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A meta-analysis of the relations between three types of peer norms and adolescent sexual behavior

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Abstract

The aim of the present meta-analysis was to investigate the associations between three types of peer norms–descriptive norms (peer sexual behaviors), injunctive norms (peer sexual attitudes), and peer pressure to have sex–and two adolescent sexual behavior outcomes (sexual activity and sexual risk behavior). Adolescent sexual activity was more strongly associated with descriptive norms (ESr_{fixed} = .40) than with injunctive norms (ESr_{fixed} = .22) or peer pressure (ESr_{fixed} = .10). Compared with the sexual activity outcome, the effect size for descriptive norms (peer sexual risk behavior) for sexual risk behavior was smaller (ESr_{fixed} = .11). Age, gender, peer type, and socio-cultural context significantly moderated these associations. Additional analyses of longitudinal studies suggested that selection effects were stronger than socialization effects. These findings offer empirical support for the conceptual distinction between three types of peer norms and hold important implications for theory, research, and intervention strategies.

5.1 Introduction

Over the past three decades, the ecological perspective has become a dominant theoretical paradigm in research on adolescent sexual development (Smetana et al., 2006). Ecological models—such as the Bioecological model (Bronfenbrenner & Ceci, 1994), the Biosocial model (E. A. Smith et al., 1985), the Biopsychosocial model (Meschke et al., 2000), and the Multi-Systemic Perspective (Kotchick et al., 2001)—conceptualize developments in adolescents' sexual cognitions and behaviors as the outcomes of continuous interactions between individual characteristics and socio-contextual factors.

In line with this theoretical approach, scholars have increasingly acknowledged that social contexts and interpersonal relationships contribute significantly to the processes that shape adolescents' sexuality (for a review, see Crockett et al., 2003). In addition to the many studies that have assessed the role of parenting and family characteristics in adolescents' sexual development (for reviews, see De Graaf, Vanwesenbeeck, Woertman et al., 2011; B. C. Miller, 2002; B. C. Miller et al., 2001), the role of peers has also been widely researched. This is not surprising, considering that adolescence is characterized by an increased

frequency of peer interactions (B. B. Brown et al., 1997), as well as a growing reliance on peer feedback in identity formation and self-evaluation (Hergovich et al., 2002). Although parents remain important proximal socializing agents, peers become increasingly substantial sources of social and emotional support, and increasingly significant frames of reference for how adolescents think and act.

In the literature on the role of peers in adolescent sexual behavior, various aspects of the peer context and adolescents' relations with peers have been studied. These include friends' gender and age (e.g., Cavanagh, 2004), frequency of peer involvement (e.g., Barnes et al., 2007), levels of peer connectedness (e.g., Markham et al., 2010), contact with pro-social peers (e.g., Manlove, Logan, Moore, & Ikramullah, 2008), involvement with deviant peers (e.g., Boislard, Poulin, Kiesner, & Dishion, 2009; Dishion, Ha, & Veronneau, 2012), and communication with peers about sex (e.g., Busse, Fishbein, Bleakley, & Hennessy, 2010). Together, these studies have shown the importance of peers in adolescent sexual behavior. However, because these studies are not embedded in a clear, single theoretical framework, they provide little integrated knowledge about how peers are linked with the development of adolescent sexuality.

The present research was conducted to integrate the literature in this area, both theoretically and meta-analytically. We specifically focused on the large number of studies that have examined the similarity, or "homophily," between the sexual behaviors of adolescents and their peers. First, we discuss the most prominent theories that attempt to explain these homophily effects. Second, based on a similar approach in research on adolescent substance use behaviors, we assess the applicability of a threefold social norm-based conceptualization of the role of peers in adolescent sexual behavior. We examine this through a meta-analysis of studies that have investigated the associations between these three types of peer norms (i.e., descriptive norms, injunctive norms, and peer pressure) and adolescent sexual activity and risk behavior. Furthermore, we test possible moderators of the meta-analytic associations and make an attempt to disentangle different over-time mechanisms (i.e., selection and socialization effects). Based on our results, we discuss the applicability of a threefold conceptualization of peer norms for a better understanding of the role that peers play in various domains of adolescent behavior, including sexual behavior.

5.1.1 Similarities between adolescents and their peers: Theories and mechanisms

Scholars have consistently shown that adolescents' behaviors tend to be very similar to those of their peers (Brechwald & Prinstein, 2011; Heilbron & Prinstein, 2008; Kandel, 1978). Several social-psychological theories propose mechanisms that may underlie these homophily effects. Social Learning Theory suggests that engagement in new behaviors is promoted by observing the behaviors of valued social referents, such as peers. This process is referred to as role-modeling, imitation, or observational learning (Bandura, 1971). According to this theory, the larger the number of peers who engage in a certain behavior, the more functional and correct the behavior will be perceived to be, and the more likely it is that adolescents will engage in the same behavior, based on the reasoning that if others are doing it, it is probably a good or wise thing to do the same (Cialdini & Trost, 1998; Fekadu & Kraft, 2002; Rivis & Sheeran, 2003). In addition, adolescents might be motivated to

conform to behavioral norms because they expect certain social rewards or punishments, such as social acceptance or rejection, or an increase or decrease in social status (Bandura, 1971; Heilbron & Prinstein, 2008). The extrinsic motivation to conform to behavioral norms is strengthened when peers explicitly formulate or reinforce these social rewards or punishments (Brechwald & Prinstein, 2011). Alternatively, identity-based theories suggest that conformity to normative behaviors, and the resulting similarity to peers, contributes to a favorable self-view, which is intrinsically rewarding (Brechwald & Prinstein, 2011; Heilbron & Prinstein, 2008; Markus & Wurf, 1987; Newman & Newman, 2001).

The principles of social learning and identity development theories have been adopted and developed further in the context of Social Norm Theory (Cialdini & Trost, 1998), which aims to explain how social frames of reference regulate individuals' behavioral decisions. According to Social Norm Theory, people have a general tendency to adapt their own behaviors in concordance with their perceptions of behaviors that are prevalent, accepted, or desired among valued social referents, referred to as social norms (Cialdini & Trost, 1998). This theory distinguishes different types of social norms as different pathways through which similarities in behaviors come about. First, descriptive norms are conceptualized as actual or perceived behaviors among social referents (Cialdini & Trost, 1998). Second, injunctive norms are conceptualized as actual or perceived attitudes (i.e., approval or disapproval) of social referents regarding the engagement in certain behaviors (Cialdini & Trost, 1998). Whereas adolescents' conformity to descriptive peer norms can be explained in terms of role-modeling and imitation, conformity to injunctive norms depends on the amount of support these norms provide for adolescents' own values regarding particular forms of conduct. When approval of peers is in concordance with adolescents' own positive attitudes toward a certain behavior, adolescents are more likely to initiate that behavior (White et al., 2002).

Whereas descriptive and injunctive norms have primarily indirect effects on adolescent behavior, namely, through adolescents' perceptions of these norms and their evaluations of whether conformity to these norms is functional, peers can also affect adolescents' behaviors more directly through explicit social pressure (Borsari & Carey, 2003; Kandel, 1985; Kandel & Andrews, 1987; Wood et al., 2001). The motivating force to conform to social pressure comes from the direct perception or explicit formulation of potential social gains (e.g., acceptance, respect, popularity, or high status) when one conforms to the desired behavior or potential social losses (e.g., social rejection) when one does not conform (Fekadu & Kraft, 2002; Rivis & Sheeran, 2003; White et al., 2009). Peer pressure, encompassing the active and explicit encouragement from peers to engage in a certain behavior, thus comprises a third distinct type of social norm (B. B. Brown et al., 1986; Clasen & Brown, 1985; Santor et al., 2000).

5.1.2 Toward a threefold conceptualization of peer norms

Despite the conceptual distinctions among these three types of social norms, empirical studies that investigate the role of peers in adolescent sexual behavior rarely adopt this threefold conceptualization of direct (peer pressure) and indirect (descriptive and injunctive) social norms. Most studies investigate either indirect descriptive and injunctive norms (e.g.,

Baumgartner, Valkenburg, & Peter, 2011) or direct peer pressure (e.g., Crockett, Raffaelli, & Shen, 2006; Sullivan, 2006). This trend can also be observed in systematic reviews and meta-analyses that have assessed peer influences in adolescent sexual behavior. In a meta-analysis of correlates of adolescent contraceptive use, Whitley and Schofield () assessed only the role of injunctive norms (i.e., peer support of contraceptive use). In a systematic literature review of theory-driven correlates of adolescents' sexual intentions and behaviors, Buhi and Goodson (2007) reviewed both descriptive norms (i.e., peers' sexual behaviors) and injunctive norms (i.e., peers' approval of sex) but not direct peer pressure. In a meta-analysis of psychosocial correlates of heterosexual condom use among both adolescent and non-adolescent samples, Sheeran, Abraham, and Orbell (1999) did investigate direct peer pressure, as well as descriptive norms (i.e., peers' condom use behaviors) and injunctive norms (i.e., attitudes toward condoms). However, peer behaviors and attitudes were combined into one peer norm, referred to as descriptive peer norms. The present meta-analysis is a first attempt to investigate the unique relations between all three types of peer norms and adolescent sexual behavior.

In other areas of adolescent behavior, researchers have used a similar threefold conceptualization of peer norms. In a study on smoking behavior, De Vries, Backbier, Kok, and Dijkstra (1995) investigated all three types of social norms (i.e., others' smoking behavior, others' normative beliefs about smoking, and perceived pressure to smoke). They found that adolescent smoking behavior was associated with all three social norm types. However, the authors noted that comparison of these results was hindered by the considerable variations in operationalizations of social norms used in other studies. In a literature review on the role of peers in college students' alcohol use, Borsari and Carey (2003) also investigated both indirect (descriptive and injunctive) and direct (peer pressure) peer norms. Again, their findings supported three distinct pathways by which peers influenced college students' drinking behavior. Here, too, the authors observed that the literature tends to study each of these peer norms in relative isolation, using varying research methods, and stressed the need to consider different types of peer norms when investigating peer influences in youth's health-risk behavior.

As these three types of peer norms are theoretically and empirically distinct, overlooking their unique ability to predict adolescent behaviors is a serious limitation of the existing research literature. Therefore, following the approach of these two studies on adolescent smoking and drinking behavior, the current study applied a similar threefold conceptualization of peer norms to investigate associations between peer norms and adolescent sexual behavior. Applicability of this threefold conceptualization provides a valuable expansion of existing theories on the role of the peer context in adolescent behavior and development. Moreover, understanding different pathways (i.e., socio-psychological processes) through which adolescent sexual behavior is related to peer norms is critical for prevention and intervention efforts aiming to promote adolescents' healthy sexual behavior and well-being.

The first aim of the present study was to meta-analytically investigate the theoretical distinction of three types of peer norms, namely, descriptive norms (peer sexual activity), injunctive norms (peer sexual attitudes), and peer pressure, and their unique associations

with two adolescent sexual behavior outcomes. The first outcome, sexual activity, was defined in terms of (a) incidence (i.e., having sexual experience), (b) timing (i.e., age at sexual onset), and (c) intensity (e.g., number of sex partners, or frequency of sexual activity). Although not inherently risky or problematic, sexual activity during adolescence can result in undesired outcomes. Engaging in sexual behaviors at an early age has been related to a higher likelihood of having unprotected sex (Stone & Ingham, 2002), contracting sexually transmitted infections (STIs; Kaestle et al., 2005), teenage pregnancy (Wellings et al., 2001), and long-term sexual health problems (Sandfort et al., 2008). The second outcome, sexual risk behavior, was defined as having unprotected sex (without condoms or contraceptives) or reporting experience with sexually transmitted infections or teenage pregnancy. For this second outcome, only descriptive risk norms (peer sexual risk behavior) could be assessed due to the limited number of retrievable studies that investigated the relations with injunctive norms or peer pressure. Thus, we investigated four meta-analytic relations (see Figure 5.1).

We expected that all three peer norm types would be uniquely related to adolescent sexual behavior. Based on its conceptualization as the most overt and direct peer norm, peer pressure should have the strongest association with adolescent sexual activity. However, effects of peer pressure appear to differ across various domains of adolescent behavior. Studies have found that adolescents experience more peer pressure toward school and peer involvement than toward sexual behavior (B. B. Brown et al., 1986; Clasen & Brown, 1985). Similarly, Santor and colleagues (2000) found that peer pressure was more strongly related to adolescents' school performance and substance use than to their number of sexual partners. Moreover, based on Sheeran and colleagues' (1999) meta-analytic finding that heterosexual condom use was more strongly related to a combination of descriptive and injunctive norms ($r = .37$) than to peer pressure ($r = .26$), we expected that descriptive and injunctive norms would be more strongly associated with adolescent sexual activity than peer pressure. In addition, based on findings that adolescents' risky online sexual behaviors were more strongly related to descriptive norms than to injunctive norms (Baumgartner et al., 2011), we further hypothesized that the effect sizes for descriptive norms would exceed those of injunctive norms.

5.1.3 Moderators of the associations between peer norms and adolescent sexual behavior

Although conformity to social norms is a universal and normative aspect of human behavior, the extent to which adolescents conform to peer norms depends on individual characteristics, interpersonal factors, and the socio-cultural context (Cialdini & Trost, 1998). Therefore, the second aim of the present meta-analysis was to test whether the strengths of the investigated meta-analytic associations were qualified by three types of moderators reflecting individual, interpersonal, and socio-cultural factors. As neither theory nor research provides definitive hypotheses about these moderating effects, all moderator analyses had an exploratory character.

Age—Younger adolescents are generally more sensitive and susceptible to social influences and pressures than older adolescents (Sumter et al., 2009), and resistance to peer influence often increases with age (Steinberg & Monahan, 2007). Hence, associations between sexual peer norms and sexual behavior may be stronger for younger adolescents than older

adolescents (Hypothesis 1). Alternatively, Problem Behavior Theory (Jessor, 1987) emphasizes that certain behavioral norms are age-graded, that is, considered (in)appropriate for certain ages or developmental stages. As sexual activity becomes more normative with increasing age, associations between sexual peer norms and adolescents' own sexual behavior may be stronger for older adolescents than for younger adolescents (Hypothesis 2). Identity development theories propose yet another pattern where conformity to peer norms would increase through early and middle adolescence due to the need to identify and affiliate with peers for a sense of identity and well-being (Newman & Newman, 2001). In later adolescence, this need would decrease after adolescents have developed a more autonomous sense of the self (Berndt, 1979; B. B. Brown et al., 1986; Clasen & Brown, 1985), resulting in an inverted U-shaped age pattern (Hypothesis 3).

Gender—In general, women tend to be more susceptible to social influences than men (Cialdini & Trost, 1998). During adolescence, girls are more sensitive to peers' social evaluations than boys (Rudolph & Conley, 2005). In line with this, Whitley and Schofield (1985) found that peer support of contraceptive use was a significant correlate of actual contraceptive use only for girls. Together, these findings suggest that peer norms may play a greater role in girls' sexual decision making than boys' (Hypothesis 1). However, with regard to gender role development and sexual socialization, boys are often permitted more sexual freedom, whereas girls are often more sexually restricted. This discrepancy translates into more positive evaluations of adolescent boys' sexual activity and more negative evaluations of adolescent girls' sexual activity (Crawford & Popp, 2003; Kreager & Staff, 2009; Lyons et al., 2011). Male adolescents also generally experience more pressure from peers to have sex and are more inclined to follow peers in their sexual behavior than girls (Berndt, 1979; B. B. Brown et al., 1986; Clasen & Brown, 1985). Hence, alternatively, associations between sexual peer norms and sexual behavior may be stronger for boys than for girls (Hypothesis 2).

Different types of peers—Over the past decade, the literature has increasingly focused on the distinction among various potential sources of peer influence on adolescent behavior, for example, best friends, popular peer role models, and larger peer networks (Berten & Van Rossem, 2011; Brechwald & Prinstein, 2011). Up to now, the literature is inconsistent with regard to which peers (i.e., close or distant) exert more influence (Berten & Van Rossem, 2011; Heilbron & Prinstein, 2008). In the present study, we performed moderator analyses to compare the effects of sexual norms between different types of peers varying in degree of closeness: (a) close friends, (b) school peers, and (c) peers in general. On one hand, closeness to peers may increase adolescents' opportunities to observe or communicate sexual norms, which may promote similarity (Hypothesis 1). Studies have shown that effects of descriptive and injunctive peer norms on adolescents' alcohol and drug use are larger when the observed peer norms are more proximal and when the bonds with peers are stronger (Vasquez, 2010; Voogt, Larsen, Poelen, Kleinjan, & Engels, 2013). Others have proposed a contrasting theory, suggesting that conformity to peer norms may be used to develop a closer relationship with more distant peers, especially when those peers are considered to have high status (Heilbron & Prinstein, 2008; Hypothesis 2).

Socio-cultural context—Finally, we investigated differences in the strength of the associations between sexual peer norms and adolescent sexual behavior between countries and between ethnic groups. To investigate between-country differences, we used one of the six cultural dimensions of Hofstede's (2001) typology of national cultures: individualism/collectivism. This dimension refers to the degree to which cultures value individual well-being and independence versus group responsibility and belonging, and is considered a central source of cultural variation in human behaviors (Schimmack, Oishi, & Diener, 2005). Compared with people in more individualistic countries (e.g., the United States and Western Europe), people living in countries that are more collectivist (e.g., many Asian countries) are generally more oriented toward their social context and more inclined to conform to social norms and social influences (Bond & Smith, 1996; Cialdini & Trost, 1998; T. Johnson, Kulesa, Cho, & Shavitt, 2005). Adolescents originating from more collectivist cultures indeed generally display greater sensitivity to friends and endorse friendship rules more than adolescents from more individualistic cultures (Verkuyten & Masson, 1996). Collectivist cultures also tend to hold more conservative sexual norms, whereas individualistic cultures generally show more liberal attitudes toward sex (Rodriguez-Arauz, Mealy, Smith, & DiPlacido, 2013). Hence, we expected to find stronger associations between sexual peer norms and sexual behavior for adolescents from more collectivist countries than for adolescents from more individualistic countries (Hypothesis 1).

In addition to differences between countries, it is also essential to consider differences between cultural groups within countries. Studies conducted in the United States show that adolescents from certain subcultures (e.g., African American, Latino) are particularly "at risk" of negative sexual health outcomes, such as early sexual initiation, unprotected sexual intercourse, and relatively high rates of STIs and teenage pregnancy (Kinsman et al., 1998; Milan et al., 2006; Romer et al., 1999). These differences have been explained in terms of cultural beliefs and values regarding sexuality, socio-economic status, and social phenomena such as segregation, discrimination, and racism (Kinsman et al., 1998; Milan et al., 2006). A recent study found that experienced discrimination increased African American adolescents' affiliations with deviant peers, who in turn promoted risky sexual behavior (Roberts et al., 2012). Based on this finding, we expected to find stronger associations between sexual peer norms and sexual behavior for adolescents from ethnic minority groups (Hypothesis 2).

5.1.4 Selection versus socialization

Scholars have increasingly acknowledged the importance of investigating how socio-contextual factors, such as peers, are associated with adolescent sexual development over time (for a review, see Zimmer-Gembeck & Helfand, 2008). Yet, most theories that are based on social learning, identity development, or social norms focus primarily on mutual socialization processes (i.e., peer influence) as an explanation for peer similarities in adolescent behavior. Homophily Theory, however, distinguishes two mechanisms that provide alternative explanations for peer similarity (Brechwald & Prinstein, 2011; Heilbron & Prinstein, 2008; Kandel, 1978). First, these similarities might be due to the tendency of adolescents to engage in similar behaviors as their friends (i.e., socialization effects). Second, these similarities might be explained by adolescents' tendencies to affiliate with peers who already engage in similar behaviors (i.e., selection effects). To explore which

mechanism is best supported by the empirical literature on adolescent sexual behavior, we performed additional analyses with longitudinal studies that allowed comparisons between selection and socialization effects. As neither theory nor research yields definitive hypotheses about the relative strength of selection and socialization effects, these additional analyses had an exploratory character.

5.2 Methods

5.2.1 Retrieval of studies

To select studies for the current meta-analysis, systematic literature searches were conducted in four electronic databases: PsychINFO, Scopus, Web of Science, and PubMed. Multiple forms and combinations of the following search terms were used: *adolescent/adolescence, teen, youth, young; peer(s), friend(s); influence, pressure, conform; norms, values, attitudes, beliefs*; and *sexual, debut, initiation, intercourse, virgin, risk, condom, contraceptive, STI/STD, HIV*, and *AIDS*. Across all four databases, a total of 11,253 hits were evaluated. When an article title suggested that adolescents' and peers' sexual behaviors were investigated, the abstract was examined further. When an abstract indicated that the article might meet our inclusion criteria (see below), the full text was retrieved for closer inspection.

An additional literature search was performed in the PsychINFO Dissertation Index. This yielded 20 hits, of which 3 dissertations appeared potentially relevant. One dissertation was accessible online but did not provide the appropriate measure (i.e., a composite score of peer sexual activity and peer sexual risk behavior). To obtain the other two dissertations, the authors were contacted and asked whether they had relevant data/statistics for this meta-analysis, but they did not respond to this request.

In addition to the online literature search, eligible articles were also found in the reference sections of studies that were already included (i.e., the ancestry method), as well as in the reference sections of relevant review articles (e.g., Buhi & Goodson, 2007; Markham et al., 2010; Ott, 2010; L. H. Smith, Guthrie, & Oakley, 2005).

Unpublished studies are always a source of concern in meta-analyses. Studies that find null results are generally less likely to get published, yet these studies could reduce overall mean effect sizes or make meta-analytic results non-significant. To reduce the possibility of publication bias, we also included effect sizes from three unpublished studies. These studies were retrieved through the authors' personal networks and via an international conference on adolescent research. The first was a longitudinal study on romantic and sexual development of Dutch adolescents (Project STARS, 2011), for which data were collected among Dutch adolescents aged 10 to 18 years. The second was a Dutch longitudinal study on the development of adolescent problem behaviors (Reitz, Van de Bongardt, & Deković, 2012). The third was a cross-sectional study investigating the association between social norm perceptions and self-reported sexual behaviors, conducted in 2010 among Ghanaian adolescents aged 13 to 19 years (Bingenheimer, 2012).

5.2.2 Inclusion criteria

To be included, studies had to meet four criteria. First, they had to assess at least one of the two focal measures of adolescent sexual behavior and at least one of the four focal measures of sexual peer norms. Second, the adolescent sample had to be a community or convenience sample. Special samples (e.g., with medical or psychiatric problems or disabilities; HIV infected or at-risk; sex workers or sex offenders; incarcerated; involved in gangs; homeless) were excluded. Third, the maximum mean age of the sample was set at 18.0 years (college samples were excluded). Fourth, included studies had to report on statistically independent samples. When more than one study reported on the same sample, we determined which study provided most optimal information for this meta-analysis. In total, 15 studies with dependent samples were excluded on the basis of being published later, including a smaller subsample, including fewer or less optimal sexual peer norm or sexual behavior measures, conducting less optimal analyses, or reporting a less optimal or no statistic.

No restrictions were formulated regarding the year of publication or the country where the study was conducted. We also included studies with both cross-sectional and longitudinal designs. From longitudinal studies, statistics from the first assessment were chosen. When no concurrent social norm–sexual behavior association was measured, the smallest time range between assessments was used.

When a study lacked sufficient information to be included, the authors were contacted by email with a request for additional information (e.g., sample information, measure[s] information, effect size). Of the 27 authors who were emailed, 7 replied that they no longer had access to the data, 1 author reported that the correct statistic could not be retrieved from the data, 2 did not follow up on the promise to provide the requested information, and 8 authors never responded. In total, authors of 12 studies provided the requested information, after which their studies were included.

5.2.3 Coding procedure

Each study was coded with a structured coding scheme to record the sample characteristics, concepts of interest, and moderators. At the beginning of the coding procedure, 18 randomly selected studies (31%) were coded independently by six coders, including the first author. Interrater reliability varied from $\kappa = .68$ (percentage Latin American adolescents in the sample) to $\kappa = 1.00$ (e.g., type of peer norm), with an average of $\kappa = .90$. After obtaining this good interrater reliability, the remaining studies were coded by the first author. Any case of uncertainty regarding the coding was discussed and solved in consensus with the co-authors. To rule out coding drift, after the coding procedure, two coders (including the first author) again independently coded nine randomly selected studies (16%). Interrater reliability varied from $\kappa = .74$ (percentage Caucasian American adolescents in the sample) to $\kappa = 1.00$ (e.g., peer type), with an average of $\kappa = .90$.

5.2.4 Investigated concepts

Adolescent sexual behaviors—For our first outcome, sexual activity, we included three measures: (a) incidence (i.e., dichotomous yes/no measures of the experience with sexual behaviors, including everything from touching to vaginal or anal intercourse), (b) timing

(i.e., measures of age at first-time sexual experience), and (c) intensity (i.e., measures of number of times, number of partners). For our second outcome, sexual risk behavior, we included measures such as experience with unprotected sex (e.g., intercourse without condoms or contraceptives) and experience with STIs or teenage pregnancy.

Peer norms—We included both peer-reported (i.e., actual) as well as adolescent-reported (i.e., perceived) peer norms. Only three studies used peer reports to measure peer sexual behavior (Jaccard, Blanton, & Dodge, 2005), peer sexual attitudes (Sieving, Eisenberg, Pettingbell, & Skay, 2006), or peer sexual risk behavior (Henry, Schoeny, Deptula, & Slavick, 2007). All other studies measured sexual peer norms as perceived by adolescents.

Peer norms were observed with various measures. Descriptive norms (peer sexual behaviors) included dichotomous yes/no measures of having sexually experienced peers, the number or proportion of sexually experienced peers, and the intensity of peers' sexual activity (e.g., number of times, number of partners). Descriptive risk norms (peer sexual risk behaviors) included measures of the perceived number or proportion of peers who had unprotected sex or experience with STIs or teenage pregnancy. Injunctive norms (peer sexual attitudes) included measures of perceived peers' approval or disapproval of sexual activity. Finally, peer pressure included measurements of sex-related peer pressure and conformity to peer pressure. In accordance with the conceptualization of peer pressure, we also included measures of perceived potential social losses (e.g., social exclusion) or gains (e.g., respect).

5.2.5 Moderators

Age—To assess the moderating effect of age, we used the mean age of each sample as a continuous variable to assess whether the effect sizes increased or decreased with age. The mean ages of the included study samples varied between 11.5 and 18.0 years ($M = 14.8$, $SD = 1.7$). In addition, a categorical variable was computed to examine the possibility of a non-linear relationship between sexual peer norms and adolescent sexual behavior over time. The categorical variable consisted of three categories: early (11.5–13 years), middle (14–16 years), and late (17–18 years) adolescents; 13 studies assessed early adolescents, 33 assessed middle adolescents, and 12 assessed late adolescents.

Gender—The gender variable was coded as the percentage of female adolescents in the sample. Most studies included mixed-gender samples, eight samples included only girls (i.e., 100% girls), and one study only boys (i.e., 0% girls).

Peer type—Three types of peers were distinguished, varying in their degree of closeness: friends (including close or best friends), school peers (including classmates), and peers in general (e.g., boys/girls of the same age). About three quarters of the studies measured peer norms among close friends; the remainder of the studies were about equally divided into those measuring school peer norms and those measuring general peer norms.

Socio-cultural context—To compare effect sizes between studies conducted in different countries, individualism/collectivism scores for each country were retrieved from the country comparison tool on the website of The Hofstede Centre (n.d., http://geert-

hofstede.com). Country scores ranged from 11 to 100 (M = 87.5, SD = 26.1), with higher scores representing higher levels of individualism (see Table 5.1).

For the comparisons between ethnic groups within the United States, ethnicity was coded as the percentage of each ethnic group within a sample. A sample was considered to consist of predominantly one ethnicity if 67% or more of the participating adolescents were of a particular ethnic group; mixed-race study samples with no ethnic group exceeding 67% of the sample were not included in the analyses. Based on the number of studies per meta-analysis, only Caucasian American (k = 11), African American (k = 10), and Latin American (i.e., Latinos in the United States; k = 4) adolescents could be compared.[2]

5.2.6 Data analysis

Computation of individual study effect sizes—Individual effect size estimates and their 95% confidence intervals were computed for each study. We used Pearson's product–moment correlation coefficients (r) as effect size estimates (ESr). Because Pearson's r does not have a normal distribution, all correlation coefficients were recomputed into normally distributed effect sizes using Fisher's Z transformation. These transformations were performed with the online practical meta-analysis effect size calculator (D. B. Wilson, 2001), developed for use alongside the book "Practical Meta-Analysis" (Lipsey & Wilson, 2001). Fisher's Zr effect sizes were used in the overall mean effect size and moderator analyses, and converted back into r afterward to facilitate interpretation and reporting. Outlying effect sizes were defined as z values above 3.3 or below −3.3 (Tabachnick & Fidell, 2001).

For studies that did not report correlation coefficients but provided means with standard deviations, numbers, frequencies, or t tests, correlation effect sizes were computed using the online practical meta-analysis effect size calculator (D. B. Wilson, 2001). For studies that reported odds ratios, we used the Excel macro from DeCoster (2009). Beta regression coefficients were converted into correlations using the correction formula developed by Peterson and Brown (2005): $r = .98 \times \beta + .05\lambda$, where $\lambda = 1$ when β is positive and 0 when β is negative. For studies that reported more than one statistic for the same relationship (e.g., different measures of peer sexual activity), weighted average effect size correlations were computed with the Excel macro from DeCoster and Iselin (2005). All measures and statistics were recoded so that higher scores meant more sexually active (i.e., had sex, and had sex earlier, more often, or with more partners), more sexual risk behavior, more sexually active peers, more sex-positive peers, more peer pressure, and more sexually risky peers.

[2]In the first meta-analysis, single studies from Australia and Canada were not included in the country moderator analyses due to the small group size (k = 1). These two studies, together with nine studies with mixed U.S. samples, were also not included in the ethnicity moderator analyses. In the second meta-analysis, five studies with mixed U.S. samples were not included in the ethnicity moderator analyses, as was one study from Taiwan, due to the small group size (k = 1). In the third meta-analysis, one study from Ghana was not included in the country moderator analyses due to the small group size (k = 1). In addition, two studies with mixed U.S. samples were not included in the ethnicity moderator analyses, as were three single studies (i.e., one from Ghana, one with a predominantly African American sample, and one with a predominantly Latin American sample), due to the small group size (k = 1). In the fourth meta-analysis, three studies with mixed U.S. samples were not included in the ethnicity moderator analyses, as were three single studies (i.e., one from Peru, one from South Africa, and one with a predominantly Latin American sample), due to the small group size (k = 1).

Computation of overall mean effect sizes—For each of the four meta-analyses, overall mean effect sizes and their 95% confidence intervals were estimated using the "Mean Effect Size Macro" for meta-analysis in SPSS 20 (D. B. Wilson, 2005a). In this procedure, each individual study effect size (Z*r*) was weighted by an estimate of its inversed variance (i.e., $n - 3$ for Z*r*; Hedges & Olkin, 1985). Experts disagree about the pros and cons of using fixed- or random-effects models for the computation of overall mean effect sizes (for a discussion, see Cohn & Becker, 2003; Hedges & Vevea, 1998; Higgins, Thompson, & Spiegelhalter, 2009; Overton, 1998). Fixed-effects models assume that one true (fixed) effect size underlies individual study effect sizes and adjust the study weights according to the within-study variance. Whereas these models are statistically powerful for performing meta-analyses with small samples, they have limited generalizability to studies that are not included in the meta-analysis. Random-effects models assume that individual study effect sizes are taken from a population of naturally varying effect sizes and calculate the study weights both from within-study and between-study variances, thus considering the extent of variation between studies (heterogeneity). Random-effects models yield results that are more generalizable to studies outside the meta-analysis sample yet have lower power. For the present research, we followed the example of meta-analyses that conducted and reported both fixed-effects and random-effects models (e.g., Kirsch et al., 2008; Shamosh & Gray, 2007; Sin & Lyubomirsky, 2009).

Publication bias—Our inclusion of three unpublished studies yielded eight effect sizes from unpublished data. Authors who were contacted by email for more information about their studies provided 12 additional effect sizes that were directly retrieved from their raw research data. Despite these efforts to reduce publication bias, we calculated fail-safe numbers to assess how many studies with null results would be needed to make the overall mean effect sizes non-significant (Durlak & Lipsey, 1991). Meta-analytic results are considered robust against publication bias when a fail-safe number exceeds R. Rosenthal's (1991) critical value ($5 \times k + 10$). Fail-safe numbers were calculated in SPSS 20 with the "Mean Effect Size Macro" for meta-analysis (D. B. Wilson, 2005a).

Moderator analyses—After estimating overall mean effect sizes, homogeneity statistics (*Q* within) were evaluated to assess the significance of the between-studies effect size variance component (Hedges & Vevea, 1998). A significant ($p < .05$) *Q* statistic indicated heterogeneity (i.e., variability across individual study effect sizes attributable to other sources than random subject-level sampling error) and led to the decision to test moderators. Continuous moderators were tested with modified weighted regression analyses using the SPSS macro by D. B. Wilson (2005b). Categorical moderator variables were analyzed in a one-way ANOVA procedure, also using an SPSS macro (D. B. Wilson, 2005c). Opinions are mixed about whether to choose fixed- or mixed-effects models for moderator analyses (see Hedges & Pigott, 2004; Overton, 1998). Whereas fixed-effects models underestimate the sampling error variance (liberal approach), mixed-effects models tend to overestimate this variance (conservative approach; Overton, 1998). For the present study, we followed the example of other meta-analyses by running both types of models (e.g., Shamosh & Gray, 2007; Sin & Lyubomirsky, 2009). Ordinary least squares (OLS) regression was performed for the fixed-effects models, and Restricted Maximum Likelihood (REML) for mixed-effects

models. As the moderators investigated in the current study were significant under the fixed-effects model but not under the more conservative mixed-effects model, despite significant residual variance in the fixed-effects models, we discuss only the results of the fixed-effects moderator analyses.

Additional analyses: Selection versus socialization effects—Additional analyses were performed to compare socialization effect sizes (i.e., sexual peer norms measured at T1, and sexual behavior measured at T1 + X) with selection effect sizes (i.e., sexual behavior measured at T1, sexual peer norms measured at T1 + X). Hereto, additional prospective effect sizes were retrieved from studies with a longitudinal design ($k = 14$; see Table 5.1).

5.3 Results

5.3.1 Sample of studies

Table 5.1 presents an overview of the 58 independent studies that were included in the present meta-analysis (also noted with an asterisk in the reference list). The included studies were conducted between 1980 and 2012. Together, they provided data on 69,638 adolescents, with sample sizes ranging from 29 to 7,530. The studies were conducted in 15 countries, mostly in Western countries (i.e., Europe, the United States, Canada, and Australia), and 9 in non-Western countries (i.e., Middle Eastern, South American, Asian, and African countries). The majority of the studies (76%) had a cross-sectional design. Together, the included articles provided 90 individual study effect sizes. Seventy concurrent and 20 over-time effect sizes were used, with time ranges between longitudinal assessments varying between 6 and 36 months. Table 5.2 presents the overall estimated mean effect sizes for each of the four investigated relations that were computed with these individual study effect sizes

5.3.2 Meta-analysis 1: Descriptive norms and adolescent sexual activity

Thirty-seven studies, providing data for 57,803 adolescents, were included in the meta-analysis of the association between descriptive norms and adolescent sexual activity. Individual study effect sizes ranged from .00 (Jorgensen, King, & Torrey, 1980) to .86 (Magnani et al., 2002). There were no outliers. The overall mean effect sizes of both fixed and random models were significant: $ESr_{fixed} = .40$ and $ESr_{random} = .36$, respectively. More perceived sexual activity of peers was significantly related to more self-reported sexual activity. The 5% fail-safe number for the random model (975) exceeded R. Rosenthal's (1991) critical value (5 × 37 + 10 = 195), indicating that the meta-analytic results for this relation were robust against publication bias. The significant homogeneity analysis statistic, Q_w (36) = 3,772.99 ($p < .001$), indicated a significant random-effects variance component ($v = .07$) and thus a heterogeneous sample of effect sizes, which led to the decision to test moderators.

Moderator analyses

Age: The effect sizes for descriptive norms increased with age ($\beta = .18$, $p < .001$), indicating that the association between peer sexual activity and being sexually active was stronger for

older adolescents than for younger adolescents (see Table 5.3). When further investigating the three age categories, the effect sizes were significantly larger for samples consisting of middle (*ESr* = .42) or late adolescents (*ESr* = .43) than for early adolescents (*ESr* = .24). The effect sizes for middle and late adolescents did not differ significantly. These findings indicate a curvilinear increase in the effect size for descriptive norms, raising from early to middle adolescence and then stabilizing (see Table 5.4 and Figure 5.2). This provided partial support for Age Hypothesis 2.

Gender: Gender was not a significant moderator, indicating that the association between perceived peer sexual activity and being sexually active did not differ for studies with varying gender compositions.

Peer type: Adolescent sexual activity was more strongly related to perceived sexual activity of close friends (*ESr* = .45) than that of school peers (*ESr* = .29), which in turn showed a stronger effect size than perceived sexual behavior of peers in general (*ESr* = .21). This finding supported Peer Type Hypothesis 1 (see Table 5.4 and Figure 5.3)

Socio-cultural context: The country moderator analysis revealed that the association between peer sexual activity and adolescents' own sexual activity was significantly weaker in countries that were higher in individualism ($\beta = -.08$, $p < .001$). This finding was in line with our hypothesis (see Table 5.3). A comparison of ethnic groups within the United States showed that Caucasian American samples (*ESr* = .45) and Latin American samples (*ESr* = .47) reported larger effect sizes than African American samples (*ESr* = .31; see Table 5.4). These results provided only partial support for the ethnic minority hypothesis, suggesting that other factors might be at play.

5.3.3 Meta-analysis 2: Injunctive norms and adolescent sexual activity

The meta-analysis of the association between injunctive norms and adolescent sexual activity included 22 studies, providing data for 15,032 adolescents. Individual study effect sizes ranged from .00 (Sieving et al., 2006) to .50 (Carvajal et al., 1999). There were no outliers. Overall mean effect sizes of both fixed and random models were significant: $ESr_{fixed} = .22$ and $ESr_{random} = .26$, respectively. More perceived peer approval of adolescent sexual activity was significantly related to being more sexually active. The meta-analytic results for this relationship were robust against publication bias, as indicated by the 5% fail-safe number for the random model (418), which exceeded R. Rosenthal's (1991) critical value ($5 \times 22 + 10 = 120$). Moderators were analyzed because of the significant homogeneity analysis statistic, $Q_w (21) = 367.04$ ($p < .001$), and the significant random-effects variance component ($v = .03$).

Moderator analyses

Age: Comparable with meta-analysis 1, effect sizes for injunctive norms increased with age ($\beta = .32$ $p < .001$; see Table 5.3). When further investigating the three age categories, the effect sizes were significantly larger during both middle (*ESr* = .27) and late adolescence (*ESr* = .36) than during early adolescence (*ESr* = .09). The effect sizes for middle and late

adolescents did not differ significantly. These findings again supported Age Hypothesis 2 (see Table 5.4 and Figure 5.2).

Gender: Similar to meta-analysis 1, gender did not significantly moderate the association between injunctive norms and adolescent sexual activity.

Peer type: For the second meta-analysis, peer type could not be tested as a moderator, because too few studies measured injunctive norms among school peers ($k = 1$) and peers in general ($k = 1$).

Socio-cultural context: In contrast with meta-analysis 1 and with our hypothesis, the moderator analysis involving country revealed that the association between peers' sexual attitudes and adolescent sexual activity was significantly stronger in countries that were higher in individualism ($\beta = .34$, $p < .001$; see Table 5.3). The results of the comparison between ethnic groups within the United States were also in the opposite direction compared with meta-analysis 1, with African American samples ($ESr = .26$) reporting larger effect sizes than Caucasian American samples ($ESr = .12$) and Latin American samples ($ESr = .12$; see Table 5.4). These results again provided only partial support for the ethnic minority hypothesis.

5.3.4 Meta-analysis 3: Peer pressure and adolescent sexual activity

Initially, 11 studies were included in the meta-analysis of the association between peer pressure and adolescent sexual activity. However, one study yielded a negative individual study effect size: −.16 (Laflin, Wang, & Barry, 2008). Because this was an outlier (in terms of direction) compared with the other study effect sizes (all positive), this study was excluded from the analyses.[3] The remaining 10 studies, providing data for 14,997 adolescents, yielded significant overall mean effect sizes in both fixed and random models: $ESr_{fixed} = .10$ and $ESr_{random} = .14$. More peer pressure to engage in sex was significantly related to more sexual activity. Contrary to meta-analyses 1 and 2, the 5% fail-safe number for the random model (41) did not exceed R. Rosenthal's (1991) critical value ($5 \times 10 + 10 = 60$), which indicated that the meta-analytic results for this relation might not be robust against publication bias. However, as the fail-safe number suggested that 41 studies with null results would be needed to make the overall mean effect size for peer pressure non-significant, we felt sufficiently confident to interpret these meta-analytic findings as an accurate reflection of the existing data. A significant homogeneity analysis statistic, Q_w (9) = 148.40 ($p < .001$), and random-effects variance component ($v = .01$) were found.

Moderator analyses

Age: In contrast to meta-analyses 1 and 2, the effect sizes for peer pressure decreased with age ($\beta = -.34$, $p < .001$), that is, the association between peer pressure and sexual activity was stronger for younger adolescents than for older adolescents (see Table 5.3). When investigating the three age categories, effect sizes were significantly larger for middle

[3]Including Laflin et al. (2008) in the peer pressure meta-analysis yielded comparable results: $k = 11$, $n = 15{,}829$; individual study effect sizes (minimum-maximum): −.16 to .36, ESr_{fixed} [95% CI] = .08*** [.07, .10], ESr_{random} [95% CI] = .11** [.04, .19], Q_w (10) = 197.94***, $v = .02$, 5% fail-safe number = 22.

adolescents (ESr = .15) than for late adolescents (ESr = .05). The effect size for early adolescents (ESr = .10) did not differ significantly from middle or late adolescents at the .05-level, but we found trends (p = .10 and p = .07, respectively). These findings, indicating a peak in the effect size for peer pressure during middle adolescence, supported Age Hypothesis 3 (see Table 5.4 and Figure 5.2).

Gender: Similar to meta-analyses 1 and 2, gender did not significantly moderate the association between peer pressure and sexual activity.

Peer type: Contrary to the direction of the moderating effect found in meta-analysis 1, adolescent sexual activity was more strongly related to general peer pressure (ESr = .22) than experienced pressure from close friends (ESr = .07). This finding supported Peer Type Hypothesis 2 (see Table 5.4 and Figure 5.3). Effect sizes for school peers could not be compared because only one study examined this peer type.

Socio-cultural context: Similar to meta-analysis 1, and in line with our hypothesis, the association between peer pressure and adolescent sexual activity was significantly weaker in countries with higher individualism ($\beta = -.74$, $p < .001$; see Table 5.3). Because of the small number of ethnic groups investigated in the peer pressure studies, within-country differences could not be tested.

5.3.5 Meta-analysis 4: Descriptive risk norms and adolescent sexual risk behavior

Twenty studies, providing data for 19,038 adolescents, were included in the meta-analysis of the association between peer and adolescent sexual risk behavior. Individual study effect sizes ranged from .03 (De Graaf et al., 2005) to .57 (Stanton et al., 1996). There were no outliers. Overall mean effect sizes of both fixed and random models were significant: ESr_{fixed} = .11 and ESr_{random} = .18. More perceived sexual risk behavior of peers was related to higher levels of adolescents' sexual risk behavior. According to the 5% fail-safe number for the random model (329), which exceeded R. Rosenthal's (1991) critical value (5 × 20 + 10 = 110), the meta-analytic results for this relation were robust against publication bias. Homogeneity analysis statistic, Q_w (19) = 181.75 ($p < .001$), and random-effects variance component (v = .01) were significant.

Moderator analyses

Age: Similar to meta-analysis 3, the association between peer sexual risk behavior and adolescent sexual risk behavior was stronger for younger adolescents than for older adolescents ($\beta = -.29$, $p < .001$; see Table 5.3). When investigating the three age categories, effect sizes during middle adolescence (ESr = .23) were significantly larger than during both early (ESr = .09) and late (ESr = .09) adolescence (see Table 5.4 and Figure 5.2). Again, these findings indicated a peak in the effect size for descriptive risk norms during middle adolescence, thus supporting Age Hypothesis 3.

Gender: In contrast with the other three meta-analyses, gender was a significant moderator of the association between peer sexual risk behavior and adolescents' own sexual risk

behavior. Effect sizes for descriptive risk norms were significantly stronger for samples with more girls (β = .22, p = .003), which supported Gender Hypothesis 1.

Peer type: The direction of the moderating effect of peer type resembled the findings in meta-analysis 3 and supported Peer Type Hypothesis 2: Adolescent sexual risk behavior was more strongly related to perceived sexual risk behavior of peers in general (*ESr* = .29) than to perceived sexual risk behavior of school peers (*ESr* = .15) or close friends (*ESr* = .09). Effect sizes for close friends and school peers did not significantly differ from each other, although we found a trend (p = .07; see Table 5.4 and Figure 5.3).

Socio-cultural context: Similar to meta-analysis 3, the association between peer sexual risk behavior and adolescents' own sexual risk behavior was stronger in countries that were higher in individualism (β = .26, p < .001; see Table 5.3). When comparing ethnic groups within the United States, the effect sizes reported in studies with Caucasian American samples (*ESr* = .22) did not differ significantly from those found in studies with African American samples (*ESr* = .16; see Table 5.4).

5.3.6 Additional analyses: Selection versus socialization effects

For these analyses, additional over-time effect sizes were retrieved from studies with a longitudinal design (k = 14), yielding 20 socialization effects and 8 selection effects (see Table 5.1).[4] For the sexual activity outcome, all three sexual peer norms (i.e., descriptive, injunctive, and peer pressure) showed significantly larger selection effects than socialization effects (see Table 5.5). For the sexual risk behavior outcome, these additional analyses could not be performed, as only one independent socialization effect could be retrieved. However, when including all available (i.e., including dependent) longitudinal effect sizes, socialization and selection effects for peer sexual risk behavior did not differ significantly from each other.

5.4 Discussion

A large body of research has demonstrated that peers play an important role in adolescent sexual development. However, overall, the literature is not embedded in a clear theoretical framework that explains the role of peers in adolescent sexual behavior. In the present study, we conducted four meta-analyses to examine the unique associations between three theoretically distinguished types of sexual norms among peers (i.e., descriptive norms, injunctive norms, and peer pressure) and two adolescent sexual behavior outcomes (i.e., sexual activity and sexual risk behavior). These meta-analyses integrated 90 independent study effect sizes from 58 published and unpublished studies conducted in 15 countries. Our findings confirmed that all three types of sexual peer norms were related to adolescents' sexual activity and sexual risk behavior. Adolescents who perceived their peers as (a) more sexually active, (b) more approving of having sex, and (c) exerting more pressure on them to

[4]These analyses were performed with independent study effect sizes (i.e., only one effect size per study: either socialization or selection). When including all available longitudinal effect sizes, including dependent effect sizes (i.e., more than one effect size per study: both socialization and selection), these analyses yielded similar patterns of results, except for peer pressure, where selection effects no longer significantly differed from socialization effects.

be sexually active tended to be more sexually active themselves. Similarly, adolescents who believed that their peers engaged in more risky sexual behavior were more likely to engage in such behavior themselves.

5.4.1 Peer norms and adolescent sexual activity

For the sexual activity outcome, both the variation and the magnitude of the meta-analytic effect sizes were in line with our hypotheses and confirmed the conceptual distinction between three types of peer norms. Together, the overall mean effect sizes showed that adolescent sexual activity is more strongly associated with indirect (descriptive and injunctive) peer norms (ESr_{fixed} = .40 and ESr_{fixed} = .22, respectively) than with direct and overt peer pressure (ESr_{fixed} = .10).

The effect sizes for descriptive and injunctive norms suggest that adolescents' sexual activity is more strongly related to what they think their peers do than to what they think their peers approve of. Similar results have been found in relation to adolescents' online sexual behavior (Baumgartner et al., 2011). Yet, the literature on social norms provides little explanation for these differences between descriptive and injunctive norms, or their unique associations with adolescents' behaviors. A possible explanation may lie in the conceptualization and measurement of both types of norms. It stands to reason that observing peers engage in a certain behavior has more impact on adolescents' decision to engage in similar behavior than the expectation that peers would approve of such behavior: Whereas peers who engage in sexual behavior probably also approve of others doing so, peers may approve of sexual behavior without being sexually active themselves. Thus, whereas injunctive norms may reflect only one component of peer norms (i.e., attitudes), descriptive norms may reflect both peer attitudes and peer behaviors. More research is needed to disentangle the social-psychological processes involved with the perceptions of descriptive versus injunctive norms, and to assess their unique associations with adolescents' behavioral intentions and decisions.

Although finding stronger effects for indirect (descriptive and injunctive) than direct (peer pressure) norms is in line with meta-analytic results regarding condom use (Sheeran et al., 1999), some caution is needed regarding the interpretation of this finding. The peer pressure meta-analysis included only a relatively small sample of studies (k = 10), reducing statistical power. In addition, the studies in the peer pressure meta-analysis varied considerably in the way that peer pressure was measured in terms of number of items (ranging from one to eight), nature of the experienced pressure (i.e., the types of sexual behaviors addressed), and source(s) of the experienced pressure (i.e., friends, school peers, or peers in general). The inconsistencies among the peer pressure studies were further illustrated by the negative association between peer pressure and adolescent sexual activity found in one study (Laflin et al., 2008). Although peer pressure is conceptualized as the most overt and direct peer norm, and is often considered a substantial correlate of adolescent sexual behavior, the small and diverse collection of studies indicates that peer pressure is relatively understudied in the field of adolescent sexual development. Scholars who wish to expand the investigation of links between peer pressure and adolescent sexual behavior must carefully consider how evidence of peer pressure can be validly and reliably identified, and whether adolescent self-

reports are the best method. It may be difficult for adolescents to recognize and acknowledge their susceptibility to external pressures when making behavioral decisions. Although the conceptualization of peer pressure entails the sacrifice of personal agency, adolescents generally experience substantial agency in making behavioral decisions (Ungar, 2000). Observational and experimental research methods may be promising directions for future research on the role of peer pressure in adolescents' behaviors.

5.4.2 Peer norms and sexual risk behavior

For the sexual risk behavior outcome, we were able to assess only the association with descriptive norms (peer sexual risk behavior). Compared with the sexual activity outcome, where we found a medium overall effect size for descriptive norms (ESr_{fixed} = .40), the effect size for descriptive risk norms was small (ESr_{fixed} = .11; Cohen, 1992). A possible explanation might be that adolescents discuss risky sexual behaviors less often or less openly with peers, possibly due to feelings of discomfort or shame. Hence, this aspect of peers' sexual behavior may be less known to adolescents than how sexually active their peers are. As a result, sexual risk norms among peers may play only a small role in adolescents' engagement in risky sexual behavior. Other factors, such as adolescents' interactions and safety negotiations with sexual partners, may be a more important focus of future research on adolescent sexual risk behavior.

5.4.3 Moderators

The second aim of the present study was to investigate whether the associations between sexual peer norms and sexual behaviors varied by age group, gender, peer type, country, and ethnicity.

Age differences—Sexual behavior was differently associated with the three types of sexual peer norms at various stages of adolescence. The strength of the associations between descriptive and injunctive norms and sexual activity increased with age, with significantly larger effect sizes during middle and late adolescence than during early adolescence. This finding supported our second hypothesis, based on the Problem Behavior Theory (Jessor, 1987), that proposed that associations between sexual peer norms and adolescent sexual behavior become stronger as sexual behavior becomes more normative over time.

In contrast, the strength of the associations between peer pressure and sexual activity peaked during middle adolescence, as did the links between descriptive risk norms and risky sexual behavior. This finding supported our third hypothesis and is consistent with identity development theories (Newman & Newman, 2001). These results also parallel findings that conformity to peer norms follows an inverted U-shaped age pattern, increasing from childhood through early and mid-adolescence and declining in late adolescence (Berndt, 1979; B. B. Brown et al., 1986; Clasen & Brown, 1985).

Together, these findings stress the importance of a developmental conceptualization of the role of peer norms in adolescent sexual behavior. Whereas it seems to be relevant for older adolescents to further investigate the social-psychological processes involved with perceptions of descriptive and injunctive sexual norms among their peers, research with

younger adolescents should focus on perceptions of peers' engagement in sexual risk behavior and their experiences with peer pressure.

Gender differences—Contrary to our expectations, gender moderated only one association across the four meta-analyses. This gender moderation effect indicated that descriptive risk norms were more strongly related to sexual risk behavior in samples that included more girls. The lack of gender differences in the other meta-analyses suggests that sexual peer norms are equally important correlates of sexual activity of boys and girls. Equal effect sizes do not, however, imply that the operating mechanisms behind peer similarity in sexual behavior are the same for boys and girls. In general, boys are situated in a more sex-positive peer context (i.e., more approval or more pressure to be sexually active, specifically from male friends), whereas girls are more often discouraged by their peers from having sex (Clasen & Brown, 1985; Crawford & Popp, 2003; Kreager & Staff, 2009; Lyons et al., 2011). Hence, functional peer similarity for boys may be to engage in sexual behavior, whereas for girls it is to refrain from sex. Further examination is needed of whether male and female adolescents perceive such sexual peer norms differently, and how this relates to their sexual behavior.

Differences between peer types—With respect to the moderating effect of peer type, our findings provided support for both our hypotheses. First, adolescents' sexual activity was more strongly related to sexual behavior of close friends than of other peers. This finding is not surprising, as adolescents have more opportunities to discuss sexual attitudes and experiences with their closer friends, and also probably do so more easily and openly, than with more distant peers. Second, adolescents' engagement in sexual risk behavior was more strongly linked to risky sexual behaviors of more distant peers (i.e., peers in general) than of close peers. This may indicate that personal experiences with risky behavior are generally less easily or openly discussed with close friends. In addition, adolescents may conform to peer pressure and engage in risky sexual behaviors to be accepted by distant, high-status peers (Heilbron & Prinstein, 2008). This would be in line with research findings that adolescents who consider more distant peers (e.g., out-of-school peers) as more important than school peers or close friends generally display more risky behaviors (Berten & Van Rossem, 2011). Overall, these findings emphasize the need to investigate further how sexual norms among different types of peers are related to adolescent sexual behavior.

Socio-cultural differences—The fact that the strongest effect sizes were reported for descriptive norms, regardless of the country in which the studies were conducted, suggests that perceptions of peer sexual behavior are the most important peer norm correlate of adolescents' sexual behavior across cultures. Notwithstanding this similarity between countries, the moderation effects supported our expectations of both between- and within-country differences in the associations between sexual peer norms and adolescent sexual behavior.

Individualism/collectivism accounted for a significant proportion of the between-country variance in the reported effect sizes. As hypothesized, descriptive norms and peer pressure had stronger associations with adolescent sexual activity in more collectivist countries. Injunctive norms and descriptive risk norms had stronger associations with adolescent sexual

(risk) behavior in more individualistic countries. Although not hypothesized, the stronger effects of injunctive norms in individualistic countries are in line with the idea that injunctive norms are effective to the extent that they provide support for an individual's pre-existing attitudes toward the engagement in a certain behavior. The social-psychological mechanism through which injunctive norms are associated with adolescents' own behavior may thus be a more individualized process compared with the other social norms, which would be fitting in a more individualistic cultural setting. It is less clear why descriptive risk norms had stronger effects on adolescent sexual risk behavior in more individualistic countries. Future studies should explore this further.

Comparisons between ethnic groups within the United States provided only partial support for our hypothesis. Although it has been suggested that ethnic minority youth are more "at risk" of negative peer influences (Kinsman et al., 1998; Milan et al., 2006; Roberts et al., 2012), studies with ethnic minority samples did not always report larger effect sizes. These results indicate that research is needed to investigate how other factors–such as socio-economic status, cultural beliefs and values regarding adolescent sexuality, and broader social phenomena such as segregation, discrimination, and racism–affect the relations between peer norms and adolescent sexual behavior.

5.4.4 Selection versus socialization

Additional analyses showed that selection effects were significantly larger than socialization effects. Thus, longitudinal studies provide more evidence for the notion that, over time, adolescents associate with peers who share similar sexual norms than for the notion that adolescents adapt their sexual behavior to existing sexual norms among their peers.

This finding must be interpreted with some caution, however, as these additional analyses could be performed with only a small number of selection and socialization effect sizes, and thus had an exploratory character. Although the use of longitudinal designs in research on adolescent sexual development has increased over the past decades (Zimmer-Gembeck & Helfand, 2008), most studies that were included in the present meta-analysis (76%) were cross-sectional. The number of studies providing selection effect sizes was particularly small, which is consistent with the generally stronger emphasis on socialization processes in peer influence research (Brechwald & Prinstein, 2011). More longitudinal studies are needed to expand our understanding of how selection and socialization processes account for the relations between sexual peer norms and adolescent sexual behavior.

Nonetheless, this finding points out a substantial limitation in the existing literature on the role of peers in adolescent sexual behavior, as well as an important direction for future research. Most theories and empirical longitudinal studies focus on explaining peer similarities in terms of socialization processes and rarely in terms of selection processes (Brechwald & Prinstein, 2011). Our findings indicate that this emphasis on socialization processes underestimates the complexity of the dynamic relations between developments in adolescents' cognitions and behaviors, on the one hand, and developments in their relations with peers, on the other hand. Future research should consider selection processes as relevant alternative explanations for observed similarities between adolescents and their peers. Research that does not consider adolescents merely as passive subjects who are

influenced by their peer context, but rather as autonomous agents who actively shape their social environment and social relationships, would advance developmental theory in general and our understanding of adolescent sexual development in particular.

5.4.5 Limitations and directions for future research

This is the first study to meta-analytically integrate the literature on the relations between three types of peer norms and adolescent sexual behavior, and the first to illustrate the applicability of a threefold conceptualization of social norms for a better understanding of the role that peers play in adolescent sexual behavior. Despite these strengths, a few limitations need to be addressed.

First, most studies used a rather narrow operationalization of adolescent sexual behavior by assessing only experiences with heterosexual intercourse. Measuring sexual activity in this way offers limited insight into the onset of sexual activity in a broader sense. Most adolescents (75%) follow a progressive sexual trajectory where they engage in other, non-coital sexual behaviors prior to their first intercourse experience (De Graaf et al., 2009). Moreover, early non-coital sexual experiences have been identified as stronger predictors of risky sexual trajectories (i.e., many partners, condom use failure, reporting a sexually transmitted infection [STI]) than early intercourse (P. Davis & Lay-Yee, 1999). Another downside of limiting the assessment of sexual behavior to heterosexual intercourse is that is excludes same-sex attracted adolescents who may engage in other (i.e., non-coital) sexual behaviors.

Only a few of the included studies assessed a wider range of sexual behavior outcomes, including kissing, petting, oral sex, and intercourse (see Table 5.1; for example, Akers et al., 2011; DiIorio, Dudley, Soet, & McCarty, 2004; Lyons et al., 2011; Tsitsika et al., 2010), but in most studies, these non-coital behaviors were assessed only for the study participants themselves and not for their peers (for exceptions, see Table 5.1; for example, Bersamin, Walker, Waiters, Fisher, & Grube, 2005; O'Sullivan & Brooks-Gunn, 2005; Prinstein, Meade, & Cohen, 2003). In addition, most of these studies did not report separate effect sizes for each sexual behavior. We were therefore unable to assess specific relations between sexual peer norms and different types of sexual behaviors.

Second, most studies relied on self-reports. It is well-documented that adolescents may not provide accurate reports regarding their sexual behavior due to fear of embarrassment, disapproval, or social sanctions (Brener et al., 2003). In addition to ensuring confidential study settings and using mixed research methods (e.g., partner reports), study designs with repeated measures (e.g., longitudinal questionnaires or diary studies) provide an opportunity to check the validity of adolescents' self-reported sexual behaviors over time.

Regarding the measurement of sexual peer norms, adolescents' perceptions of social norms are often misperceptions, showing a discrepancy with actual behaviors and attitudes of peers (Brechwald & Prinstein, 2011; Prentice & Miller, 1996). Although adolescents' perceptions of peer norms are better predictors of adolescents' attitudes and behaviors than actual peer norms (Heilbron & Prinstein, 2008; Prentice, 2008; Prentice & Miller, 1996), these misperceptions could affect adolescents' reports of their own behaviors, thus inflating the

identified effect sizes of the associations between adolescents' peer norm perceptions and their own behavior. A possible way to avoid this method bias in the assessment of peer effects might be through observations of adolescents' interactions and conversations with their peers. Such observational methods have been used in studies of deviancy training in relation to adolescent delinquency that have shown that observed reinforcement of deviant talk during videotaped conversations between adolescents and their friends was associated with the development of antisocial and risk behaviors (Dishion, Spracklen et al., 1996; Patterson et al., 2000). A similar approach in which both peer norms and sexual behaviors are measured more objectively may be a promising direction for future research on the role of peers in adolescent sexual behavior.

Finally, the results of the moderator analyses must be interpreted with some caution. The identified moderator effects were significant under fixed-effects models, which are sufficiently powerful to detect moderator effects in small samples, but not under the more conservative mixed-effects models, which might have had insufficient power to detect moderator effects given the relatively small number of studies in the four meta-analyses. In addition, most studies (59%) investigated samples of middle adolescents, limiting generalizability of the age moderator findings to early and late adolescents. The operationalization of the gender moderator was also suboptimal. Although it is a common procedure in meta-analyses to code gender as the percentage of females in the sample (e.g., De Ridder, Lensvelt-Mulders, Finkenaer, Stok, & Baumeister, 2012; Masi, Chen, Hawkley, & Cacioppo, 2011), separate effect sizes for boys and girls are required to test whether they significantly differ from one another. As too few studies in the present meta-analysis reported effect sizes for both boys and girls, we could not calculate separate mean effect sizes. Regarding the peer type moderator analyses, most studies measured sexual norms among close peers, thus limiting the generalizability of the findings to other types of peers. With respect to the sociocultural context moderator analyses, the majority of the included studies were conducted in the United States, which limits generalizability of the findings to adolescents in other countries. We found that sexual peer norms are particularly understudied in more collectivist cultures, although they are expected to play a particularly significant role in those cultures.

Altogether, these limitations underline the importance of further research to investigate how relations between sexual peer norms and adolescent sexual behavior differ by gender, across different stages of adolescence, and between countries and ethnic groups. Future studies should also further examine how adolescent sexual behavior is related to sexual norms among various types of peers, including cliques, crowds, and romantic or sexual partners (Brechwald & Prinstein, 2011). Measuring adolescent sexual behavior more broadly is another important direction for future research.

5.4.6 Implications for prevention and intervention strategies

Notwithstanding these limitations, our meta-analytic findings have implications for prevention and intervention strategies that aim to promote youths' sexual health. Over the past decades, the social norm approach has been increasingly applied to reduce adolescent risk behavior. The underlying notion of this approach is that adolescents' perceptions of peer

norms are often misperceptions. By providing accurate information about the prevalence of certain attitudes and behaviors among peers, these misperceptions can be corrected, resulting in a decrease in adolescents' own risky behaviors (Brechwald & Prinstein, 2011; Prentice & Miller, 1996). This approach has proven to be effective in substance use prevention programs (Prentice, 2008). The increasing use of peer educators in sexuality education programs, aimed at positively affecting (e.g., correcting) adolescents' perceptions of sexual peer norms, shows similar promising results (e.g., Agha & Van Rossem, 2004; Caron et al., 2004).

Our findings also indicate that addressing indirect (descriptive and injunctive) sexual peer norms may be a more effective aspect of youth sexual health programs than reducing adolescents' susceptibility to direct peer pressure to have sex. This is in line with research findings of Hansen and Graham (1991), who compared two strategies for preventing adolescent substance use. One strategy focused on correcting erroneous perceptions of the prevalence and acceptability of substance use among peers (i.e., descriptive and injunctive norms), and the other strategy focused on teaching skills to refuse peer pressure in the form of actual substance offers. Results showed that normative education significantly reduced adolescent substance use, whereas resistance skills training did not. However, findings from our moderator analyses suggest that reducing susceptibility to peer pressure may be a particularly important focus for younger adolescents and adolescents in more collectivist cultures.

5.4.7 Conclusion

Overall, our meta-analytic findings provide empirical support for the conceptual distinction of three types of peer norms, including both indirect (descriptive and injunctive) and direct (peer pressure) norms. Together with similar findings from studies on adolescent smoking behavior (De Vries et al., 1995) and alcohol use (Borsari & Carey, 2003), the present meta-analysis on adolescent sexual behavior shows that this threefold conceptualization of peer norms is a valuable approach for enhancing our knowledge about the role of peer norms in various domains of adolescent behavior. A better understanding of how adolescents' behavioral intentions and decisions are related to different types of peer norms, and how both socialization as well as selection processes operate with respect to those norms, is crucial for the effective promotion of healthy adolescent development.

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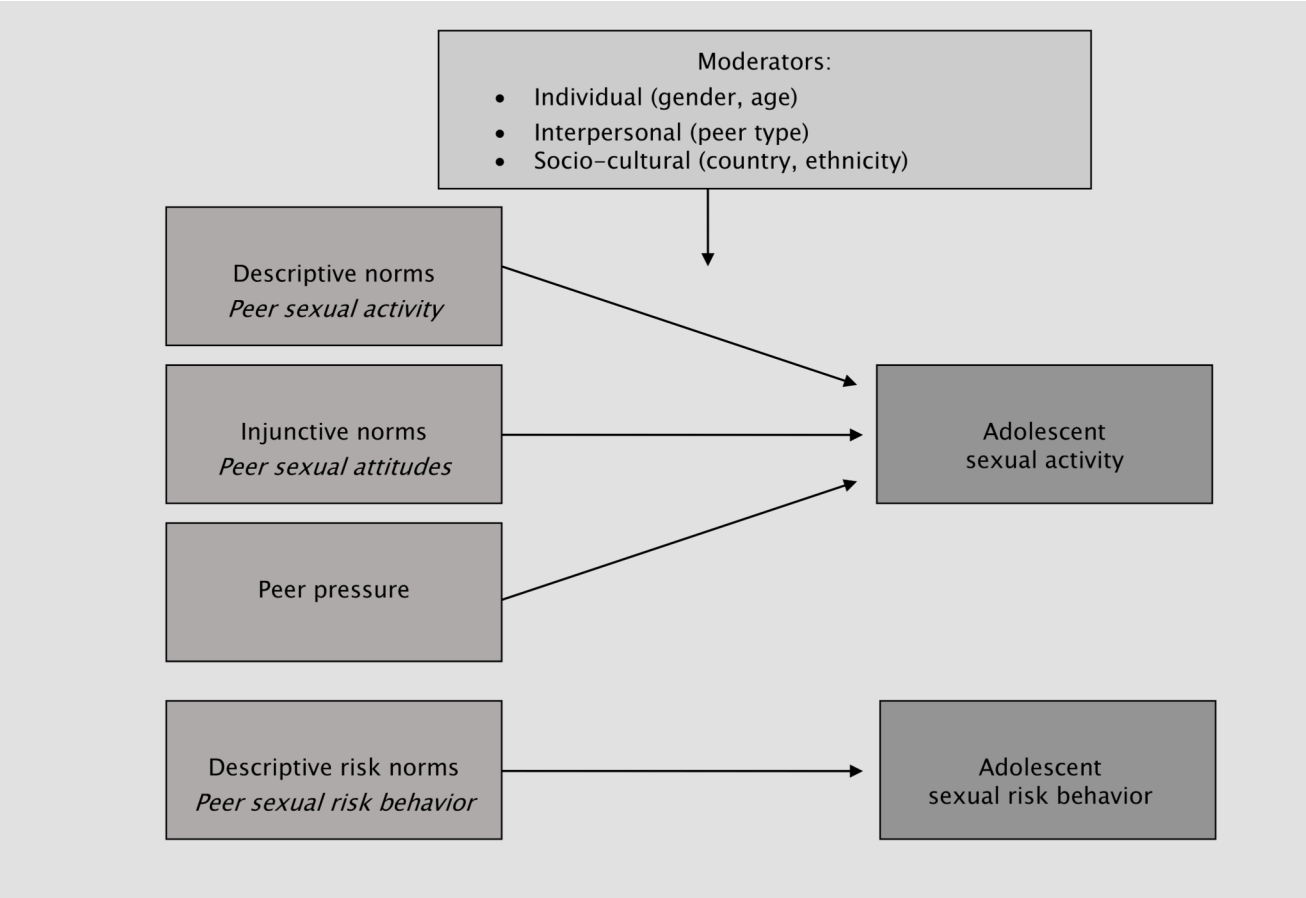

Figure 5.1.
Investigated Sexual Behavior Outcomes, Peer Norms, and Moderators.

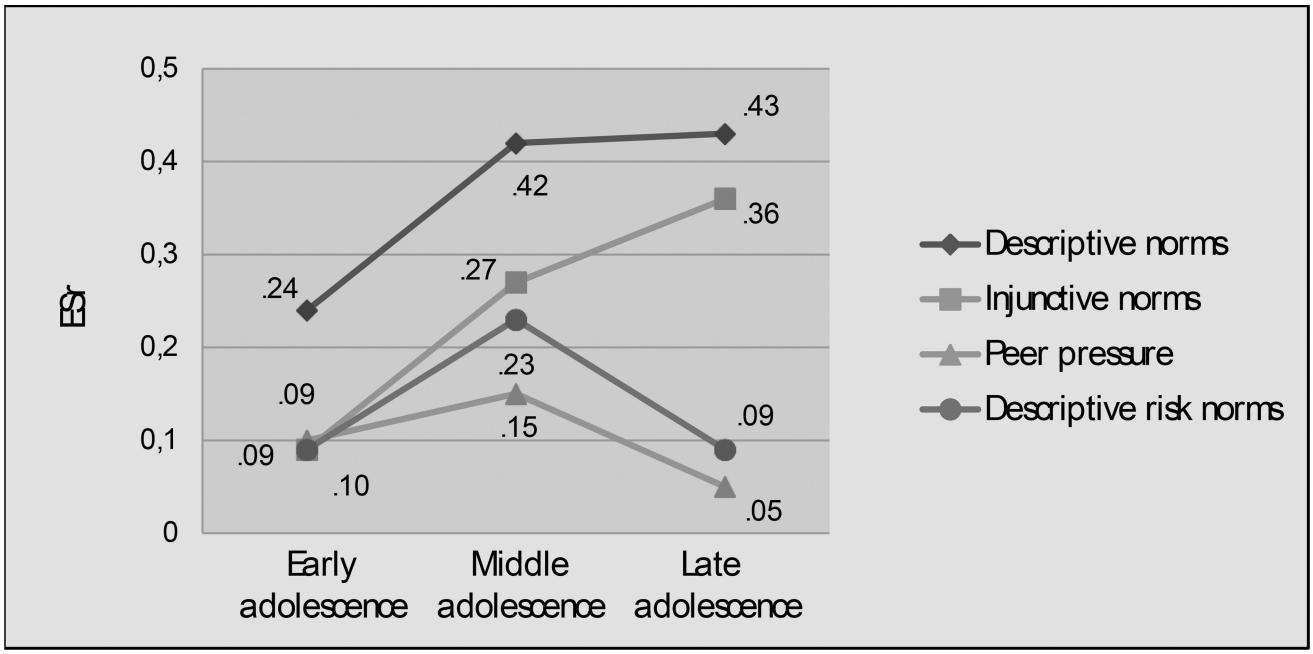

Figure 5.2.
Development of the Overall Mean Effect Sizes for the Associations Between Sexual Peer Norms and Adolescent Sexual Activity and Risk Behavior over Three Stages of Adolescence.

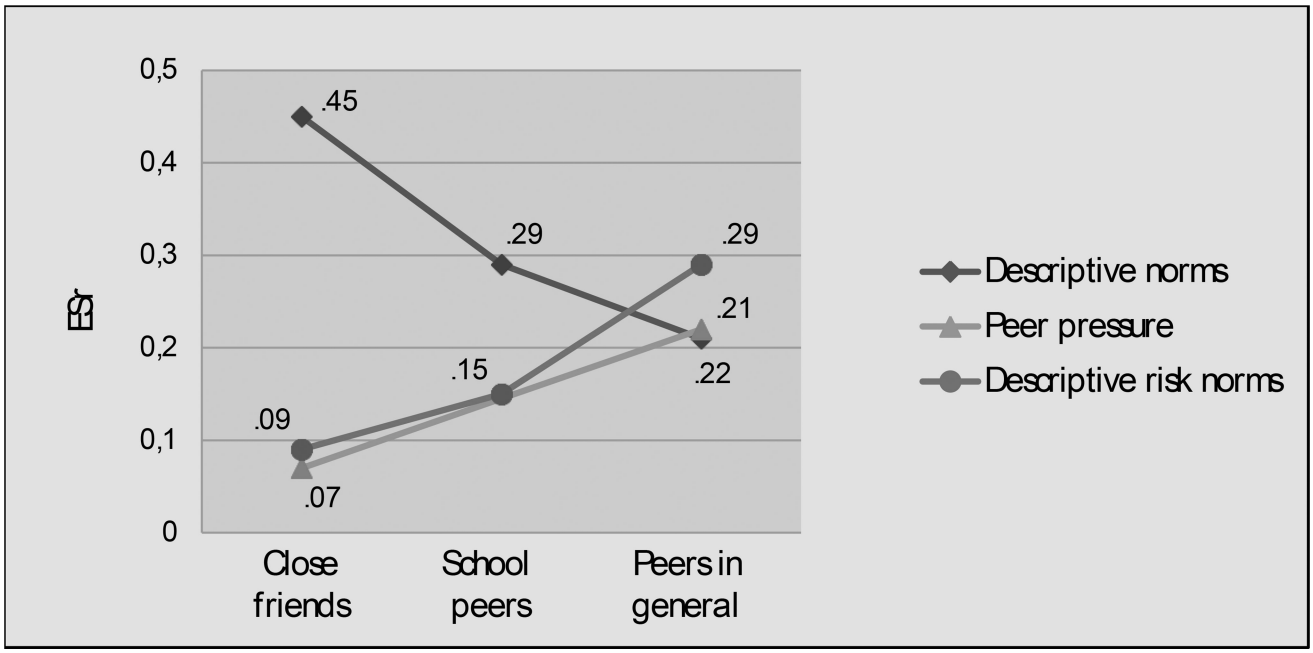

Figure 5.3.
Overall Mean Effect Sizes for the Associations Between Sexual peer Norms and Adolescent Sexual Activity and Risk Behavior Across Three Types of Peers Varying in Levels of Relationship Closeness.

Table 5.1

Overview of the Included Studies and Their Descriptions

	Study	Sexual peer norm measure	Sexual (risk) behavior measure		Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
Meta-analysis 1: Descriptive norms and adolescent sexual activity												
1	Babalola 2004	Perceived number of sexually active friends (all–none).	Age at first intercourse.		.09	.02, .16	755	17.0	61%	Rwanda (−)	African	1
2	Beadnell et al. 2007	"How many of your friends who are your age are having intercourse?" (1=all of them; 7=none of them).	"Since you've been in [present] grade, have you had intercourse?" (0=no; 1=yes).		.49$_{SO}$	.44, .54	790	15.5	53%	USA (100)	Mixed	1
3	Bingenheimer 2012	"Over the past year, how many of your friends have had sex?" (all–none).	**1**	"Have you ever in your life had intercourse?" (0=no; 1=yes).	.52	.47, .55	1,275	15.6	55%	Ghana (11)	African	1
			2	"How old were you the first time you ever had sex?"								
			3	"How many sex partners have you had in total in your whole life?"								
4	Boyce et al. 2006	Number of close friends that had intercourse (none/less than half–more than half).	Ever had intercourse.		.62	.60, .63	7,530	15.0	54%	Canada (87)	Canadian	1
5	Christopher et al. 1993	Perceived experience of best friend with 6 sexual behaviors of the Guttman-scale (kissing–intercourse, oral sex not included).	Experience with 6 sexual behaviors of the Guttman-scale (kissing–intercourse, oral sex not included).		.39	.32, .47	489	13.0	58%	USA (100)	Latin-American	1
6	De Graaf et al. 2005	"My friends have had intercourse" (1=none; 5=all).	**1**	Experience with different sexual behaviors: touching, naked making out,	.34	.32, .37	4,129	17.6	52%	the Netherlands (87)	European Caucasian	1

	Study	Sexual peer norm measure	Sexual (risk) behavior measure		Study effect size r^a	95% CI^b	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)^c	Ethnicity^d	Peer type^e
				manual sex, oral sex, (anal) intercourse (yes/no).								
			2	Age first experience with different sexual behaviors: touching, naked making out, manual sex, oral sex, (anal) intercourse.								
			3	Number of (anal) intercourse partners.								
7	De Graaf et al. 2012	Good friends have had intercourse (1=none; 5=all).	**1**	Experience with different sexual behaviors: touching, manual sex, oral sex, (anal) intercourse (yes; no).	.32	.30, .34	7,317	18.0	50%	the Netherlands (87)	European Caucasian	1
			2	Age first experience with different sexual behaviors: touching, manual sex, oral sex, (anal) intercourse.								
			3	Number of (anal) intercourse partners.								

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
8	DiBlasio & Benda 1992	"About how many of your friends have had intercourse?" (1=none, or almost none; 4=almost all).	Number of times respondents ever had intercourse (1=never; 5=six or more times).	.54	.50, .58	1,478	15.8	75%	USA (100)	US Caucasian	1
9	East et al. 2006	Number of friends that had intercourse (1=none of my friends; 5=all of my friends).	Ever had intercourse (0=never; 5=more than 10 times).	.58	.50, .65	323	13.7	54%	USA (100)	Latin-American	1
10	Harrison et al. 2012	"Of the girls/boys you know, how many do you think have had intercourse?" (1=none/ few; 4=most/all).	**1** Ever had intercourse. **2** Age at first sex. **3** Sexually active past six months.	.11	.05, .17	983	15.4	56%	South Africa (69)	African	1/2
11	Jaccard et al. 2005	Nominated closest friend's response to: "Have you ever had intercourse?"	"Have you ever had intercourse?"	$.37_{CR}$ $.06_{SO}$ $.29_{SE}$	.33, .41	1,688	15.3	50%	USA (100)	Mixed	1
12	Jorgensen et al. 1980	"How would you best describe the sexual behavior of your closest friends on dates?" (1=most of my friends do not go as far as petting; 5=most of them have full sexual relations).	**1** "How many times have you had full sexual relations (gone all the way)?" **2** "In the past six months, how many times have you had full sexual relations?" (1=once; 8=more than seven times).	.00	−.16, .16	147	16.4	100%	USA (100)	US Caucasian	1
13	Kawai et al. 2008	"In your school, how many learners do you think have had intercourse?"	**1** "Have you ever had vaginal intercourse?"	$.15_{SO}$	.12, .19	2,477	12.8	58%	Tanzania (22)	African	2

	Study	Sexual peer norm measure	Sexual (risk) behavior measure		Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
			2	"Have you ever had anal sex?"								
14	Kinsman et al. 1998	"How many of the kids you know have had sex/ intercourse?" (a. most, b. some, c. none).	**1**	"Have you ever had sex/ intercourse?	$.31_{SO}$	.25, .37	947	11.6	61%	USA (100)	Mixed	3
			2	"How old were you when you had sex or intercourse for the first time?"								
15	L'Engle & Jackson 2008	"How many of your friends do you think have had sex?" (1=none; 4=most).	"Have you ever had intercourse, that is, when a guy puts his penis into a girl's vagina?"		$.29_{SO}$	.23, .35	854	13.7	52%	USA (100)	Mixed	1
16	Little & Rankin 2001	"People refer to intercourse in many ways (…). As far as you know, how many of your friends have done this?" (none–all of them).	"Have you ever had consenting sex with anyone?" (no; yes)		.30	.17, .41	229	14.0	47%	USA (100)	US Caucasian	1
17	Lyons et al. 2011	"How many of your friends do you think have had sex?" (1=none; 6=all).	**1**	Ever fooled around.	.53	.49, .57	1,315	15.3	52%	USA (100)	Mixed	1
			2	Ever had intercourse.								
			3	Number of lifetime sex partners.								
18	Magnani et al. 2002	Whether respondents' friends had sex.	**1**	Ever had sex.	.86	.85, .88	1,961	17.9	-	Zambia (34)	African	1
			2	Total number of lifetime sexual partners.								
19	Magnani et al. 2001	Perceived number of friends in the students' class (at school) that have had sex (none–many).	**1**	Ever had sex.	.33	.31, .35	6,517	15.2	61%	Peru (12)	Latin	2
			2	The number of sexual partners in								

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI^b	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)^c	Ethnicity^d	Peer type^e
			the last three months.								
20	Maguen & Armistead 2006	"Has your best friend had intercourse?"	"Have you ever had intercourse?" (yes; no).	.41	.34, .48	568	15.6	100%	USA (100)	African-American	1
21	Nahm et al. 2001	"How many of your friends who are your age are having intercourse?" (1=none; 7=all).	"Have you ever had intercourse with a male/ female?"	.53	.50, .55	2,973	14.4	51%	USA (100)	Mixed	1
22	Potard et al. 2008	Perceived proportion of peers who have had intercourse.	**1** Sexual experience. **2** Recent sexual activity (including oral sex).	.45	.27, .59	100	17.3	57%	France (76)	European Caucasian	3
23	Prinstein et al. 2003	**1** Perceptions of friend's oral sex activity. **2** Perceived number of friend's oral sex partners. **3** Perceptions of friend's intercourse activity. **4** Perceived number of friend's intercourse partners.	**1** Oral sex activity in the past year (yes; no). **2** Number of oral sex partners in the past year. **3** Intercourse activity in the past year (yes; no). **4** Number of intercourse partners in the past year.	.38	.25, .49	212	16.3	59%	USA (100)	US Caucasian	1
24	Project STARS W1 2011	"How many of your best friends do you think have experience with intercourse?" (1=none; 6=all).	Have you ever had sex with another person? With sex we mean everything from touching or caressing to intercourse (no; yes).	$.50_{CR}$ 39_{SO} $.42_{SE}$	.46, .55	1,035	13.7	48%	the Netherlands (87)	European Caucasian	1
25	Rai et al. 2003: Cross-section 92	How many friends were sexually active (1=none; 5=most).	Ever had intercourse.	.27	.11, .41	152	13.8	49%	USA (100)	African-American	1
26	Rai et al. 2003: FOT baseline	How many friends were sexually active (1=none; 5=most).	Ever had intercourse.	.27	.21, .34	811	11.5	58%	USA (100)	African-American	-

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
27	Robinson et al. 1998	"By the end of the 8th grade, how many boys/girls do you think have had sex?" (none–more than half).	Ever had intercourse.	.27	.17, .37	330	13.5	49%	USA (100)	US Caucasian	3
28	Robinson et al. 1999	"By the end of the 8th grade, how many boys/girls do you think have had sex?"	Ever had intercourse.	.19	.09, .29	339	11.6	50%	USA (100)	Mixed	3
29	Romer et al. 1999	How many friends had engaged in sex (none; some; most).	**1** "Have you ever had a boy put his penis in your vagina (girls)/put your penis in a girl's vagina (boys)?" **2** "Have you ever had a boy put his penis in your anus or butt (girls)/put your penis in a girl's anus or butt? (boys)?"	.29	.20, .39	355	12.7	51%	USA (100)	African-American	1
30	D. A. Rosenthal et al. 1999	"How many girls/boys your age have engaged in the following behaviors with a boy/girl?" (none–all).	Age at first experience of intercourse.	.05	−.08, .18	241	16.6	61%	Australia (99)	Australian	3
31	Shtarkshall et al. 2009	Perceived proportion of male/female peers (classmates) who had already initiated coitus (none–about two thirds or more).	Experienced coitus.	.35	.32, .38	4,609	15.9	52%	Israel (56)	Middle-East	2
32	Sieverding et al. 2005	**1** "How many of your close friends have had sex?" **2** "How many of the teens your age have	"Have you had intercourse with anyone in the last 6 months?"	$.09_{SO}$	−.02, .20	307	15.8	42%	USA (100)	Mixed	1/3

	Study	Sexual peer norm measure		Sexual (risk) behavior measure		Study effect size r^a	95% CI^b	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)^c	Ethnicity^d	Peer type^e
			had sex?" (none–all).										
33	Stanton et al. 1996	**1**	Most close friends have sex.	Had intercourse in previous 6 months.		.18$_{SO}$	−.00, .35	119		-	USA (100)	African-American	1/3
		2	Most boys have sex.										
		3	Most girls have sex.										
34	Tsitsika et al. 2010	Have sexually experienced friends (yes; no).		**1**	Sexual experience: any sexual contact, excl. vaginal intercourse, on at least one occasion.	.69	.67, .72	1,538	14.7	52%	Greece (34)	European Caucasian	1
				2	Had intercourse at least once.								
35	Upadhyay & Hindin 2006	Perceptions of whether close friends ever petted or had sex.		Ever petted, or had sex.		.27$_{SO}$	.23, .31	1,930	15.1	49%	Philippines (31)	Asian	1
36	Whitaker & Miller 2000	Percentage of close friends hat ever had sex.		**1**	Ever had sex.	.24	.18, .30	904	15.3	57%	USA (100)	Mixed	1
				2	Age at first intercourse.								
				3	Number of lifetime sex partners.								
37	Whitbeck et al. 1993	If close friends dated, engaged in heavy petting, or intercourse (1=none; 5=all).		Experience with heavy petting and intercourse during the last 12 months.		.*52*$_{SO}$	.33, .66	76	12.6	100%	USA (100)	US Caucasian	1
Meta-analysis 2: Injunctive norms and adolescent sexual activity													
1	Abbott & Dalla 2008	"My friends believe that premarital sex:		Sexually abstinent or sexually active (sex was specifically defined as intercourse).		.44	.27, .58	103	17.2	68%	USA (100)	US Caucasian	1
		1	Is my decision, and										

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI^b	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)^c	Ethnicity^d	Peer type^e
		I can choose to have sex if I want. **2** Is only OK in some situations, with a serious dating partner or if I am engaged. **3** Is absolutely wrong, and that I should wait to have sex until marriage. **4** I don't know how this person feels about me participating in premarital sex."									
2	Akers et al. 2011	Perceptions of friends' attitudes toward having sex when in love, with a boy/ girlfriend, or waiting until one is older (3 items, sample item: "How does your friend feel about having sex if you're in love?").	Engagement in eight sexual behaviors with opposite-sex partners: Four non-penetrative behaviors: deep kissing, having breasts touched, having genitals touched, touching partner's genitals. Four penetrative behaviors: giving oral sex, receiving oral sex, vaginal sex, anal sex.	$.24_{SO}$	.13, .33	358	15.3	100%	USA (100)	African-American	1
3	Bersamin et al. 2005	"How upset do you think your three closest friends would be if you: **a.** Made out with someone; **b.** Had oral sex; **c.** Had intercourse." (1=not at all upset; 4=very upset).	**1** "Has a girl/boy ever touched your genitals?" **2** "Have you ever touched a girl's/boy's genitals?" **3** "Have you ever had oral sex with a girl/boy?"	$.19_{SO}$	.12, .25	870	14.1	51%	USA (100)	US Caucasian	1

	Study	Sexual peer norm measure	Sexual (risk) behavior measure		Study effect size r^a	95% CI^b	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)^c	Ethnicity^d	Peer type^e
			4	"Have you ever had intercourse?" (0=no; 1=yes).								
4	Bingenheimer 2012	"How many of your friends believe boys/girls your age should wait until they are older before they have sex?"	**1**	"Have you ever had intercourse?" (0=no; 1=yes).	.28	.23, .33	1,275	15.6	55%	Ghana (11)	African	1
			2	"How old were you the first time you ever had sex?"								
			3	"How many sex partners have you had in your life?"								
5	Carvajal et al. 1999	Whether most friends believed that: **1** Persons of the respondent's age should postpone sex until they were older. **2** It was acceptable for persons of the respondent's age to have sex with a steady boyfriend or girlfriend. (1=definitely no; 4=definitely yes).	"Have you ever had sex?		.50$_{SO}$	.45, .55	821	14.8	64%	USA (100)	Mixed	1
6	DiIorio et al. 2001	Perceived peer attitudes regarding sex (5 items, e.g., "Your friends think it is okay for adolescents your age to	"Have you ever had intercourse?" (yes; no).		.33	.24, .41	405	13.7	44%	USA (100)	African-American	1

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	Study	Sexual peer norm measure	Sexual (risk) behavior measure		Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
		have sex." (1=strongly disagree; 5=strongly agree).										
7	DiIorio et al. 2004	Perceptions of friends' attitudes toward sex; 8 items, e.g., "Your friend thinks you should not have sex until you are married." (1=strongly disagree; 5=strongly agree).	**1**	"Have you ever had intercourse?" (yes; no).	.28	.19, .36	491	13.2	39%	USA (100)	African-American	1
			2	Intimate sexual behaviors (7 items, e.g., "Have you ever held hands with a boy/girl?" (yes; no).								
8	East et al. 2006	"Would your friends approve or disapprove if you had intercourse?" (1=disapprove; 5=approve).	Ever had intercourse: - 0=never; 1=ever. - 1=never; 2=1 time; 3=2–3 times; 4=4–10 times; 5=more than 10 times.		.09	−.02, .19	323	13.7	54%	USA (100)	Latin-American	1
9	Gillmore et al. 2002	"Does your best friend think it would be OK for you to have intercourse when you are in the [next] grade? (1=NO!; 4=YES!)	"Since you've been in (present) grade, have you had intercourse?" (0=no; 1=yes).		$.39_{SO}$	.33, .45	780	15.6	53%	USA (100)	Mixed	1
10	Jorgensen et al. 1980	"If my friends knew that I was having full sexual relations they would…" (1=strongly object; 5=probably agree and give me their support).	**1**	"How many times have you had full sexual relations (gone all the way)?"	.09	−.08, .24	147	16.4	100%	USA (100)	US Caucasian	1
			2	"In the past six months, how many times have you had full sexual relations?" (1=once; 8=more than seven times).								

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
11	Kawai et al. 2008	Social norms towards delayed sex (5 items, e.g., "Most of my friends think one has to be older before having sex").	**1** "Have you ever had vaginal intercourse?" **2** "Have you ever had anal sex?"	$.02_{SO}$	−.02, .06	2,477	12.8	58%	Tanzania (22)	African	1
12	L'Engle & Jackson 2008	"How would your friends feel about you having sex at this time in your life?" (1=strongly disapprove; 5=strongly approve).	"Have you ever had intercourse, that is, when a guy puts his penis into a girl's vagina?"	$.23_{SO}$	.17, .29	854	13.7	52%	USA (100)	Mixed	1
13	Laflin et al. 2008	Peer sexual norms (6 items, e.g., "Most students at my school think people my age should wait until they are older to have sex").	Had intercourse.	$.12_{SO}$	.06, .19	832	12.8	59%	USA (100)	US Caucasian	2
14	Little & Rankin 2001	"If your friends found out that you were having sex, how do you think they would feel?" (they would disapprove and stop being my friends; they would disapprove but still be my friends; they wouldn't care; they would approve).	"Have you ever had consenting sex with anyone?" (no; yes)	.37	.26, .48	229	14.0	47%	USA (100)	US Caucasian	1
15	Lyons et al. 2011	Friends' liberal attitudes toward sex, 3 three items, e.g., "My friends think it's okay to have sex with someone you are not actually dating".	**1** Ever fooled around. **2** Ever had intercourse. **3** Number of lifetime sex partners.	.30	.25, .35	1,315	15.3	52%	USA (100)	Mixed	1
16	Maguen & Armistead 2006	"Does your best friend believe premarital sex is wrong?" (not at all–very much).	"Have you ever had intercourse?" (yes; no).	.21	.13, .28	568	15.6	100%	USA (100)	African-American	1
17	O'Sullivan & Brooks-Gunn 2005	Anticipated peer reactions to respondent's participation in 3 levels of sexual activity (1=strong disapproval; 4=strong approval).	Experiences with breast fondling and intercourse.	$.39_{CR}$ $.22_{SO}$ $.16_{SE}$	.25, .52	155	13.5	100%	USA (100)	Mixed	1

	Study	Sexual peer norm measure	Sexual (risk) behavior measure		Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
18	Pai et al. 2010	Perceptions of friends' approval of adolescents engaging in four behaviors: kissing, light petting, heavy petting and intercourse (1=strong disapproval; 4=strong approval).	"Have you had your breasts fondled in the past year?" (yes; no).		.29	.19, .38	372	13.1	100%	Taiwan (13)	Asian	1
19	Potard et al. 2008	Perception of peers to be favorable to one-night stands, and sexual relations without feelings of love.	**1**	Sexual experience.	.28	.09, .45	100	17.3	57%	France (76)	European Caucasian	3
			2	Recent sexual activity (including oral sex).								
			3	Number of sex partners.								
20	Project STARS W1 2011	"My best friends believe that boys and girls our age should not yet have sex" (1=completely not true; 6=completely true).	"Have you ever had sex with another person? With sex we mean everything from touching or caressing to intercourse." (0=no; 1=yes).		$.37_{CR}$ $.33_{SO}$ $.30_{SE}$	.32, .42	1,201	13.7	46%	the Netherlands (87)	European Caucasian	1
21	Sieving et al. 2006	Nominated friends' perceived benefits of having intercourse (5 items, e.g., "You would feel guilty").	Ever had vaginal intercourse.		$.00_{SO}$	−.06, .06	1,215	15.5	56%	USA (100)	US Caucasian	1
22	Villarruel et al. 2004	Friend approval of intercourse.	Engaged in intercourse in the past 3 months.		.21	.05, .36	141	15.0	55%	USA (100)	Latin-American	1
Meta-analysis 3: Peer pressure and adolescent sexual activity												
1	Bazargan et al. 2010	Perceived peer pressure, 8 items, e.g., "I'm encouraged by my friends to not have sex", "I would fit in with my friends if I don't have sex".	**1**	Ever had intercourse.	.36	.27, .45	380	13.5	52%	USA (100)	African-American	1
			2	Age at first intercourse.								
			3	Number of lifetime sexual partners.								
2	Bingenheimer 2012	"What would happen if a boy/girl your age had sex with a girlfriend /boyfriend of about the same age?" (respect more/less).	**1**	"Have you ever in your life had intercourse?"	.35	.30, .39	1,275	15.6	55%	Ghana (11)	African	3

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
			(0=no; 1=yes).								
			2 "How old were you the first time you ever had sex?"								
			3 "How many sex partners have you had in total in your whole life?"								
3	De Graaf et al. 2012	"In my circle of friends, you don't belong unless you: **1** Have a romantic relationship. **2** Have French kissed. **3** Have had sex. **4** Have had sex with many people. **5** Don't have sex before marriage." (1=completely disagree; 5=completely agree).	**1** Experience with different sexual behaviors: touching, manual sex, oral sex, (anal) intercourse (yes; no). **2** Age first experience with different sexual behaviors: touching, manual sex, oral sex, (anal) intercourse. **3** Number of (anal) intercourse partners.	.05	.03, .08	7,317	18.0	50%	the Netherlands (87)	European Caucasian	1
4	DiBlasio & Benda 1992	"Have you ever felt pressure from your group of friends to have intercourse with the person(s) you date?" (1=no; 4=a lot).	The number of times respondents ever had intercourse (1=never; 5=six or more times).	.04	−.01, .09	1,478	15.8	75%	USA (100)	US Caucasian	1
5	East et al. 2006	"Is there pressure from your friends for you to have	Ever had intercourse (0=never; 5=more than 10 times).	.21	.10, .31	323	13.7	54%	USA (100)	Latin-American	1

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
		intercourse?" (1=no pressure at all; 5=a lot of pressure).									
6	Kinsman et al. 1998	"If a 12-year-old girl/boy in your school started having sex, what would happen?" (a=her friends would respect hermore; b=her friends would respect her less; c=it would not affect her friends' respect).	**1** "Have you ever had sex/ intercourse? **2** "How old were you when you had sex or intercourse for the first time?"	$.09_{SO}$	.03, .15	947	11.7	50%	USA (100)	Mixed	2
7	Laflin et al. 2008	Peer pressure (3 items about frequency, intensity, and personal experience with peer pressure, e.g., "There is a lot of peer pressure for someone my age to have sex").	Have had intercourse.	$-.16_{SO}$	−.22, –.09	832	12.8	59%	USA (100)	US Caucasian	3
8	Milan et al. 2006	"In the past year, how much were you pressured to NOT have sex by your friends?" (0=not at all; 3=very much).	**1** Number of sexual partners per year. **2** Age at first intercourse.	.06	−.04, .15	411	17.6	100%	USA (100)	Mixed	1
9	Project STARS W1 2011	"I feel pressured to have sex, because a lot of people my own age have already had sex" (1=never; 6=very often).	"Have you ever had sex with another person? With sex we mean everything from touching or caressing to intercourse." (0=no; 1=yes).	$.04_{CR}$ $.17_{SO}$ $.17_{SE}$	−.02, .11	1,030	14.0	48%	the Netherlands (87)	European Caucasian	3
10	Reitz et al. 2012	**1** "How strong is the pressure from friends to have sex?" **2** "How strong is the pressure from friends to keep your virginity?" (1=no pressure; 4=strong pressure).	"Have you ever had sex with a boy/girlfriend?" (yes; no).	$.12_{CR}$ $.14_{SO}$ $.12_{SE}$	.05, .20	621	13.4	50%	the Netherlands (87)	European Caucasian	1

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
11	Sieving et al. 2006	"If you had intercourse, your friends would respect you more" (1=strongly disagree; 5=strongly agree).	Ever had vaginal intercourse.	$.07_{SO}$	.01, .12	1,215	15.5	56%	USA (100)	US Caucasian	1
Meta-analysis 4: Descriptive risk norms and adolescent sexual risk behavior											
1	L. K. Brown et al. 1992	Perception of friends' use of condoms.	Consistent condom use.	.20	.08, .31	266	16.2	52%	USA (100)	US Caucasian	1
2	De Graaf et al. 2005	"My friends always: **1** Use a contraceptive when they have intercourse. **2** Use condoms when they have intercourse with a new partner." **3** Use condoms when they have intercourse with a steady partner." (1=none; 5=all).	**1** Contraceptive use first intercourse. **2** Condom use first (anal) intercourse. **3** Consistent contraceptive use last intercourse partner. **4** Consistent condom use last (anal) intercourse partner. **5** Results STI/HIV test past year.	.03	−.01, .06	4,129	17.6	52%	the Netherlands (87)	European Caucasian	1
3	De Graaf et al. 2012	**1** Good friends use something to prevent pregnancy during intercourse (1=none; 5=all). **2** Good friends use condoms during intercourse (1=none; 5=all).	**1** Contraceptive use first intercourse. **2** Condom use first intercourse. **3** Consistent contraceptive use last intercourse partner. **4** Consistent condom use last (anal)	.08	.05, .10	7,317	18.0	50%	the Netherlands (87)	European Caucasian	1

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
			intercourse partner. **5** Results STI/HIV test past year.								
4	De Rosa et al. 2010	"Of your 4 closest friends, how many of them have gotten pregnant or gotten someone pregnant?" (0–4 or more).	Condom use at last intercourse (yes; no).	.04	−.03, .16	448	12.8	33%	USA (100)	Latin-American	1
5	DiIorio et al. 2001	"Most of my friends use condoms" (1=none; 5=all).	"How often do you and your current sexual partner use a condom when you have sex?" (1=never; 5=always).	.25	.07, .41	116	13.9	44%	USA (100)	African-American	1
6	Donald et al. 1994	"Do you think that girls (or boys) the same age as you mostly use condoms if they have sex?" (1=none; 5=all).	Condom use last time sex (yes; no).	.26	.20, .32	907	16.5	569%	Australia (99)	Australian	3
7	Harrison et al. 2012	**1** "Of the girls/ boys you know, how many do you think use condoms with their boy-/ girlfriends?" **2** "Of the girls/ boys you know, how many do you think are infected with HIV?" (1=none/few; 4=most/all).	**1** Ever used a condom. **2** Used a condom at last intercourse.	.07	−.08, .22	173	15.4	56%	South Africa (69)	African	1/2
8	Henry et al. 2007	Nominated friends' number of cross-sex partners with whom engaged in intercourse without a condom.	Number of cross-sex partners with whom engaged in intercourse without a condom.	$.11_{CR}$ $.12_{SO}$ $.12_{SO}$	.06, .16	1,350	16.7	49%	USA (100)	Mixed	1
9	Jorgensen et al. 1980	"If any of your friends have had full sexual relations, how many of them use birth control?" (1=none; 4=all).	"When you have had sexual relations in the past, how often have you used birth	.27	.11, .41	147	16.4	100%	USA (100)	US Caucasian	1

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	Study	Sexual peer norm measure		Sexual (risk) behavior measure		Study effect size r^a	95% CI^b	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)^c	Ethnicity^d	Peer type^e
					control?" (1=never; 4=always).								
10	Lindsay et al. 1999	"Do you think that people the same age as you mostly use condoms if they have sex?" (1=none; 5=all).		Sex without condom.		.32	.24, .40	495	16.9	56%	Australia (99)	Australian	3
11	Magnani et al. 2001	**1**	Perceived number of friends in the students' class (at school) who had become pregnant or who had impregnated someone (many; a few; none).	Condom use at first intercourse.		.10	.02, .17	600	15.2	0%	Peru (12)	Latin	1/2
		2	Whether any friends have had an abortion.										
12	Milan et al. 2006	**1**	How many of four closest friends had ever been pregnant.	**1**	Frequency unprotected intercourse last 30 days.	.09	−.01, .18	411	17.6	100%	USA (100)	Mixed	1
		2	Number of friends with baby.	**2**	Consistent condom use with intercourse past 6 months (0–100%).								
				3	Had intercourse with a risky partner in the last year.								
13	Potard et al. 2008	Belief that peers usually use condoms.		**1**	Contraception use first sexual act with current boy/ girlfriend.	.41	.23, .56	100	17.3	57%	France (76)	European Caucasian	3

	Study	Sexual peer norm measure	Sexual (risk) behavior measure		Study effect size r^a	95% CI^b	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)^c	Ethnicity^d	Peer type^e
			2	Contraception use first sexual act with first partner.								
			3	Regularity of contraceptive use with first sexual partner.								
			4	Contraception with different types of partner (casual).								
14	Project STARS W1 2011	How many of your best friends: **1** Always use birth control (e.g., the pill or a condom) to prevent pregnancy when they have sex with someone? **2** Always use a condom to prevent STIs when they have sex with some-one of whom they don't know for sure whether they don't have an STI? (0=none of my friends; 5=all my friends).	**1**	"If I have sex, I use a condom to prevent STIs." **2** "If I have sex, I use a contraceptive (0=almost never to never; 4=always or almost always).	.28$_{CR}$ .13$_{SO}$ .17$_{SE}$	.06, .47	80	15.5	33%	the Netherlands (87)	European Caucasian	1
15	Rai et al. 2003: Cross-section 92	How many friends used a condom (1=none; 5=most).	Condom use the last time respondent had sex.		.20	−.05, .35	152	13.8	49%	USA (100)	African-American	1

	Study	Sexual peer norm measure	Sexual (risk) behavior measure	Study effect size r^a	95% CI[b]	Sample size	Mean age in years	Gender (% female)	Country (Hofstede's I/C score)[c]	Ethnicity[d]	Peer type[e]
16	Rai et al. 2003: FOT baseline	How many friends used a condom (1=none; 5=most).	Condom use the last time respondent had sex.	.09	−.02, .16	811	11.5	58%	USA (100)	African-American	-
17	Romer et al. 1999	How many friends ever use condoms (none; some; most).	**1** "When you had sex, did you or your partner ever use a condom?" **2** How often condoms had been used (1=never; 4=always).	.15	.04, .25	355	12.7	51%	USA (100)	African-American	1
18	S. L. Rosenthal et al. 1995	Frequency of sexually transmitted diseases among their sexually active friends, and among sexually active adolescents in general.	Number of STD episodes.	.28	.16, .39	248	16.9	100%	USA (100)	African-American	1/3
19	Stanton et al. 1996	**1** Most close friends use condoms. **2** Most boys use condoms. **3** Most girls use condoms.	"Did you or your partner use a condom the last time you had sex?"	$.57_{SO}$	.26, .78	29		-	USA (100)	African-American	1/3
20	Whitaker & Miller 2000	Percentage of close friends that always used a condom during sex.	**1** Condom use first intercourse. **2** Condom use most recent intercourse. **3** Lifetime condom use. **4** Consistent condom use.	.35	.29, .40	904	15.3	57%	USA (100)	Mixed	1

Notes. In most studies, intercourse was referred to as "sexual intercourse".

[a] Subscripts in this colon refer to the study design: CR = Cross-sectional (default); SO = Socialization; SE = Selection.

[b] Effect sizes with a 95% confidence interval including zero can be considered statistically non-significant.

[c] Hofstede's Individualism / Collectivism score. Higher scores refer to more individualism.

[d] ≥ 67% of the sample consists of this ethnic group.

[e] Peer type: 1 = Friends (including close or best friends), 2 = School-peers (including classmates), and 3 = Peers in general (e.g., 'boys/girls of the same age').

Table 5.2

Overall Mean Effect Sizes for the Four Meta-Analyses

	k	*n*	Individual study effect sizes (range)	ESr_{fixed} [95% CI]	ESr_{random} [95% CI]	Q_w	*V*
Meta-analysis 1: Descriptive norms and adolescent sexual activity	37	57,803	.00 – .86	.40*** [.40, .41]	.36*** [.29, .44]	3,772.99***	.07
Meta-analysis 2 : Injunctive norms and adolescent sexual activity	22	15,032	.00 – .50	.22*** [.21, .24]	.26*** [.19, .32]	367.04***	.03
Meta-analysis 3: Peer pressure and adolescent sexual activity	10	14,997	.04 – .36	.10*** [.08, .11]	.14*** [.07, .21]	148.40***	.01
Meta-analysis 4: Descriptive risk norms and adolescent sexual risk behavior	20	19,038	.03 – .57	.11*** [.10, .12]	.18*** [.13, .23]	181.75***	.01

Notes. *k* = number of studies; *n* = number of adolescents; *ESr* = overall mean effect size [*ESr* < .10 = non-relation, .10 < *ESr* < .30 = small, .30 < *ESr* < .50 = medium, *ESr* > .50 = large (Cohen, 1992)]; CI = confidence interval; Q_W = heterogeneity statistic; *v* = random effects variance component.

* *p* < .05.

** *p* < .01.

*** *p* < .001.

Table 5.3

Continuous Moderators of the Associations between Peer Norms and Adolescent Sexual Activity and Risk Behavior

Moderators (Range [*M* ± *SD*])	***k***	***n***	ESr_{fixed} **[95% CI]**	Q_w	***B* (*SE*)**	**β**
Meta-analysis 1: Descriptive norms	37	57,803	.40*** [.40, .41]	3,772.99***		
Age					.03 (.00)	.18***
11.5 – 18.0 years (14.8 ± 1.8)						
Individualism/Collectivism					−.00 (.00)	−.08***
11 (Ghana) – 100 (U.S.) (83.1 ± 28.8)						
Meta-analysis 2: Injunctive norms	22	15,032	.22*** [.21, .24]	367.04***		
Age					.04 (.01)	.32***
12.3 – 17.3 years (14.6 ± 1.4)						
Individualism/Collectivism					.00 (.00)	.34***
11 (Ghana) – 100 (U.S.) (86.8 ± 29.7)						
Meta-analysis 3: Peer pressure	10	14,997	.10*** [.08, .11]	148.40***		
Age					−.02 (.00)	−.34***
11.7 – 18.0 years (14.9 ± 2.0)						
Individualism/Collectivism					−.00 (.00)	−.74***
11 (Ghana) – 100 (U.S.) (87.2 ± 27.5)						
Meta-analysis 4: Descriptive risk norms	20	19,038	.11*** [.10, .12]	181.75***		
Gender					.00 (.00)	.22**
0% – 100% females (54.8 ± 23.5)						
Age					−.02 (.00)	−.29***
11.5 – 18.0 years (15.4 ± 2.0)						
Individualism/Collectivism					.00 (.00)	.26***
12 (Peru) – 100 (U.S.) (90.8 ± 20.6)						

Note. This table presents only significant continuous moderators. Higher scores on Individualism/Collectivism refer to more individualism.

k = number of studies; *n* = number of adolescents; *ESr* = overall mean effect size; CI = confidence interval; Q_W = heterogeneity statistic.

*$p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5.4

Categorical Moderators of the Associations between Peer Norms and Adolescent Sexual Activity and Risk Behavior

Moderators	***k***	***N***	***ESr*$_{fixed}$ [95% CI]**	**Q_w**
Meta-analysis 1:				
Descriptive norms	37	57,803	.40***[.40, .41]	3,772.99***
Age				
Early	8	5,613	.24***[.21, .26]	50.67***
Middle	23	37,687	.42***[.41, .43]	1,788.30***
Late	6	14,503	.43***[.41, .44]	1,716.53***
Peer type				
Close friends	25	40,023	.45***[.44, .46]	3,151.77***
School peers	7	15,959	.29***[.28, .31]	134.67***
Peers in general	4	1,010	.21***[.15, .27]	14.62**
Ethnic subgroup				
Caucasian-American	6	2,472	.45***[.41, .48]	79.29***
Latin-American	2	812	.47***[.42, .53]	11.68***
African-American	5	2,005	.31***[.27, .35]	11.93*
Meta-analysis 2:				
Injunctive norms	22	15,032	.22***[.21, .24]	367.04***
Age				
Early	4	4,172	.09***[.06, .12]	46.71***
Middle	16	10,657	.27***[.25, .29]	216.35***
Late	2	203	.36***[.24, .48]	1.58
Ethnic subgroup				
Caucasian-American	6	3,396	.12***[.09, .16]	49.66***
Latin-American	2	464	.12**[.03, .21]	1.58
African-American	4	1,822	.26***[.22, .30]	4.37
Meta-analysis 3:				
Peer pressure	10	14,997	.10***[.08, .11]	148.40***
Age				
Early	2	1,568	.10***[.05, .15]	0.47
Middle	6	5,701	.15***[.12, .17]	116.23***
Late	2	7,728	.05***[.03, .07]	0.01
Peer type				
Close friends	7	11,745	.07***[.05, .09]	48.94***
Peers in general	2	2,305	.22***[.18, .25]	57.06***
Meta-analysis 4:				

Moderators	*k*	*N*	ESr_{fixed} [95% CI]	Q_w
Descriptive risk norms	20	19,038	.11*** [.10, .12]	181.75***
Age				
Early	4	1,643	.09*** [.05, .14]	10.71*
Middle	8	2,438	.23*** [.19, .27]	31.73***
Late	8	14,957	.09*** [.08, .11]	95.81***
Peer type				
Close friends	12	15,675	.09*** [.08, .11]	104.00***
School peers	4	1,050	.15*** [.09, .21]	13.71**
Peers in general	3	1,502	.29*** [.24, .35]	3.26
Ethnic subgroup				
Caucasian-American	2	413	.22*** [.13, .31]	0.52
African-American	6	1,711	.16*** [.11, .20]	15.67**

Note. This table presents only significant categorical moderators. *k* = number of studies; *n* = number of adolescents; *ESr* = overall mean effect size [ESr < .10 = non-relation, .10 < ESr < .30 = small, .30 < ESr < .50 = medium, ESr > .50 = large (Cohen, 1992)]; CI = confidence interval; Q_W = heterogeneity statistic.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5.5

Additional Analyses Comparing Socialization and Selection Effect Sizes

	k	*N*	ESr_{fixed} [95% CI]	Q_w
Meta-analysis 1: Descriptive norms				
Socialization effects	8	7,500	.26*** [.24, .28]	108.69***
Selection effects	2	2,557	.31*** [.27, .34]	24.06***
Meta-analysis 2: Injunctive norms				
Socialization effects	8	8,207	.17*** [.15, .19]	260.09***
Selection effects	2	1,233	.28*** [.23, .33]	2.92
Meta-analysis 3: Peer pressure				
Socialization effects	2	2,162	.08 [.04, .12]	0.24
Selection effects	2	1,446	.15*** [.10, .20]	0.94

Note. For the sexual risk behavior meta-analysis analyses could not be performed, as only one independent socialization effect could be retrieved from the longitudinal studies. *k* = number of studies; *n* = number of adolescents; *ESr* = overall mean effect size [ESr < .10 = non-relation, .10 < ESr < .30 = small, .30 < ESr < .50 = medium, ESr > .50 = large (Cohen, 1992)]; CI = confidence interval; Q_W = heterogeneity statistic.

* $p < .05$.

** $p < .01$.

*** $p < .001$.