lieten zien dat jongeren op basis van gelijkenis in seksuele intentie "clusteren" in vriendschapsnetwerken, maar alleen bij jongeren met een lage mate van emotionele stabiliteit. Dit betekent dat wanneer jongeren een lage mate van emotionele stabiliteit hebben zij een voorkeur hebben voor vrienden die dezelfde mate van seksuele intentie hebben als zijzelf.

Ten slotte werd in hoofdstuk 6 de rol van seksuele media in seksuele ontwikkeling onderzocht. Bij seksuele media gaat het dan om films of websites waar seksuele beelden wordt getoond. Er is onderzocht of jongeren die veel seksuele media consumeren ook meer permissieve seksuele attitudes hebben (meer liberale of tolerante attitudes over bijvoorbeeld seks zonder relatie en vreemdgaan). Voor deze studie is gebruik gemaakt van de gegevens uit drie meetmomenten bij jongeren van 13-16 jaar oud. De resultaten lieten zien dat jongeren die veel naar seksuele films kijken, of seksuele websites bezoeken ook meer permissieve seksuele attitudes hebben. Ook werd gevonden dat jongeren die over tijd meer

toenemen in seksuele media consumptie ook meer toenemen in permissieve seksuele attitudes. Voor de jongeren die seksuele media realistisch vinden, bleek ook dat het gebruik van deze media sterker samenhang met hun permissieve seksuele attitudes.

Deel 3: Seksuele minderheden: Gezondheid en welzijn

In deel 3 van dit proefschrift werd gekeken naar de relatie tussen minderheidsstress en welzijn onder jongeren die zich (ook) aangetrokken voelen tot personen van hetzelfde geslacht.

In hoofdstuk 7 werd bij 16-21 jarige Amerikaanse lesbische, homoseksuele, en biseksuele jongeren gekeken naar de samenhang tussen minderheidsstress en depressie en suïcidale gedachten. Daarnaast werd onderzocht of het gevoel een last te zijn voor anderen en sociale isolatie aan depressie en suïcidale gedachten bijdragen. De resultaten lieten zien dat jongeren die meer minderheidsstress rapporteerden zichzelf vaker een last voor anderen voelden, en daardoor ook meer depressieve klachten en meer suïcidale gedachten hadden.

In hoofdstuk 8 werd opnieuw gekeken naar de samenhang tussen minderheidsstress en psychologisch welzijn, en dit keer werd onderzocht of het hebben van een romantische relatie deze samenhang zou verminderen. Deze vraag werd onderzocht bij 16-24 jarige Nederlandse jongeren die (ook) op personen van het eigen geslacht vallen. In deze studie werd ten eerste opnieuw gevonden dat minderheidsstress gerelateerd was aan een lagere mate van psychologisch welzijn. Daarnaast lieten de resultaten zien dat bij jongeren die een romantische relatie hadden, een van de onderzochte componenten van minderheidsstress (namelijk de verwachtingen van afwijzing) niet langer psychologisch welzijn voorspelde. Deze studie laat dus zien dat het hebben van een romantische relatie mogelijk de impact van minderheidsstress op psychologisch welzijn vermindert.

Conclusie

Veel van het bestaande onderzoek naar de adolescentie romantische en seksuele ontwikkeling richt zich op seksueel risicogedrag, en “geslachtsgemeenschap”, terwijl we weten dat adolescentie romantische en seksuele ontwikkeling complexer is dan dat. De resultaten van de verschillende studies benadrukken het belang van het bestuderen van adolescentie ontwikkeling in een biopsychosociaal model, waarmee zowel biologische, psychologische, als sociale factoren worden onderzocht.

Er zijn enkele belangrijke verbeterpunten te noemen bij dit proefschrift. Ten eerste, omdat in geen van de studies jongeren werden gevolgd tot in de volwassenheid, konden mogelijk belangrijke implicaties van de romantische en seksuele

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ontwikkeling tijdens de adolescentie voor de ontwikkeling als volwassenen niet onderzocht worden. Ook is het voor vervolgonderzoek belangrijk om te kijken naar mogelijke voorspellers van de romantische en seksuele ontwikkeling tijdens de adolescentie in de kindertijd. Ten tweede kon er in de huidige studies maar naar een beperkt aantal aspecten van romantische en seksuele ontwikkeling gekeken worden. Belangrijke concepten om in verdere onderzoeken mee te nemen zijn bijvoorbeeld de kwaliteit en betekenis van intieme relaties.

Uit dit proefschrift is duidelijk geworden dat het belangrijk is om bij onderzoek naar de romantische en seksuele ontwikkeling van adolescenten zowel psychologische als biologische factoren te onderzoeken. De studies naar puberteitsontwikkeling laten zien dat er een directe relatie is tussen puberteitsontwikkeling en romantische en seksuele ontwikkeling; dat deze relaties verschillen voor jongens en meisjes; en dat het van belang is om de sociale omgeving van jongeren in overweging te nemen. De studies naar de psychologische factoren laten zien dat persoonlijkheid niet alleen een belangrijke factor is bij de vorming van vriendschappen, maar ook bij de ontwikkeling van seksualiteit. Ten slotte hebben de studies benadrukt dat het belangrijk is om de sociale omgeving van jongeren mee te nemen in onderzoek naar romantische en seksuele ontwikkeling. Zo lieten de studies in dit proefschrift zien dat vrienden en klasgenoten een belangrijke rol spelen, maar ook dat het belangrijk is voor jongeren om deel uit te maken van een veilige en accepterende omgeving. De algemene conclusie van dit proefschrift onderstreept het belang om huidige theorieën over adolescentie ontwikkeling, zoals het biopsychosociaal model, te gebruiken en romantische en seksuele ervaringen van jongeren een plek in deze modellen te geven.

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Mam: Thuis zeggen we vaak dat ik mijn werklust van papa heb, maar van jou heb ik de benodigde zorgvuldigheid en daadkracht meegekregen. Als ik vroeger mijn bijbaan niet leuk vond zei je "harder studeren voor een baan die je later wel leuk vindt." Ook al vertel ik jullie nog zelden waar mijn werk precies over gaat, je viert elke publicatie met me mee. Je hebt mij geleerd dat ik trots mag zijn als iets lukt en als ik het zelf niet meer zie, kan ik voor die trots altijd bij jullie terecht.

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Eddie: Lief, mijn favoriete menspersoon, toen ik begon aan dit proefschrift had ik nog geen idee dat jouw naam hier zou staan. Wat fijn dat je er bent en dat ik elke dag opnieuw mezelf bij jou kan vinden, en jou bij mij. Op nog heel veel tijd samen!

Curriculum Vitae

Curriculum Vitae

Laura Baams (1984) finished high school at College de Heemlanden, Houten, in 2003. After high school, she studied Psychology at the University of Portsmouth, England, for one year with support from the Nuffic Organization. She finished the bachelor Psychology at the University of Amsterdam (2004-2007). After this, Laura finished the Psychology Research Master at the University of Amsterdam, with a major in Research Methods and a minor in Clinical Psychology (2007-2009). During and after her studies, Laura taught several courses at the University of Amsterdam. In December 2010, Laura started her Ph.D. project – the NWO/FWOS funded Project STARS. During her time as a Ph.D. candidate she received support from EARA/SRA, Fulbright, and VVAO. She also spent three months at the University of Arizona to work with dr. Stephen Russell. Laura completed her Ph.D. project in August 2014. Currently, Laura works as a postdoctoral researcher at Utrecht University, where she continues her research on sexual development and sexual minority adolescents.

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