

Abstract

Technology offers new opportunities for adolescents to engage in sexual activity and experimentation. Most research has examined online and offline behaviors in isolation, rather than considering how these experiences co-occur in diverse ways for youth and associate with sexual well-being. This study identified subclasses of adolescents based on their frequency of engagement in consensual online and offline sexual behaviors over the past three months and examined associations with sociodemographic and socioemotional characteristics, as well as positive sexuality outcomes, namely sexual well-being and respectful attitudes toward partners. Participants were 1,177 Quebec adolescents ($M_{age} = 16.00$) who completed self-report questionnaires. Gender-stratified models included 998 cisgender girls and boys who reported having engaged in at least one sexual behavior in their lifetime. Latent class analysis revealed four subclasses for boys (*Pornography-focused*; *Low sexual engagement*; *Moderate digital and physical engagement*; *Moderate digital and high physical engagement*; and three subclasses for girls (*Low sexual engagement*; *Moderate digital and physical engagement*; *Moderate digital and high physical engagement*). Age, sexual identity, and socioemotional characteristics were examined as predictors of class membership, while sexual well-being and respectful attitudes toward partners were compared across classes. Results highlight the importance of examining diverse in-person and digital sexual behaviors jointly to understand patterns of sexual engagement and well-being among adolescents.

Patterns of Digital and In-Person Sexual Behaviors Among Adolescents: Associations with Individual Characteristics, Sexual Well-being and Respectful Attitudes toward Partners

Adolescence marks a critical period of learning and exploration across multiple domains of development, including sexuality. During this time, many young people begin to explore their sexual identities and engage in a range of behaviors (Böthe et al., 2020; Lindberg et al., 2021). In the modern digital era, these engagements may include both autoerotic and partnered practices across in-person and digital contexts. By ages 15 to 17, most adolescents have engaged in various sexual activities, including kissing, caressing a partner over clothes, and pornography use, and about half have engaged in text-based sexting (Galper et al., 2024; Kotiuga et al., 2022; Lefkowitz et al., 2018). Yet most research on adolescent sexuality focuses on isolated behaviors or prevalence rates, overlooking how digital and in-person sexual practices co-occur in patterned ways and how adolescents who report similar behaviors may nonetheless differ in their broader patterns of sexual engagement. A holistic, interactionist approach to studying development posits that sociocultural experiences co-occur and interact in complex configurations that explain developmental outcomes (Ford & Lerner, 1992; Magnusson, 1985). Accordingly, identifying patterns of sexual engagement offers several advantages. It provides a more developmentally grounded picture of what adolescent sexual activity looks like in practice and helps clarify whether, and for whom, digitally assisted practices substitute for, complement, or remain peripheral to in-person experiences. Guided by this perspective, the present study uses a person-centered mixture modeling approach to identify distinct patterns of adolescents' in-person and digitally assisted sexual engagement over the past three months. Secondary objectives were to examine whether sociodemographic (age, gender, and sexual identity) and socioemotional characteristics (emotional problems, inattention/hyperactivity, and social aloofness) predict class

membership and whether distinct subgroups of sexual engagement are associated with indicators of positive sexuality (sexual well-being and respectful attitudes towards a partner's consent).

Sexual Behaviors in Adolescence

The onset of puberty brings intensified sexual desire and arousal, accompanied by heightened curiosity about sexuality. Early adolescence is typically characterized by increased engagement in autoerotic practices, including sexual fantasies and masturbation (Kotiuga et al., 2022). These explorations can serve developmental functions, allowing youth to understand their bodies, physiological responses, and emerging desires (Attwood et al., 2018; Hogarth & Ingham, 2009). As adolescents progress towards adult development, partnered sexual activity and exploration becomes more common, and serves in part to orient youth towards adult relationship practices (Suleiman et al., 2017). Historically, adolescent sexual behaviors have been narrowly defined as penile–vaginal intercourse and conceptualized primarily in terms of risk. However, it is now increasingly acknowledged that adolescent sexuality encompasses a broader range of behaviors that, under certain conditions, can provide opportunities for pleasure, intimacy, and positively valenced emotional experiences (Lefkowitz et al., 2018; Tolman & McClelland, 2011; Welsh et al., 2005). Indeed, many adolescents' early partnered sexual experiences involve physical intimacy without intercourse or penetration, such as kissing, caressing, and touching over or under clothing (de Graaf et al., 2009). Among a sample of 14- to 17-year-old Canadian youths, prevalence rates ranged from 60–78% for kissing and 37–63% for non-genital touching (Kotiuga et al., 2022). These dyadic experiences provide opportunities for reinforcing one's sexual self-concept as well as developing interpersonal skills essential to healthy sexuality, including learning to communicate desires and boundaries while also considering those of a partner (Arbeit, 2014; Kågesten & van Reeuwijk, 2021). Although these non-genital experiences

are a significant part of adolescents' sexual landscape and social development, they are often overlooked in research given the strong focus on physical health risks (Harden, 2014). Compared to non-genital sexual practices, behaviors involving genital stimulation are less common during mid-and late adolescence, with approximately 30–50% of adolescents reporting manual or oral stimulation or vaginal intercourse, and between 5 and 7% reporting anal sex (Fortenberry et al., 2010; Kotiuga et al., 2022; Leichter et al., 2007). To date, most research in this area has focused on lifetime or ever/never prevalence rates, with less attention to the frequency or patterning of behaviors. Examining sexual practices over a defined period, such as the past three months, offers a complementary portrait of adolescents' current sexual landscape and allows for the identification of co-occurring behavioral patterns that are less evident with prevalence-based approaches.

Digital innovation has altered adolescent sexual exploration by introducing new forms of sexual interactions. Pornography use is a prevalent form of sexual exploration among contemporary adolescents with use typically increasing between early and late adolescence (Pirrone et al., 2022). Canadian data reveal that over 55% of youth have deliberately sought pornography by age 14, rising to 73% by age 17 (Böthe et al., 2020; Kotiuga et al., 2022). Research indicates that many adolescents use pornography to satisfy curiosity about sexuality or to experience sexual arousal and pleasure, while some use it to regulate difficult emotions (Böthe et al., 2021, 2022; Grubbs et al., 2019). Existing studies have not yielded sufficient or consistent evidence to establish pornography as a singularly negative or positive factor in most adolescents' sexual lives and further research is needed to clarify the contexts in which its use may be linked to positive or negative outcomes (Kotiuga et al., 2025; Landripet et al., 2025).

Digital technology also affords new opportunities for partnered sexual exploration. Sexting—the exchange of sexually suggestive messages or images—has become a prevalent practice among adolescents (Albury et al., 2013; Mori et al., 2019). Research indicates that sexting may facilitate connection and exploration within relational contexts, particularly for adolescents not yet ready for physical sexual encounters (Anastassiou, 2017; Pistoni et al., 2023). While most definitions include both text-based and image-based forms, the former appears to be far more common, and the latter may involve unique risks (e.g., identifiable nude images, sending sexualized images of minors) (Doyle et al., 2021; Kotiuga et al., 2022; Power et al., 2022). Additionally, while sexual arousal is associated with both forms of sexting, partner pressure specifically predicts riskier image-based sexting involving genitals or sexual acts (Maes & Vandenbosch, 2022). Thus, text-based and image-based sexting are distinct practices with different predictors and outcomes, warranting separate examination.

In the digital era, adolescent sexual activities may span various contexts and behaviors, including genital and non-genital behaviors, autoerotic and partnered practices, and digital or in-person activities. It may be that practices complement rather than replace physical intimacy. For example, adolescents who sext are more likely to engage in genital-focused partnered behaviors (Falconer et al., 2022). Yet how different forms of digital and in-person sexual behavior coexist in adolescents' patterns of sexual engagement—and how these patterns vary across youth—remains unclear, largely due to the siloed nature of existing research which often focuses on a single sexual practice (e.g., pornography use) in isolation. Given the high prevalence and developmental significance of both digital and in-person sexual behaviors, identifying distinct configurations that reflect how adolescents combine these experiences is essential for understanding contemporary patterns of adolescent sexual behavior. Such knowledge may help

dispel misconceptions about contemporary adolescent sexuality and move beyond one-size-fits-all approaches to health promotion and sexuality education.

Sexual Behaviors Across Age, Gender and Sexual Identity

Sexual behavior patterns vary across demographic groups. Research indicates that sexual behaviors become more prevalent with age, typically following a progression from autoerotic practices (such as masturbation and pornography use) to non-genital partner touching, and eventually to genital behaviors (Kotiuga et al., 2022). Similarly, the prevalence of sexting—particularly sending sexts—increases with age, and many adolescents who engage in this practice do so before becoming physically sexually active with a partner (Hicks et al., 2021; Madigan et al., 2018; Mori et al., 2022; Parti et al., 2023; Pistoni et al., 2023).

Beyond age-related patterns, both gender similarities and differences have been identified. Specifically, few gendered differences in in-person partnered sexual behaviors have been documented (Kotiuga et al., 2022; Lindberg et al., 2021). However, boys tend to report higher prevalence and frequency of pornography use (Böthe et al., 2020; Donevan et al., 2024). Research also indicates that boys are more likely than girls to engage in non-consensual sexting or receive sexts, while girls more often report feeling pressured in sending them (Pistoni et al., 2023; Van Ouytsel et al., 2021; Wright & Wachs, 2024). In contrast, no gender differences have been observed in consensual sexting (Wright & Wachs, 2024). The extent to which broader patterns of sexual engagement differ across gender groups remains unclear, highlighting the value of a person-centered approach that examines gender-specific subgroups.

Prevalence and frequency of sexual behaviors also vary as a function of sexual identity. Existing research suggests that sexual minority girls report an earlier mean age of engagement in sexual behaviors, whereas sexual minority boys tend to report a later age at first sexual contact

(Dewaele et al., 2017; Tornello et al., 2014). However, data remain limited regarding similarities and differences in the frequency of in-person sexual behaviors across sexual identity groups during adolescence. With respect to digitally assisted sexual practices, sexual minority girls report higher prevalence and frequency of pornography use than their heterosexual peers, whereas patterns among boys appear more consistent across sexual identities, although some evidence suggests that sexual minority boys report higher frequency of use (Böthe et al., 2020; Kotiuga et al., 2025; Mattebo et al., 2016). Sexual minority adolescents are also more likely to report sending and receiving sexts (Holmes & Babchishin, 2025; Van Ouytsel et al., 2019).

Although group-based analyses reveal population-level trends, individuals within demographic categories can exhibit markedly different patterns of engagement in physical and digitally assisted sexual contexts (Boislard et al., 2016). Examining whether subgroup structures are similar or distinct across gender, alongside the role of age and sexual identity in predicting class membership, allows for the assessment of differential likelihoods of belonging to distinct patterns of sexual engagement, while recognizing heterogeneity in class membership within demographic groups.

Socioemotional Characteristics and Sexual Behavior Patterns

Sexual development unfolds within broader socioemotional functioning, particularly adolescents' capacity to regulate emotions and impulses and to navigate interpersonal relationships (Dewitte, 2014; Kotiuga et al., 2023; Lando-King et al., 2015). Adolescents vary widely in these capacities, and sexual practices differ in their emotional, regulatory, and interpersonal demands. Consequently, individual differences in socioemotional functioning may be associated with how adolescents engage in sexual behaviors across in-person and digitally mediated contexts.

Previous research has shown that socioemotional characteristics are related to adolescents' engagement in specific sexual practices. For example, a study of 2,112 adolescents aged 14–18 found that youths who both used pornography and engaged in sexting reported higher extraversion, whereas those who reported pornography use only tended to be more introverted and lower in social intimacy (Efrati & Amichai-Hamburger, 2020). However, effect sizes were small, and analyses relied on lifetime prevalence rather than frequency of engagement, providing only a partial picture of adolescents' sexual involvement. Related work has also examined sexual behaviors in clinical or neurodivergent populations, particularly adolescents with ADHD or autism. A systematic review of 36 studies reported inconsistent associations, with some studies showing higher levels of sexual activity among individuals with ADHD and lower levels among autistic individuals, while others found no differences (Young & Cocallis, 2023). These mixed findings may reflect limitations of variable-centered approaches that rely on mean-level associations that can obscure heterogeneity in how adolescents with similar characteristics engage in sexual behaviors. Still, studies focusing on digitally mediated practices suggest that adolescents with ADHD are more likely to report higher frequencies of pornography use and sexting (Böthe et al., 2019; Lunde et al., 2023; Niazof et al., 2019). Moreover, research with autistic individuals indicates that many express interest in sexuality but encounter challenges navigating sexual or romantic interactions, with pornography sometimes serving as an alternative avenue for sexual engagement (Motamed et al., 2025; Smusz et al., 2024).

Building on research from neurodivergent and clinical populations, the present study examines three socioemotional characteristics that are dimensionally distributed in the general population and closely tied to emotion regulation, interpersonal motivation, and self-regulatory

capacities relevant to adolescent sexual engagement (Dewitte, 2014; McDonnell & Nuttall, 2018; Porcelli et al., 2023; Rubenstein & Chawla, 2018; Vogel et al., 2018). These include emotional problems (manifestations of anxious and depressive states), inattention/hyperactivity (difficulties with impulsivity, restlessness, and self-regulation), and social aloofness (reduced interest in or enjoyment of social interaction). Spanning internalizing, externalizing, and social domains, these characteristics map onto core emotional and interpersonal processes implicated in sexual development. By adopting a person-centered approach, this study examines whether these characteristics are differentially associated with distinct configurations of in-person and digitally mediated sexual practices. This approach allows for the possibility that adolescents with similar socioemotional profiles may engage in sexual behaviors in different ways, patterns that may be masked when relying solely on mean-level comparisons.

Linking Sexual Behaviors to Sexual Well-being and Respectful Attitudes towards Partners

Contemporary perspectives on adolescent sexuality have moved beyond risk-focused frameworks toward more holistic understandings that recognize sexuality as a normative and potentially positive dimension of development (Diamond & Huebner, 2012; Harden, 2014; Vasilenko et al., 2014). This paradigm shift emphasizes that healthy adolescent sexuality encompasses more than the absence of negative outcomes—it includes sexual well-being and the capacity for ethical, respectful interpersonal interactions (Kågesten & van Reeuwijk, 2021). Understanding how different patterns of sexual behavior relate to these positive outcomes is essential for identifying which configurations of sexual activities may support healthy sexuality and which may be associated with greater challenges.

A key challenge in studying sexual well-being among adolescents has been the absence of a clear definition and a model applicable to all youth regardless of age and level of

involvement in sexual or romantic interactions (Lewis et al., 2025; Lorimer et al., 2019; Sundgren et al., 2024). Recently, Mitchell et al. (2021) proposed a comprehensive framework of sexual well-being that encompasses seven domains: sexual respect, sexual self-esteem, comfort with sexuality, self-determination in one's sexual life, sexual safety and security, forgiveness of past sexual experiences, and resilience in relation to sexual experience. Importantly, sexual wellbeing can be experienced across diverse patterns of sexual engagement, including by adolescents who choose not to engage in any sexual behaviors.

Research examining sexual behaviors and sexual well-being or related constructs has yielded mixed findings that underscore the importance of examining configurations rather than isolated practices. Research on in-person partnered activities—including kissing, cuddling, and genital sexual activity—generally shows associations with greater relationship satisfaction, sexual pleasure, positive affect, and sexual self-efficacy among adolescents (Beckmeyer et al., 2021; Hensel et al., 2011; Horne & Zimmer-Gembeck, 2006; Lefkowitz et al., 2018; Vrangalova & Savin-Williams, 2011; Welsh et al., 2005; Wight et al., 2008). However, other studies have reported null or negative associations (e Silva et al., 2018; Vasilenko et al., 2014).

A similarly complex pattern emerges in research on digital sexual practices. For instance, research on pornography use shows positive links with sexual self-efficacy and negative links with sexual body esteem, as well as higher sexual anxiety and lower sexual esteem in boys but the opposite pattern in girls (Kotiuga et al., 2025; Litsou et al., 2021; Paslakis et al., 2022). Similarly, sexting research reveals links with both positive outcomes such as arousal and gratification alongside difficult experiences including harassment, guilt, and shame (Anastassiou, 2017; Doyle et al., 2021; Ojeda & Del Rey, 2022; Van Ouytsel et al., 2016).

Positive and healthy sexuality development involves not only one's own sexual well-being but also engaging ethically and respectfully with others (Kågesten & van Reeuwijk, 2021). Despite this recognition, empirical research on adolescent sexuality has focused predominantly on self-referential outcomes, with little research examining relational dimensions such as respectful attitudes toward partners' consent and sexual boundaries (henceforth, respectful attitudes toward partners) (Maes et al., 2022). Examining both dimensions is important because they do not necessarily align. For example, a person who prioritizes their own needs while disregarding those of others may report high sexual well-being while contributing to negative experiences for a partner or another person.

Attitudes toward real or hypothetical partners develop among all adolescents, regardless of whether they are currently sexually active (Fortenberry, 2013). However, different configurations of sexual behavior may relate differently to these attitudes, as they expose adolescents to different models and contexts for understanding consent, mutuality, and boundaries. For instance, pornography often does not model consent negotiation or mutuality, while sexting lacks nonverbal cues for gauging a partner's comfort (Marques et al., 2024; Nesi et al., 2018; Rothman et al., 2015). In contrast, in-person partnered behaviors involve direct negotiation and responsiveness. Whether respectful attitudes toward partners differ across adolescents whose sexual engagement is primarily technology-mediated, primarily in-person, or a combination of both remains empirically unclear.

The Present Study

Although prior research documents variability in adolescents' sexual practices, little is known about qualitatively distinct patterns of sexual engagement that integrate both in-person and digitally assisted practices. Accordingly, the first objective of the current study was to

identify classes based on the frequency of recent (past three months) engagement in consensual sexual behaviors, encompassing both digital practices (pornography use, text-based sexting, image-based sexting) and in-person experiences (kissing, caressing over clothing, and genital contact). This approach recognizes that the meaning and implications of any single behavior depend on the broader pattern of adolescents' sexual experiences. The three-month timeframe was selected to capture recent behavioral patterns while allowing sufficient variability in frequency, balancing accurate recall with developmental appropriateness for mid-adolescents, whose sexual interests and relationship opportunities may shift over time. To examine whether these patterns were similar or distinct across gender groups, latent class analyses were conducted separately among cisgender girls and cisgender boys.

To further knowledge of the associations between adolescent sexuality and broader developmental characteristics, the second objective aimed to examine predictors of class membership, including demographic characteristics (age and sexual identity) and socioemotional traits (emotional problems, inattention/hyperactivity, and social aloofness). Identifying how these individual characteristics relate to different patterns of sexual engagement may help delineate vulnerability and inform more tailored support strategies.

Finally, to clarify the extent to which patterns of sexual engagement relate to other intrapersonal and interpersonal dimensions of sexuality, the third objective aimed to examine whether class membership was differentially associated with sexual well-being and respectful attitudes toward partners. This dual focus acknowledges that positive sexual development entails not only feeling good about one's own sexuality but also engaging with others in ways that reflect respect and mutual consent, two dimensions that may not always align.

Method

Participants

Participants were 1,599 adolescents recruited from nine high schools in the Capitale-Nationale and Mauricie regions of Quebec, Canada from October 2024 to March 2025. Among these schools, three were private and two were classified as highly disadvantaged according to the Socioeconomic Environment Index. Participants were retained in the study sample if they completed the sociodemographic questionnaire, which was the minimum completion requirement, and passed the attention checks. Of the 1,599 initial participants, 1,177 (73.6%) met these criteria. Participants were aged 14 to 18 years ($M = 16.00$, $SD = 0.71$). Participant characteristics are presented in Table 1, and Figure 1 displays lifetime and past three-month prevalence rates for the six sexual practices examined.

INSERT TABLE 1.

INSERT FIGURE 1.

Procedure

The study was approved by the ethics committee of the Université du Québec à Trois-Rivières. Schools in the Mauricie and Central Quebec regions were contacted to assess their interest in participating in a study on adolescent mental health and well-being. Eight schools agreed to allocate a class period for students who wished to participate, and school administrators signed an authorization form. On each scheduled data collection period, a research assistant presented the study to the students and remained in the classroom throughout the period to answer any questions. Students who elected to participate accessed a secure website (Qualtrics Research Suite) containing the consent form and the self-report questionnaire, which took approximately 45 minutes to complete. During the data collection period, all students were provided with physical blockers to promote confidentiality and privacy. All students were also

provided access to an online Prezi presenting answers to commonly asked adolescent questions related to sexual health, as well as information on related themes (e.g., emotions and boundaries), developed by the research team. Students could consult this material during the class period if they chose not to participate or at any time after the study. Students who did not participate were also free to engage in personal work.

In accordance with provincial legislation allowing adolescents aged 14 years and older to provide informed consent for research participation, parental consent was not required. The consent form was written in age-appropriate language and was verbally explained to students by a research assistant on the day of data collection. To support comprehension, students were also presented with a brief recap of key consent elements, including their right to ask questions and receive satisfactory answers, their right to withdraw at any time, the confidential and anonymous handling of their responses, and the fact that participation did not involve waiving any rights or releasing the research team from their responsibilities.

Measures

Sexual Practices

Participants reported how often they had consensually engaged in the following activities over the past three months: pornography use, kissing, manual stimulation, oral stimulation, vaginal intercourse, anal intercourse, voluntary text-based sexting, and voluntary image-based sexting. Initial responses were provided on a 6-point Likert scale: 0 = Never in my life, 1 = Yes, but not in the last three months, 2 = Less than once a month, 3 = A few times a month, 4 = A few times a week, and 5 = A few times a day. However, to align with the study objectives, responses 0 and 1 were recoded as zero to indicate no engagement in the behavior over the past three months, resulting in a 5-point scale, ranging from 0 to 4. A composite score for penetrative

sexual practices was created by combining reports of oral, vaginal, and anal sex. This decision was made for two main reasons. First, this approach allowed for a focus on engagement in genital sexual behaviors while avoiding heteronormative assumptions about specific practices, particularly given that anal sex, although less prevalent and frequent, largely co-occurred with other penetrative behaviors. Second, models with these behaviors considered separately were tested, but convergence issues indicated they were not estimable, likely due to the low prevalence rates and indicator strength of each behavior separately. Consequently, for both theoretical and empirical reasons, these behaviors are collapsed.

Definitions of pornography, text-and image-based sexting were provided to participants. Pornography use was defined as “intentionally looking at, reading, or listening to visual, audio, or written materials (e.g., videos, pictures, audio erotic stories, or sexual activity sounds) depicting nude individuals or people engaging in sexual activity” (Kohut et al., 2020). Text-based sexting was defined as the exchange of written messages with sexual content (e.g., text messages, messages sent via messaging applications or social media direct messages) (Noorishad et al., 2023). Image-based sexting was defined as the exchange of sexual images, photos, or videos of oneself or of the person with whom one is communicating (e.g., nude or partially nude images, sexual acts, or screenshots of images or videos captured via webcam) (Noorishad et al., 2023). The present study focused on voluntary sexting, defined as the intentional and consensual exchange of sexual messages or images with another person.

Demographic Variables

Participants reported their age, sex assigned at birth, gender identity, and sexual identity. For gender identity, respondents selected one of five options: girl, boy, non-binary, agender, or a free-response write-in option. Using information from the sex assigned at birth and gender

identity variables, a derived gender variable was created and coded into three categories: cisgender boys, cisgender girls, and gender diverse youth. Next, as shown in Table 2, dummy-coded variables were created for each gender category: cisgender boys (1 = cisgender boy, 0 = otherwise), cisgender girls (1 = cisgender girl, 0 = otherwise), and gender diverse youth (1 = gender diverse, 0 = otherwise). Regarding sexual identity, participants selected options from nine options including a write-in option (heterosexual, bisexual, pansexual, lesbian, gay, queer, asexual, questioning, or a free-response write-in option). To maintain statistical power given small cell sizes, sexual identity was dichotomized for analyses (0 = heterosexual adolescents, 1 = sexual minority adolescents).

Socioemotional Characteristics

The Emotional Problems and Inattention/Hyperactivity subscales of the Strengths and Difficulties Questionnaire, each comprising five items, were used to assess emotional problems and inattention/hyperactivity manifestations, respectively (Goodman et al., 1998). Responses were rated on a 3-point Likert scale: 0 = “not true,” 1 = “a little true,” or 2 = “very true” and a total score was computed by producing a sum of the items. Internal consistency within the present sample was acceptable ($\alpha = .68-.79$). Sample items included: “I am often unhappy, depressed or tearful” (emotional problems) and “I am easily distracted, I find it difficult to concentrate” (inattention/hyperactivity). Higher scores reflected greater levels of emotional problems and inattention/hyperactivity.

Social aloofness was assessed using the 6-item subscale of the Broader Autism Phenotype Questionnaire (BAPQ; Hurley et al., 2007; Stojković et al., 2018). Importantly, the BAPQ capture subclinical, dimensionally distributed traits associated with the broader autism phenotype in the general population (Piven & Sasson, 2014). Responses were rated on a 6-point

Likert scale ranging from very rarely (1) to very often (6) and a mean score was computed. Internal consistency within the present sample was good ($\alpha = .83$). An example item of this subscale is: “I like being around other people (reverse coded).” Higher scores reflected greater levels of social aloofness.

Sexual well-being

The Natsal Sexual Well-being Measure (Natsal-SW; Mitchell et al., 2025) was used to assess participants’ sexual well-being across multiple domains, including security and safety, respect, self-esteem, resilience, forgiveness of past sexual experiences, self-determination, and comfort. Adolescents responded to 13 items on a 5-point Likert scale ranging from Strongly agree to Strongly disagree. An example item is: “I feel in control of my sexual thoughts and desires.” A single total sexual well-being score was computed by averaging participant responses. Internal consistency for this measure was good ($\alpha = .85$). Higher scores indicated greater levels of sexual well-being.

Respectful Attitudes toward Partners

To assess participants’ respectful and consent-based attitudes toward partners, the Positive Approach to Sexual Relationships subscale of the *Positive Sexuality in Adolescence Scale* (PSAS; Maes et al., 2022) was used. One of the original seven items—“If I had questions about my sexuality or my relationship, I would expect to talk about this openly with my partner”—was removed, as it pertained to sexual communication rather than respectful and consent-based attitudes toward partners. This change resulted in a six-item subscale with improved internal consistency, with Cronbach’s alpha increasing from .84 to .90.

Adolescents rated their agreement with statements such as “I think it’s important for a partner to feel safe when we’re intimate” and “If I were to be intimate with someone, I think it is

important that we both enjoy the experience” using a 5-point Likert scale ranging from *Strongly agree* to *Strongly disagree*. A composite score was calculated to reflect each participant’s overall attitude and higher scores indicated greater levels of respectful attitudes.

Statistical Analyses

Prevalence rates for lifetime and past three-month engagement in all six sexual practices were computed across all participants ($n = 1,177$) and are displayed in Figure 1. For the latent class analyses, the sample was restricted to cisgender girls and boys who reported lifetime engagement in at least one of the six assessed sexual behaviors. Among the 1,177 participants retained in the study sample, 106 (9.0%) reported no lifetime engagement in any of the assessed behaviors, and 47 (4.0%) had missing responses for all sexual behavior items and therefore could not be classified according to lifetime engagement¹. The sample included 31 gender-diverse adolescents (2.6%); however, five had already been excluded because they either reported no lifetime engagement or had missing responses for all sexual behavior items. Thus, 26 additional participants were excluded from the gender-stratified models based on gender, resulting in a final LCA analytic sample of 998 participants. Descriptive statistics and bivariate correlations for the LCA analytic sample are presented in Table 2.

Patterns of missing data were examined descriptively. Across class indicators, item-level missingness ranged from 0.29% to 2.73% and 96% of participants had no missing data. Regarding class predictors and outcomes, item-level missingness ranged from 0% to 13.33% and 86.2% of participants had no missing data. The data were missing completely at random

¹ This group of sexually inactive participants was composed primarily of cisgender girls (78.3%), followed by cisgender boys (20.8%) and gender-diverse youth (0.9%). Sexually inactive adolescents were significantly more likely to be cisgender girls than cisgender boys, $\chi^2(1, N = 1,130) = 25.94, p < .001$, and were slightly younger than those who reported at least one lifetime sexual experience ($M = 15.79$ vs. $M = 16.02$), $F(1, 1125) = 9.90, p = .002, \eta^2 = .009$.

(MCAR) based on Little's MCAR test ($\chi^2[42] = 38.560, p = .623$) and missing data on the class indicators are handled via full information maximum likelihood (FIML).

To address the first objective, finite mixture models were conducted in Mplus to identify latent subgroups based on adolescents' self-reported frequencies of six sexual behaviors over the past three months: pornography use, kissing, text-based sexting, image-based sexting, physical touching over clothing, and genital sexual contact (Muthén & Muthén, 1998). These models identify latent classes of adolescents who show similar patterns of engagement across the assessed sexual behaviors.

For both cisgender boys and girls, a series of models were estimated to determine the best-fitting solution based on statistical fit indices, interpretability, and parsimony (Bauer & Curran, 2003; Dziak et al., 2020). Fit indices included the Bayesian Information Criterion (BIC); Sample-Size Adjusted Bayesian Information Criterion (SABIC); Akaike Information Criterion (AIC); Lo-Mendell-Rubin Likelihood Ratio Test (LMR); Bootstrap Likelihood Ratio Test (BLRT), and entropy. Lower AIC and BIC values indicated better model fit, while higher entropy values reflected greater classification precision. Entropy values above 0.80 were considered satisfactory (Tein et al., 2013). For the LMR and BLRT tests, a statistically significant p -value ($p < .05$) indicates that a model with k classes provides significantly better fit than a model with $k-1$ classes (Nylund et al., 2007; Tein et al., 2013). Finally, to ensure class stability and interpretability, each class was required to comprise at least 5% of the sample (Leiter & Maslach, 2016).

To meet the second objective, multivariable multinomial logistic regressions were estimated separately for boys and girls, with class membership regressed simultaneously on predictors, (i.e., sexual identity, age, emotional problems, inattention/hyperactivity, and social

aloofness) using the R3STEP approach. This approach tests the extent to which an increase in the predictor is associated with higher probability of a participant belonging to one class rather than another, with results reported as odds ratios (OR) indicating the relative likelihood of membership in one class compared to a reference class. To address the third objective, the Bolck, Croon, and Hagnaars (BCH; Bolck et al., 2004) method was used to compare mean levels of sexual well-being and respect for a partner's consent across profiles. The BCH approach retains the measurement integrity of the latent classes and adjusts for classification error when estimating mean differences.

Results

Descriptive statistics and correlations for the analytic sample of the cisgender girls and boys who had engaged in at least one sexual practice in their lifetime are presented in Table 2.

INSERT TABLE 2

Characteristics of Latent Profiles

Table 3 presents the fit indices for both sets of LCA models. Normalized entropy was very high for all profile solutions, indicating excellent classification quality. On the basis of several converging criteria, a three-class solution was retained for girls while a four-class solution was retained for boys. The SABIC reached its lowest value at the four-class solution for boys, and the adjusted LMR indicated that adding a fifth class did not significantly improve model fit. For girls, the adjusted LMR was the primary basis for retaining three classes, as the test was non-significant for the four-class solution ($p = .610$). No class fell below 5% of the sample in either retained solution.

INSERT TABLE 3.

To illustrate differences in sexual engagement across classes, Figure 2 presents the mean frequencies of sexual behaviors over the past three months for each class. Among cisgender boys, a four-class solution was retained. The first class, labeled “*Pornography-focused*” (7%; $n = 32$), was characterized by very low frequencies across most sexual behaviors, with the exception of pornography use, which was significantly higher than in the other three classes (all $p_s < .001$). The second class, labeled “*Low sexual engagement*” (61.3%; $n = 282$), was characterized by very low frequencies across most sexual behaviors, with mean scores close to 0 (“never in the past three months”). The third class, labeled “*Moderate Digital and Physical Engagement*” (11.7%; $n = 54$), was characterized by pornography use and text-based sexting occurring approximately once a month, with image-based sexting rarely or never reported in the past three months. In-person partnered behaviors were reported approximately a few times a month. The fourth class, labeled “*Moderate Digital and High Physical Engagement*” (20%; $n = 92$), reported a similar frequency of digital practices to the third class, with no significant differences on pornography or text-and image-based sexting. However, participants in the *Moderate Digital and High Physical Engagement* class reported kissing, caressing, and penetrative sex occurring closer to a few times a week, significantly more frequently than those in the *Moderate Digital and High Physical Engagement* class.

Among cisgender girls, a three-class solution was retained. The first class, labeled “*Low sexual engagement*” (52.7%; $n = 283$), was characterized by very low frequencies across all sexual behaviors. Specifically, mean scores were close to 0 across both digital and partnered practices, except for pornography use, which was reported at less than once a month on average. The second class, labeled “*Moderate Digital and Physical Engagement*” (26.3%; $n = 141$), was characterized by digital practice engagement occurring less than once a month, alongside

partnered physical behaviors occurring approximately a few times a month. Relative to the *Low sexual engagement* class, text and image-based sexting, kissing, caressing, and penetrative sex were all significantly more frequent, while pornography use did not differ significantly between these two classes. The third class, labeled “*Moderate Digital and High Physical Engagement*” (21%; n = 113), reported a similar frequency of digital practices to the *Moderate Digital and Physical Engagement* class. However, participants in the *Moderate Digital and High Physical Engagement* class reported kissing and caressing occurring a few times a month, and penetrative sex occurring less than once a month, all significantly more frequent than average rates of those in the *Moderate Digital and Physical Engagement* class.

INSERT FIGURE 2.

Predictors of Profile Membership

Tables 4 and 5 present the results of multivariable multinomial logistic regressions examining demographic and socioemotional predictors of class membership among cisgender boys and girls, respectively. Older boys had significantly higher odds of belonging to the *Moderate digital and high physical engagement* class than the *Low sexual engagement* class (OR = 1.86, 95% CI [1.28, 2.70]). Regarding sexual identity, sexual minority boys were absent from the *Moderate digital and high physical engagement* class, suggesting that sexual minority boys were considerably less likely to belong to this class, though the absence of cases precluded formal statistical comparison. No significant differences in class membership were observed among the remaining three classes based on sexual identity. Regarding socioemotional characteristics, higher emotional problems and inattention/hyperactivity symptoms were associated with significantly lower odds of belonging to the *Low sexual engagement* class relative to the *Pornography-focused* class (OR = 0.78, 95% CI [0.65, 0.94]; OR = 0.82, 95% CI

[0.68, 0.99]). In contrast, higher social aloofness was associated with significantly greater odds of belonging to the *Low sexual engagement* class relative to the *Pornography-focused* class (OR = 2.15, 95% CI [1.24, 3.72]). Moreover, higher inattention/hyperactivity symptoms were associated with significantly greater odds of belonging to the *Moderate digital and high physical engagement* class relative to the *Low sexual engagement* class (OR = 1.18, 95% CI [1.03, 1.35]). In contrast, higher social aloofness was associated with significantly lower odds of belonging to both the *Moderate digital and high physical engagement* class and the *Moderate digital and physical engagement* class relative to the *Low sexual engagement* class (OR = 0.56, 95% CI [0.38, 0.81]; OR = 0.49, 95% CI [0.31, 0.76]). Moreover, higher levels of emotional problems were associated with higher odds of being in the *Moderate digital and physical engagement* class relative to the *Low sexual engagement* class (OR = 1.20, 95% CI [1.03, 1.40]).

For girls, age did not significantly predict class membership across any comparison. Regarding sexual identity, sexual minority girls had significantly higher odds of belonging to the *Low sexual engagement* class relative to both the *Moderate digital and high physical engagement* class (OR = 3.91, 95% CI [1.93, 7.90]) and the *Moderate digital and physical engagement* class (OR = 3.40, 95% CI [1.39, 8.32]). Regarding socioemotional characteristics, higher inattention/hyperactivity symptoms were associated with significantly lower odds of belonging to the *Low sexual engagement* class relative to the *Moderate digital and high physical engagement* class (OR = 0.85, 95% CI [0.77, 0.94]). No other socioemotional predictors significantly differentiated class membership among girls.

INSERT TABLES 4 - 5.

Positive Sexuality Outcomes

For boys, class membership was significantly associated with both sexual well-being ($\chi^2(3) = 54.011, p < .001$) and respectful attitudes towards a partner ($\chi^2(3) = 12.434, p = .006$).

Regarding sexual well-being, boys in the *Moderate Digital and High Physical Engagement* class reported the highest levels of sexual well-being ($M = 4.30, SE = 0.08$), which was significantly higher than those in the *Moderate Digital and Physical Engagement* class ($M = 3.89, SE = 0.12; \chi^2(1) = 8.178, p = .004$), the *Low sexual engagement* class ($M = 3.67, SE = 0.04; \chi^2(1) = 47.302, p < .001$), and the *Pornography-focused* class ($M = 3.54, SE = 0.13; \chi^2(1) = 26.313, p < .001$).

Boys in the *Moderate Digital and Physical Engagement* class ($M = 3.89, SE = 0.12$) reported significantly higher sexual well-being than those in the *Pornography-focused* class ($M = 3.54, SE = 0.13; \chi^2(1) = 4.123, p = .042$).

Regarding respectful attitudes toward a partner, boys in the *Pornography-focused* class ($M = 6.65, SE = 0.09$) reported significantly lower consent-related attitudes than those in the *Moderate Digital and High Physical Engagement* class ($M = 6.84, SE = 0.04; \chi^2(1) = 4.108, p = .043$). Moreover, boys in the *Low sexual engagement* class ($M = 6.68, SE = 0.04$) also reported significantly lower respectful attitudes compared to those in the *Moderate Digital and High Physical Engagement* class ($\chi^2(1) = 9.733, p = .002$).

For girls, class membership was only significantly associated with sexual well-being ($\chi^2(2) = 28.456, p < .001$). Specifically, girls in the *Moderate Digital and High Physical Engagement* class ($M = 4.01, SE = 0.07$) reported significantly higher sexual well-being compared to those in the *Low Sexual Engagement* class ($M = 3.64, SE = 0.04; \chi^2(1) = 22.272, p < .001$). Similarly, girls in the *Moderate Digital and Physical Engagement* class ($M = 3.90, SE = 0.06$) also reported significantly higher sexual well-being compared to those in the *Low Sexual Engagement* class ($\chi^2(1) = 11.902, p = .001$).

Discussion

Previous research has documented prevalence or frequency rates for distinct sexual practices, consistently showing that solo practices such as pornography use are more prevalent and frequent, particularly among boys, than both in-person and digitally mediated partnered behaviors (Böthe et al., 2020; Kotiuga et al., 2022). While such studies are informative for describing specific practices, they offer limited insight into adolescents' overall involvement in sexual behaviors and the ways in which different practices co-occur. This study extends current knowledge of adolescent sexuality by identifying latent classes of sexual engagement among mid-adolescents based on past three-month frequencies of pornography use, kissing, over-the-clothing touching, sexting, and penetrative sexual practices. The findings provide further support for moving beyond a binary classification of adolescents as “sexually active” or “inactive” to better capture the wide array of sexual experiences, particularly in a digital age that affords new ways of engaging in digital, in-person, partnered, and solo activities. They also shed light on how distinct patterns of sexual behaviors are associated with some adolescents' sociodemographic and socioemotional characteristics, as well as intrapersonal and interpersonal dimensions of positive sexuality.

Distinct Profiles of Sexual Engagement

Many prior studies have defined sexual activity based on specific behaviors, most often penetrative sex (Lindberg et al., 2021; Santelli et al., 2000; Twenge et al., 2017). In contrast, the present study adopted a broader definition of sexual engagement that included in-person non-genital behaviors as well as digitally mediated practices. Using this approach, 9.4% of participants reported no lifetime engagement in any of the sexual practices assessed. Cisgender

girls (vs. youth of other genders) and younger adolescents were more likely to be considered sexually inactive using this broad definition.

Among adolescents who reported having engaged in at least one sexual practice in their lifetime, separate latent class analyses were conducted for cisgender girls and cisgender boys; gender diverse youth were excluded due to insufficient sample size. This yielded four distinct classes for boys and three for girls, based on past three-month frequencies of in-person and digitally assisted sexual practices. Across cisgender boys and girls, the largest subgroups (i.e., 61.3% and 52.7% respectively) were characterized by very low frequencies of sexual engagement over the past three months (*Low Sexual Engagement*). These classes showed near-zero mean frequencies across all partnered behaviors, with only occasional pornography use. The fact that more than half of the sample belonged to this profile, together with the finding that a subset of the original sample reported no engagement in the sexual practices assessed, underscores the importance of validating low levels of sexual engagement as developmentally normative during mid-adolescence. Although these findings align with prior research documenting that pornography use is relatively common during adolescence (Böthe et al., 2022; Donevan et al., 2022; Rothman et al., 2021), they extend this literature by showing that, when examined over a three-month window, such engagement occurs at low frequencies for the majority of youths. Moreover, adolescents in these classes' reports of scarcely any engagement in non-genital in-person partnered behaviors during this period, such as kissing and touching, provide a fuller picture of adolescents who engage minimally across partnered sexual behaviors.

Interestingly, a small but distinct subgroup specific to boys also emerged (*Pornography-Focused*; 7.0%), characterized by the highest mean frequency of pornography use across all classes. Partnered practices were reported, on average, less than once a month. This pattern

suggests that, for a minority of adolescent boys, pornography use may occur largely in the absence of partnered sexual engagement, adding nuance to prior research suggesting that pornography use and partnered sexual activity tend to co-occur (Morgan, 2011; Pirrone et al., 2022).

Across both groups, two classes emerged that were characterized by higher levels of in-person partnered sexual activity. These classes, labeled *Moderate Digital and Physical Engagement* (boys = 11.7%; girls = 21%) and *Moderate Digital and High Physical Engagement* (boys = 20%; girls = 26.3%), were distinguished primarily by the frequency rather than the patterns of behaviors reported, with partnered digital practices remaining low compared to partnered in-person practices. Among these more sexually active adolescents, sexual repertoires spanned both digital and in-person partnered experiences, though frequency rates suggest that in-person physical intimacy remains central to sexual engagement. Notably, even among the most sexually active subgroups, sexting was reported at less than once a month on average, suggesting that this behavior may be less prevalent among adolescents than is often implied in public discourse (Maheux et al., 2020; Walrave et al., 2015). These findings also highlight that partnered sexual engagement is a normative experience for many during mid-adolescence, drawing attention to the importance of ensuring that all adolescents have the internal and external resources to navigate both in-person and digitally assisted sexual experiences safely when they choose to do so (Arbeit, 2014; Kågesten & van Reeuwijk, 2021).

Together, these findings highlight the importance of recognizing the heterogeneous patterns of sexual engagement that characterize contemporary adolescent sexuality, normalizing both lower and higher levels of sexual activity during adolescence, and considering multiple contexts when examining adolescent sexuality. In light of this variability, sexuality education

and sexual health and well-being promotion efforts would benefit from promoting knowledge, attitudes and skills that support sexual experiences that are safe, respectful, and pleasurable in both offline and online settings. Notably, pornography use was present across all profiles, pointing to the relevance of addressing pornography within comprehensive sexuality education (Byron et al., 2021; Litsou et al., 2021). At the same time, the findings challenge assumptions about widespread excessive pornography use, suggesting instead that adolescents at risk for excessive use represent a vulnerable minority rather than a normative pattern.

Sociodemographic and Socioemotional Correlates

Previous research has identified group differences in sexual engagement across age, gender, and sexual identity, yet substantial within-group variability remains (Boislard et al., 2016; Bóthe et al., 2020; Kotiuga et al., 2022, 2025; Ševčíková & Daneback, 2014). Consistent with this literature, the present findings show that sociodemographic characteristics do not define patterns of sexual engagement per se, but rather that certain groups may be overrepresented in specific classes. Among boys, older age was associated with higher odds of membership in the *Moderate Digital and High Physical Engagement* profile relative to the *Low Sexual Engagement* profile, aligning with prior research documenting age-related increases in sexual behavior prevalence (Haydon et al., 2012; Kotiuga et al., 2022). However, no differences by age were observed among girls, and future research with broader and more diverse samples is needed to clarify how age-related patterns of sexual engagement differ across genders.

Regarding sexual identity, no sexual minority boys were in the *Moderate Digital and high physical engagement* class, and sexual minority girls showed higher odds of membership in the *Low sexual engagement* class relative to both other classes. Although prior research has shown that some sexual minority youth report higher frequencies of pornography use or sexting,

contributing to elevated group means in variable-centered analyses, the present results indicate that, when examined over a three-month window and within a person-centered framework, most sexual minority adolescents in this sample reported low levels of sexual engagement (Bóthe et al., 2020; Holmes & Babchishin, 2025; Van Ouytsel et al., 2019).

In line with prior research showing that socioemotional functioning is related to adolescents' and adults' experiences of sexuality and sexual behavior, the present study examined three socioemotional characteristics hypothesized to be associated with patterns of sexual engagement. Specifically, social aloofness was considered given its links to reduced social interest and interpersonal closeness, which may limit engagement in physical intimacy with a partner. Consistent with this rationale, among boys, higher social aloofness was associated with greater likelihood of belonging to the *Lower sexual engagement* class compared to the three other classes. No differences in social aloofness were identified among girls. The present findings therefore offer partial support for previous research linking social withdrawal to later transitions into sexual life (Lucas et al., 2020; Zimmer-Gembeck et al., 2004) as this pattern was observed among boys but not girls in the present study. One possible explanation is that social aloofness may not reflect the same relational processes across genders, which is consistent with research on social aloofness and autism spectrum traits suggesting that girls tend to maintain stronger interpersonal motivation than boys (Sedgewick et al., 2016).

Previous research has linked emotional problems to both higher pornography use and greater involvement in partnered sexual behaviors (Calatrava et al., 2025; Perry et al., 2019), suggesting that emotional vulnerability may be associated with sexual engagement in more than one way. In the present study, higher emotional problems among boys were associated with greater likelihood of belonging to both the *Pornography-focused* class and the *Moderate digital*

and physical engagement class, relative to the *Low sexual engagement* class. This pattern is informative because it suggests that emotionally vulnerable boys are not characterized by a single profile of sexual engagement. Rather, emotional problems may be represented across distinct behavioral patterns, some primarily digital and others involving both digital and in-person experiences. These findings highlight the importance of incorporating indicators beyond behavioral patterns of sexual engagement, as similar levels or forms of engagement may reflect different motivations, meanings, and subjective experiences across adolescents. Indeed, sexual and romantic contexts may be salient for emotionally vulnerable boys for many of the same developmental reasons as for other adolescents, including intimacy, exploration, and pleasure, while also serving additional affective functions for some, such as validation, reassurance, distraction, or emotional regulation.

In addition to reporting higher emotional problems, boys in the *Pornography-focused* class also reported higher inattention/hyperactivity symptoms than boys in the *Low sexual engagement* class. Taken together, these findings suggest that the *Pornography-focused* class may be characterized by broader emotional and self-regulatory vulnerabilities, consistent with research showing that frequent pornography use may be more common among youth who report higher impulsivity, executive functioning difficulties, or emotion regulation difficulties (Calatrava et al., 2025; Rousseau et al., 2020). One possible interpretation is that digitally mediated sexual contexts may place fewer immediate interpersonal demands than face-to-face interactions while still being experienced as salient or rewarding. This potentially makes these practices more appealing for some youth, particularly those who exhibit higher levels of impulsivity or difficulties with emotion regulation.

Moreover, consistent with research linking inattention/hyperactivity to higher levels of sexual activity among adolescents (Lunde et al., 2023; Niazof et al., 2019; Young & Cocallis, 2023), higher inattention/hyperactivity was also associated with membership in the *Moderate digital and physical engagement* class among both boys and girls compared to the *Low sexual engagement* groups. This pattern may reflect broader tendencies toward reward sensitivity or sensation-seeking, which have been associated with greater involvement in novel or stimulating experiences, including sexual experiences (Eckstrand et al., 2017).

Differential Associations with Sexual well-being and Respectful Attitudes towards Partners

Among both boys and girls, profiles characterized by higher levels of in-person partnered engagement were associated with greater sexual well-being than those with little to no partnered engagement. While no significant differences in sexual well-being between the two partnered classes were identified in girls, boys in the *Moderate digital and high physical engagement* class reported significantly higher sexual well-being than those in the *Moderate digital and physical engagement* class. This pattern is consistent with prior research indicating that adolescents who engage in partnered sexual behaviors tend to report more positive thoughts and feelings about their sexuality (Hensel et al., 2011; Horne & Zimmer-Gembeck, 2006; Welsh et al., 2005). These findings align with positive sexuality frameworks by suggesting that consensual sexual behaviors may be associated with positive subjective experiences for some adolescents (Harden, 2014). Importantly, the mid-range levels of sexual well-being observed among adolescents of both genders in the *Low sexual engagement* class are also developmentally expected during mid-adolescence and are not inherently problematic.

These results also help nuance the discourse surrounding adolescent pornography use and sexting. Previous studies have documented both negative and positive correlates of pornography

use and sexting among adolescents (Doyle et al., 2021; Morgan, 2011; Rothman et al., 2015). Without minimizing potential risks, the present findings, considered alongside prior work, suggest that both in-person and digitally assisted sexual practices may fulfill specific needs related to sexual arousal, pleasure, or feeling desired. In this sense, acknowledging that patterns of sexual engagement combining consensual in-person and digitally assisted practices are associated with higher sexual well-being may help adults and educators engage in more attuned conversations with youth that validate adolescents' experiences. Such validation has been shown to support more open discussions and may increase adolescents' receptivity to conversations about health and safety promotion and mitigating risks (Corcoran et al., 2020).

Regarding respectful attitudes toward a partner, differences across classes were only identified among boys. Adolescents in the *Pornography-focused* and *Low sexual engagement* classes reported significantly lower respectful attitudes compared to the *Moderate digital and high physical engagement* class. These results are consistent with theories of attitude development suggesting that moral and relational attitudes, including valuing consent, develop through social learning and may be shaped by broader interpersonal experiences, not only by direct engagement in partnered sexual behaviors (Javidi et al., 2020; Kågesten & van Reeuwijk, 2021). Practices such as pornography may allow adolescents to meet certain sexual interests without the interpersonal demands of in-person interactions, such as negotiation or reciprocal responsiveness, which may be particularly appealing to some youth. In addition, higher inattention/hyperactivity symptoms observed in this group have both been linked to poorer interpersonal outcomes and may also provide further challenges to focusing on a partner's needs (Betchen, 2003; VanderDrift et al., 2019).

These findings underscore the importance of examining multiple facets of adolescent sexuality, including not only how adolescents feel about their sexuality, but also how they approach and relate to partners across different sexual contexts. They also point to the need for future research to examine how adolescents navigate sexual experiences across digital and in-person contexts, with particular attention to partner-oriented considerations.

Study limitations

The present study has several limitations. First, the sample was drawn from regular education classes in schools located in two districts in the Canadian province of Quebec. The sample also lacked ethnocultural diversity and included few gender-diverse participants. As a result, findings may not generalize to adolescents with learning differences, marginalized or underserved youth, gender-diverse adolescents, or youth from different regional contexts. Regarding gender identity, although mean frequencies of sexual behaviors were presented for gender-diverse youth, these participants were excluded from the analytical models because the small sample size precluded identifying meaningful classes within this group. Future research should prioritize oversampling gender-diverse youth to permit meaningful subgroup analyses. Similarly, although sexual identity was included as a predictor in the analyses and variability in patterns of sexual engagement was examined using a person-centered approach, the present study was not designed to capture heterogeneity within sexual minority groups specifically. Given the diversity of sexual experiences among sexual minority adolescents, future research with larger and more diverse samples is needed to examine within-group variability more directly (Boislard et al., 2016; Choi et al., 2019; Savin-Williams, 2011). Second, the current results, focused on subclinical dimensional traits, suggest that research with neurodivergent populations on these issues may be warranted. Other characteristics of the Quebec context, such

as mandatory sexuality education in high school and relatively progressive norms regarding sexuality, may further limit the generalizability of these findings. Third, while the study provides a valuable snapshot of variability in adolescents' engagement patterns over a three-month period, its cross-sectional design cannot account for the dynamic nature of sexuality and engagement sexual behavior (Dalenberg et al., 2018; de Graaf et al., 2009). Indeed, interest and opportunities for sexual activity can fluctuate and may significantly influence the outlets adolescents choose to explore (Kaestle, 2019; Meier & Allen, 2009). Longitudinal studies that allow for the evaluation of profile configuration and membership stability would be useful to better understand how engagement in sexual behaviors evolves over the course of adolescence and test bidirectional links with socioemotional and well-being factors. Fourth, although significant differences were found across profiles relative to respectful attitudes towards a partner, the absolute mean differences were small, suggesting that this association should be interpreted cautiously and may have limited practical significance. Future research would benefit from using more specific and multi-method indicators, including scenario-based assessments, behavioral tasks, and, when appropriate, partner-reported measures, to determine whether small differences in self-reported respectful attitudes translate into meaningful differences in consent-related reasoning, communication, or behavior. Fifth, while the study focused on consensual sexual experiences, the subjective experience of these behaviors (e.g., levels of desire, physical or psychological pleasure) was not assessed despite the importance of associated perceptions and emotions for sexual well-being (Debrot et al., 2017; Ford et al., 2019). Including measures of subjective experiences may help further detail individual differences in adolescents' sexual practices. Moreover, because the present study focused exclusively on consensual behaviors, the identified profiles do not encompass non-consensual experiences, which should be considered in future

research to more fully capture the range of adolescents' sexual experiences. Finally, the reliance on self-report measures may introduce social desirability bias, particularly given the sensitive nature of the topics. Notably, the study assessed self-reported respectful attitudes toward partners' consent rather than actual behaviors, which may not fully capture how these attitudes translate into practice.

Practical Implications and Conclusion

The present study identifies qualitatively distinct patterns of sexual engagement among mid-adolescents and highlights that, for many youths, sexual exploration can occur across both in-person and digitally mediated contexts. Importantly, the findings also underscore substantial variability in adolescents' levels of sexual engagement, with the majority reporting minimal involvement in partnered sexual behaviors. Together, these results emphasize the importance of recognizing and normalizing individual differences in sexual development and avoiding assumptions that sexual activity follows a single or uniform trajectory during adolescence. Presenting accurate information about these patterns may help counter misperceptions about peer behavior and reduce perceived pressure to conform to normative expectations. Given that digitally mediated practices were present across all profiles, sexuality education curricula and professional interventions may benefit from explicitly addressing these contexts, including both their potential benefits and risks as well as underlying motivations. Because digital interactions may place different demands on interpersonal skills such as reciprocity, consent negotiation, and emotional attunement, supporting adolescents in developing these competencies across both digital and in-person contexts appears particularly important.

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Table 1*Participants' Sociodemographic and Romantic/Sexual Characteristics (n=1177)*

Characteristic	n	%
Gender		
Cisgender boys	502	42.7
Cisgender girls	643	54.7
Gender diverse	31	2.6
Ethnicity		
White	829	71.3
Black	81	7
Mixed	123	10.6
Middle Eastern	54	4.6
Latin American	41	3.5
Indigenous	12	1
Asian	14	1.2
Other	9	0.8
Family configuration		
Two-parent household	779	66.2
One parent / one parent + partner	197	16.8
Shared custody	149	12.7
Other arrangement (e.g., guardian, foster care)	44	3.7
Alone or with roommate	7	0.6
Sexual orientation		
Heterosexual	1020	87.3
Bisexual / Pansexual	79	6.8
Questioning	33	2.8
Gay or lesbian	26	2.2
Asexual / Demisexual	4	0.3
Queer	2	0.2
Other	4	0.3
Romantic/sexual experience		
Ever had a romantic or sexual partner	755	64.1
<i>Mean number of partners = 2.12 (3.05)</i>		
Relationship exclusivity (among those with a partner)		
Exclusively exclusive relationships	583	77.5
Both exclusive and non-exclusive	83	11
Only non-exclusive	28	3.7
Other / unsure	58	7.7

Note: This table presents the sociodemographic characteristics of the full eligible sample ($N = 1,177$), including adolescents who reported no sexual behaviors and gender-diverse adolescents.

Table 2*Descriptive Statistics and Bivariate Correlations Among Study Variables in the LCA Analytic Sample (n = 998)*

	<i>n</i>	Range	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Pornography use	988	0-4	1.42	1.26	-														
2. Text-based sexting	976	0-4	0.58	1.00	0.11**	-													
3. Image-based sexting	970	0-4	0.25	0.68	0.09**	0.64**	-												
4. Kissing	995	0-4	1.36	1.59	-0.06	0.44**	0.30**	-											
5. Touching	991	0-4	1.09	1.36	-0.04	0.47**	0.32**	0.89**	-										
6. Penetrative practices	989	0-4	0.76	1.17	-0.01	0.49**	0.39**	0.78**	0.80**	-									
7. Sexual Wellbeing	986	1-5	3.80	0.73	-0.04	0.11**	0.06	0.26**	0.26**	0.29**	-								
8. Respectful Attitudes	984	1-7	6.79	0.52	-0.02	-0.06	-0.08*	0.05	0.03	0.02	0.08*	-							
9. Emotional problems	866	0-10	4.03	2.83	-0.15**	0.08*	0.09*	0.13**	0.12**	0.09*	-0.13**	0.08*	-						
10. Inattention/ Hyperactivity	865	0-10	4.81	2.35	0.02	0.12**	0.14**	0.12**	0.14**	0.11*	0.02	0.02	0.30**	-					
11. Social Aloofness	997	1-6	2.28	0.79	0	-0.07*	-0.03	-0.08*	-0.08*	-0.06	-0.11**	-0.06	0.18**	0.03	-				
12. Age	994	14-18	16.02	0.71	0.01	0.06	0.05	0.08*	0.09*	0.12**	0.02	0	0.01	-0.04	-0.01	-			
13. Cisgender boys	461	-	-	-	0.42**	-0.03	-0.07*	-0.13**	-0.11**	-0.09*	0.01	-0.11**	-0.52**	-0.08**	0.02	0.01	-		
14. Cisgender girls	537	-	-	-	-0.42**	0.03	0.07*	0.13**	0.11**	0.09*	-0.01	0.11**	0.52**	0.08*	-0.02	-0.01	-1.00	-	
15. Sexual minority youth	108	-	-	-	0	-0.01	0	-0.12**	-0.12**	-0.11**	-0.15**	-0.02	0.20**	0.08*	0.12**	0.02	-0.16**	0.16**	-

Note: For the sexual-behavior indicators, values represent mean frequency scores for engagement during the past month. For binary variables, *n* represents the number of participants coded 1 for the indicated category. Gender variables were coded as follows: cisgender boy (1 = cisgender boy, 0 = cisgender girl) and cisgender girl (1 = cisgender girl, 0 = cisgender boy). Both indicators are presented to facilitate interpretation. Sexual minority status was coded 1 = sexual minority youth and 0 = heterosexual youth. * $p < .05$. ** $p < .001$.

Table 4. Multinomial Logistic Regression for the Effects of the Predictors on Class Membership (Boys)

Predictors	Class 2 vs Class 1			Class 3 vs Class 1			Class 4 vs Class 1		
	<i>Low sexual engagement vs Pornography-focused</i>			<i>Moderate digital and physical engagement vs Pornography-focused</i>			<i>Moderate digital and high physical engagement vs Pornography-focused</i>		
	Coeff. (SE)	OR	95% CI	Coeff. (SE)	OR	95% CI	Coeff. (SE)	OR	95% CI
Age	-0.430 (0.369)	0.650	[0.315, 1.340]	-0.095 (0.398)	0.909	[0.417, 1.983]	0.189 (0.380)	1.208	[0.574, 2.545]
Sexual identity	-0.500 (0.735)	0.606	[0.144, 2.560]	-1.192 (0.961)	0.304	[0.046, 1.998]	--	--	--
Emotional problems	-0.249 (0.097)*	0.779	[0.645, 0.942]	-0.064 (0.113)	0.938	[0.752, 1.169]	-0.190 (0.107)	0.827	[0.670, 1.019]
Inattention/hyperactivity	-0.195 (0.095)*	0.823	[0.683, 0.992]	-0.182 (0.111)	0.834	[0.670, 1.037]	-0.030 (0.102)	0.971	[0.795, 1.185]
Social aloofness	0.764 (0.280)**	2.147	[1.240, 3.716]	0.045 (0.337)	1.046	[0.540, 2.026]	0.178 (0.310)	1.195	[0.651, 2.194]
Predictors	Class 3 vs Class 2			Class 4 vs Class 2			Class 4 vs Class 3		
	<i>Moderate digital and physical engagement vs Low sexual engagement</i>			<i>Moderate digital and high physical engagement vs Low sexual engagement</i>			<i>Moderate digital and high physical engagement vs Moderate digital and physical engagement</i>		
	Coeff. (SE)	OR	95% CI	Coeff. (SE)	OR	95% CI	Coeff. (SE)	OR	95% CI
Age	0.335 (0.245)	1.398	[0.866, 2.259]	0.619 (0.190)**	1.858	[1.280, 2.698]	0.284 (0.272)	1.329	[0.779, 2.265]
Sexual identity	-0.692 (0.801)	0.501	[0.104, 2.409]	--	--	--	--	--	--
Emotional problems	0.185 (0.079)*	1.203	[1.032, 1.404]	0.059 (0.073)	1.061	[0.920, 1.223]	-0.126 (0.097)	0.881	[0.729, 1.065]
Inattention/hyperactivity	0.013 (0.076)	1.013	[0.874, 1.175]	0.165 (0.068)*	1.179	[1.033, 1.347]	0.152 (0.093)	1.164	[0.970, 1.397]
Social aloofness	-0.719 (0.229)**	0.487	[0.311, 0.763]	-0.586 (0.192)**	0.557	[0.382, 0.812]	0.134 (0.276)	1.143	[0.666, 1.962]

Note. OR = odds ratio; the coefficients and OR reflects the effects of the predictors on the likelihood of membership into the first listed profile relative to the second listed profile. For sexual orientation, sexual minority adolescents were coded as 1 and heterosexual adolescents were coded as 0. There were no Class 4 comparisons for sexual orientation as sexual minority boys were absent from this class. * $p < .05$, ** $p < .01$, *** $p < .001$.

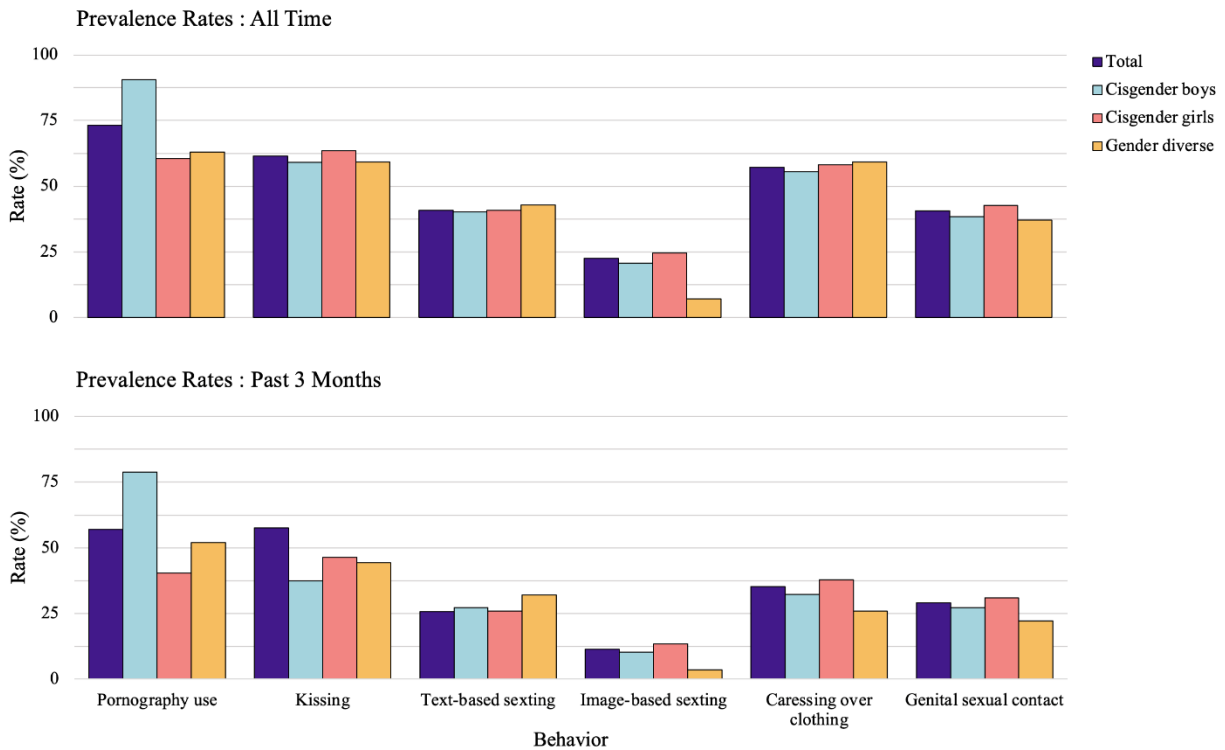
Table 5. Multinomial Logistic Regression Results for the Effects of the Predictors on Class Membership (Girls)

Predictors	Class 1 vs Class 3			Class 3 vs Class 2			Class 1 vs class 2		
	<i>Low sexual engagement vs Moderate digital and high physical engagement</i>			<i>Moderate digital and high physical engagement vs Moderate digital and physical engagement</i>			<i>Low sexual engagement vs Moderate digital and physical engagement</i>		
	Coeff. (SE)	OR	95% CI	Coeff. (SE)	OR	95% CI	Coeff. (SE)	OR	95% CI
Age	-0.138 (0.159)	0.871	[0.637, 1.190]	0.113 (0.214)	1.120	[0.737, 1.703]	-0.025 (0.198)	0.975	[0.662, 1.437]
Sexual identity	1.363 (0.359)***	3.907	[1.931, 7.903]	-0.139 (0.541)	0.870	[0.301, 2.511]	1.223 (0.457)**	3.398	[1.389, 8.316]
Emotional problems	-0.075 (0.048)	0.928	[0.844, 1.021]	0.033 (0.062)	1.033	[0.915, 1.166]	-0.042 (0.056)	0.959	[0.859, 1.071]
Inattention/hyperactivity	-0.162 (0.052)**	0.850	[0.768, 0.942]	0.071 (0.067)	1.073	[0.941, 1.224]	-0.091 (0.061)	0.913	[0.810, 1.028]
Social aloofness	-0.011 (0.159)	0.989	[0.724, 1.352]	0.261 (0.199)	1.299	[0.879, 1.918]	0.250 (0.171)	1.284	[0.918, 1.797]

Note. OR = odds ratio; the coefficients and OR reflects the effects of the predictors on the likelihood of membership into the first listed profile relative to the second listed profile. For sexual orientation, sexual minority adolescents were coded as 1 and heterosexual adolescents were coded as 0. * $p < .05$, ** $p < .01$, *** $p < .001$.

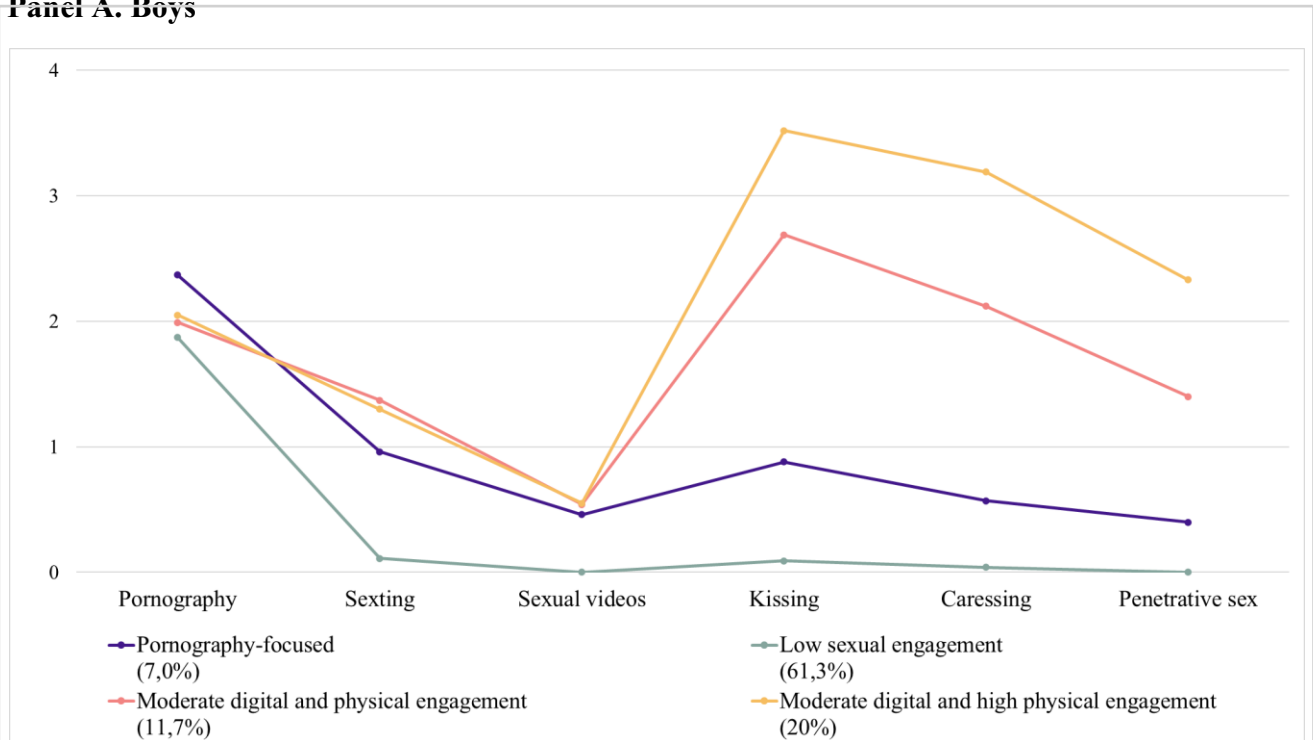
Figure 1.

Prevalence of Engagement in Sexual Practices Over the Lifetime and the Past Three Months

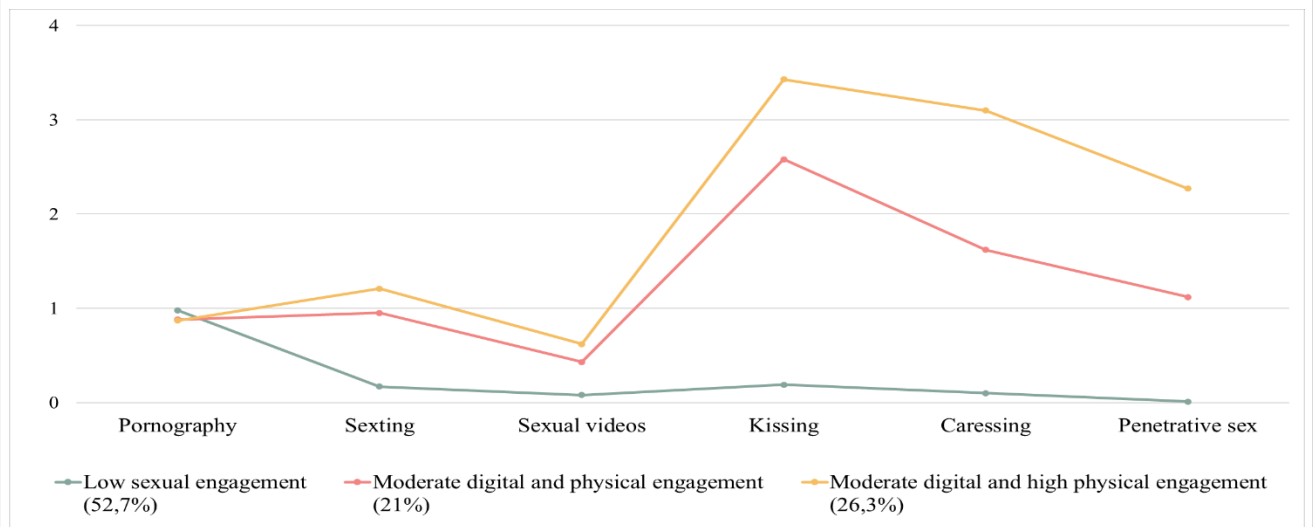


Note. To provide prevalence estimates for the full study population and avoid overestimating engagement, prevalence rates were calculated using the complete eligible sample ($N = 1,177$) as the denominator. Genital sexual contact included oral, vaginal, and anal sex. Lifetime prevalence rates were 35.2%, 33.5%, and 6.4%, respectively, and past-three-month prevalence rates were 24.5%, 24%, and 2.7%, respectively.

Figure 2.
Mean Frequency of Sexual Behaviors in the Past Three Months Across Latent Classes
Panel A. Boys



Panel B. Girls



Note. Weighted means are based on conditional item-response probabilities. Mplus Category 1 to Category 5 labels correspond to original response values 0 to 4. The y-axis should therefore be interpreted as follows: 0 = Never/yes, but not in the last three months; 1 = Less than once a month; 2 = A few times a month; 3 = A few times a week; 4 = A few times a day.