



# Prevalence of AI-Supported Sexual Activities Among Adults in Germany: Results from a National Online Survey

Nicola Döring<sup>1</sup> · Veronika Mikhailova<sup>1</sup> · M. Rohangis Mohseni<sup>1</sup>

Received: 28 August 2025 / Revised: 20 November 2025 / Accepted: 26 November 2025  
© The Author(s) 2026

## Abstract

Generative and conversational artificial intelligence (AI) has introduced new possibilities for digital sexual engagement, extending the established landscape of online sexual activities (OSA) into what can be referred to as AI-supported sexual activities (AISA). Despite growing public and academic interest, empirical data on AISA prevalence, demographic patterns, and subjective experiences are lacking. This study addressed this gap by exploring AISA engagement in a national online sample of 2,658 adults in Germany (aged 18–75) collected in November and December 2024. Specifically, it investigates the prevalence of using AI for non-sexual and sexual activities within the past 12 months (RQ1) and examined how involvement in AISA varies by gender (RQ2), age group (RQ3), and sexual identity (RQ4). In addition, participants' subjective evaluations of AISA were assessed in terms of perceived satisfaction (RQ5). Results showed that 31.6% of participants engaged in at least one type of AISA, with the most common activities being accessing AI-generated sexual information, consuming AI-generated pornography, and using AI for sexual counseling (RQ1). Men (RQ2), younger adults (RQ3), and non-heterosexual participants (RQ4) reported significantly higher engagement across all AISA types. Satisfaction ratings were generally moderate but above the scale midpoint (RQ5). Overall, the findings indicate that AISA is becoming an increasingly present aspect of everyday digital practices, with usage patterns reflecting demographic patterns similar to those observed in OSA. The study underscores the importance of further research into the personal, social, and ethical implications of sexual activities involving AI.

**Keywords** Artificial intelligence · AI-supported sexual activities · Digital intimacy · Online sexuality · Sexual technology

## Introduction

Digital technologies have fundamentally transformed how people experience and express their sexualities. Since the rise of the Internet in the 1990s, a wide range of sexual behaviors have moved into digital spaces, from accessing sexual health information and pornographic content to engaging in interpersonal sexual communication (Döring, 2009). These Internet-based sexual activities have since become an integral part of everyday life for many people around the world. As a result, a substantial body of research has

emerged, documenting the prevalence, diversity, and effects of digital sexuality (e.g., Ballester-Arnal et al., 2021; Döring & Mohseni, 2018; Döring et al., 2017; Shaughnessy et al., 2017).

More recently, the rapid advancement of artificial intelligence (AI) has further expanded the scope of sexual activities in digital contexts. AI can be broadly defined as an umbrella term for technological systems that are able to perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and content generation (Zhang et al., 2021). The public release of ChatGPT in late 2022 (OpenAI, 2022) marked a pivotal moment in the accessibility and popularity of AI tools, triggering a wave of new applications across everyday domains, including intimate and sexual life. ChatGPT is an example of a Large Language Model (LLM), an AI system specialized (1) in the generation of text and (2) in natural-language written and oral conversations with users. As an LLM, ChatGPT can be categorized as both generative AI (i.e., a content-generating AI model) and conversational AI (i.e., an AI chatbot). Generative and

---

Nicola Döring and Veronika Mikhailova share first authorship and equally contributed to this work.

---

✉ Nicola Döring  
nicola.doering@tu-ilmenau.de

<sup>1</sup> Department of Economic Sciences and Media, Technische Universität Ilmenau, Ehrenbergstr. 29, 98693 Ilmenau, Germany

conversational AI models have numerous sexual applications, from AI-generated sexual health information to synthetic pornography and interactions with AI lovers or AI sexual counselors (Döring et al., 2025).

This technological development has sparked increasing attention in both public discourse and academic debate, raising questions about how AI is reshaping human intimacy and sexual expression (Döring et al., 2025). Despite this growing interest, empirical data on AI-supported sexual activities (AISA) remain scarce. In particular, little is known about how common these practices are, who engages in them, and how satisfying they are experienced by users. This study addresses this gap by providing the first overview of AISA engagement among adults in Germany, focusing on prevalence rates, demographic patterns, and perceived satisfaction with a range of six key AISA types.

Given the German context, it is important to consider national attitudes toward AI. While public engagement with AI in Germany is relatively high, trust in these technologies tends to be comparatively low—a phenomenon often described as “German Angst” (Gondlach & Regneri, 2023). This tendency toward caution and risk awareness shapes how new technologies, including AI, are evaluated and adopted. It stands in contrast to the more optimistic and benefit-oriented perspectives observed in countries such as the USA and China, where technology adoption is typically characterized by greater enthusiasm (Brauner et al., 2024; Richter et al., 2025). Exploring the German context thus offers a valuable extension to existing research and helps capture cultural variability in the adoption of AISA.

## Technology-Supported Sexual Activities

Over the past three decades, a range of umbrella terms—such as internet sexuality, online sexuality, cybersexuality, and online sexual activities (OSA)—has been used to describe the increasing diversity of sexual behaviors supported by digital technologies (e.g., Cooper et al., 2001; Döring, 2009; Kwok & Wescott, 2020). These include activities such as seeking sexual information, consuming pornographic content, or engaging in interpersonal sexual communication online (Döring et al., 2017).

To capture the complexity and diversity of these practices, multiple classifications have been proposed. Common distinctions include the difference between arousing and non-arousing use (e.g., digital sexual entertainment versus sexual education; Bélanger Lejars et al., 2020), solitary and partnered activities (e.g., watching digital pornography alone versus together with a partner; Shaughnessy et al., 2017), commercial and non-commercial practices (e.g., online sex work via webcam versus live webcam sex between romantic partners; Döring et al., 2021), and, more recently, human–human and human–machine interaction (e.g., exchange of intimate

digital messages with another human versus with an AI chatbot; Döring et al., 2021). These classifications have proven useful for analyzing the evolving nature of digital sexuality, offering a conceptual structure for understanding how users navigate technological environments in relation to their sexual needs and interests.

Importantly, these digital sexual practices do not occur in a vacuum. They are shaped by broader social contexts and tend to vary across demographic groups such as gender, age, and sexual identity (Gesselman et al., 2023). In particular, men, younger adults, and non-heterosexual individuals tend to report higher engagement (Döring & Mohseni, 2018; Gesselman et al., 2023; Shaughnessy et al., 2017). Prior work has pointed to factors that may help explain these patterns, such as men’s greater pursuit of arousing experiences combined with stronger attraction to sexual media (Cross et al., 2013; Petersen & Hyde, 2010), greater sexual activity and openness to experimentation among younger adults (Beutel et al., 2008), and the reliance of non-heterosexual individuals on digital spaces for exploration and community in the face of marginalization and scarce offline representation (Coyne et al., 2022; Paciente et al., 2024). At the same time, recent studies point to a rise in older adults’ use of digital technologies within intimate contexts, challenging conventional views of decline in technological and sexual engagement with age (Birkland, 2024; Scandurra et al., 2022). Such demographic trends outline not only who engages in digital sexual practices, but also how these experiences are interpreted and what outcomes they produce. Therefore, recognizing these patterns is essential for understanding both current and emerging sexual technologies.

## AI-Supported Sexual Activities

Extending beyond the established landscape of OSA, the recent rise of AI has introduced a new domain of digital sexuality: AI-supported sexual activities (AISA), also referred to as AI-enabled, AI-mediated, AI-assisted, AI-enhanced, or AI-driven sexual activities. While sharing conceptual ground with OSA, AISA is defined by its reliance on intelligent systems that generate content, simulate social interaction, or mediate relationships through adaptive and automated functions (Döring et al., 2025). This technological autonomy marks a qualitative shift in how technology participates in intimate life, underscoring the importance of examining AISA as a distinct phenomenon.

Building on prior conceptual work on digital sexuality and OSA, AISA can be divided into six main types. These types were adapted from established OSA typologies and extended to capture emerging use cases specific to AI-supported sexual experiences, drawing on insights from prior literature (Döring et al., 2021, 2025):

- (1) *AI-generated sexual information and education*: This includes short, fact-based interactions with AI tools such as chatbots or voice assistants to clarify sexual health concerns, explore anatomy, or receive educational input. These interactions are typically non-arousing and focused on informational content (Marcantonio et al., 2024, 2025; Nadarzynski et al., 2021).
- (2) *AI-assisted sexual counseling and therapy*: In these scenarios, users engage in personalized dialogs with AI agents that simulate coaching or therapeutic interactions related to sexual functioning, relationship difficulties, or emotional intimacy. Such applications mirror human counseling formats but offer on-demand, automated alternatives (Hatch et al., 2025; Puhlman & Chen, 2025; Vowels et al., 2024).
- (3) *Sexual interactions and relationships with AI agents*: This type involves emotionally or erotically charged exchanges with text-based or embodied AI entities, such as virtual companions, love bots, or flirtatious chatbots. These interactions are often designed to mimic the dynamics of human–human intimacy and may include sexting, dirty talk, or erotic roleplay, and can range from one-time interactions to years-long relationships (Adewale & Muhammad, 2025; Hanson & Bolthouse, 2024; Pan & Mou, 2024; Pentina et al., 2023; Skjuve et al., 2022; Willoughby et al., 2025).
- (4) *AI-mediated interpersonal sexual interactions*: This type refers to situations where AI facilitates intimacy between two or more human users. Examples include users who have AI tools generate messages for interpersonal communication, AI-enhanced dating platforms, algorithmic matchmaking, or smart sex toys for interpersonal use that rely on AI to optimize coordination or communication (Alizadeh et al., 2024; Chabot et al., 2024; Hancock et al., 2020).
- (5) *Consumption of AI-generated pornography*: In this type, users engage passively with erotic or pornographic content created or modified by AI systems, including synthetic images, videos, or audio. This mirrors traditional porn consumption but shifts the content creation process to algorithmic systems (Jacobs, 2024; Kim & Banks, 2024).
- (6) *Creation of AI-generated pornography*: In contrast to passive consumption, this type involves users actively generating customized erotic and pornographic content using generative AI tools. Users may specify prompts, styles, or fantasy scenarios, making the process more interactive and personally meaningful (Lapointe et al., 2025). At the same time, such practices also raise ethical concerns, particularly when AI is used to produce non-consensual or harmful content, such as deepfake pornography involving the likeness of real individuals (Jacobsen & Simpson, 2024; Umbach et al., 2024).

The six types of AISA reflect both continuity and innovation within the field of digital sexuality (Döring et al., 2025). Understanding this evolving terrain requires not only conceptualization, but also empirical investigation. Research on technology adoption suggests that new tools are often approached with a mix of curiosity and ambivalence, balancing enthusiasm for novel opportunities with uncertainty and caution (Schepman & Rodway, 2020). Moreover, satisfaction with digital technologies has frequently been linked to the degree of interactivity, personalization, and agency they provide (Chang & Hwang, 2020; Sundar & Marathe, 2010), pointing to key dimensions that may also shape how AISA are experienced.

### Current Study

As outlined in the preceding sections, typologies of AISA are beginning to emerge; however, empirical evidence on the prevalence, demographic patterns, and experiences associated with these practices remains scarce. To date, most research has concentrated on broader forms of OSA, leaving important questions about the real-world adoption, variation, and perceived outcomes of AISA largely unexplored.

The present study seeks to address this gap by providing the first empirical data on the prevalence of AI-supported non-sexual and sexual activities among adults in Germany (RQ1). It further examines how AISA engagement varies by gender (RQ2), age group (RQ3), and sexual identity (RQ4). Based on the previous OSA research outlined in the preceding sections, higher AISA engagement among men, younger participants, and non-heterosexual individuals is expected. Finally, the study investigates participants' subjective evaluations of their experiences with AISA in terms of perceived satisfaction (RQ5). Together, these research questions aim to contribute to a more comprehensive understanding of the role AI plays in contemporary sexual behavior, while advancing cross-cultural validation through context-specific data from Germany.

### Method

The study draws on data from a survey conducted with a national online sample of adults in Germany. The questionnaire, dataset, and analysis script are publicly available on <https://osf.io/zqxdp/>.

### Participants

Participants were surveyed through an incentivized online panel managed by Bilendi, a global provider of data collection and technology solutions for market and social research. The panel consists of individuals who voluntarily joined via a

quality-controlled opt-in process and are typically invited to participate in specific surveys in exchange for a small monetary incentive (e.g., between €0.50 and €1.00 per survey). Eligible participants were adults aged 18 to 75 residing in Germany with sufficient German language proficiency to complete the questionnaire.

The panel is maintained in accordance with ISO 20252:2019 standards for market, opinion, and social research, a certification that was renewed by Bilendi in November 2024. All data collection and processing procedures are fully compliant with the European Union General Data Protection Regulation (GDPR) and relevant German data protection legislation.<sup>1</sup>

Bilendi employed an uncrossed quota sampling procedure to approximate the Internet-using population in Germany aged 18–75 years based on age, gender, education, marital status, and federal state. A total of 85,136 panel members were invited to take part in our study, of whom 4,780 (5.6%) accessed the study during the two-week fieldwork period. Of those, 253 were screened out due to exclusion criteria (e.g., being under the age of 18), 1,085 due to the quota being full, and 150 due to quality criteria.

To help ensure data integrity and reduce the likelihood of bot responses or inattentive participation, the survey included two built-in attention check items—one prompting participants to select a specific response, and another asking them to confirm they had answered honestly. Failure to pass these checks was among the criteria used to identify low-quality responses. A further 524 did not complete the survey, leaving 2,768 participants. From those, we filtered 110 participants with a quality indicator lower than 0.14 that indicates implausibly short completion times. This cleaning step had no impact on the original quota structure. The final sample comprised 2,658 participants, with an average age of 48.7 years ( $SD = 15.4$ ); 49.7% self-identified as women. Selected sociodemographic sample characteristics are displayed in Table 1. The target sample size of approximately 2,750 participants was chosen to ensure sufficient statistical power for estimating the prevalence of AISA with acceptable precision and for detecting differences across demographic subgroups (e.g., gender, age, sexual identity), even when the behaviors of interest occur at relatively low rates in the general population.

## Research Ethics

The study was conducted in compliance with the Declaration of Helsinki (in the current, revised version) and approved by the Ethics Committee of Technische Universität Ilmenau

with ID #2024–07–201. All participants were pre-registered members of Bilendi’s online panel and gave informed consent prior to participating in the study. Participation was entirely voluntary. Respondents were free to pause the questionnaire, resume it at a later time, or discontinue their participation at any point.

## Procedure

The online questionnaire was administered via the survey software Tivian by Unipark.<sup>2</sup> Eligible participants were invited to take part in the study via an email containing a survey link that was distributed by the panel provider. Participants first gave informed consent and then completed the questionnaire. Data collection took place between November 11 and December 3, 2024, allowing for timely completion while avoiding overlap with the upcoming holiday season. The average survey completion time was 18 min, with a median duration of 13 min. In addition to the measures reported here, the questionnaire also included further survey items and an embedded online experiment that are reported elsewhere (Döring & Mohseni, 2025).

## Measures

The questionnaire was developed based on previous research on the prevalence and typologies of online sexual experiences (Döring & Mohseni, 2018; Döring et al., 2017), adapted to explore AI-supported sexual experiences, and pretested with five individuals. It comprised items covering participants’ sociodemographic characteristics, their engagement in different types of AISA, and their subjective evaluations of these AISA experiences.

## Sociodemographic

First, participants reported their gender, age, federal state of residence, highest level of education, and marital status. These variables were used to define quotas for sample recruitment. Additionally, participants indicated their sexual identity (for operationalizations see Table 1).

## Prevalence of AISA

To put AISA in context, the lifetime prevalence of AI tool use was assessed separately for professional and private contexts. Participants who indicated any prior AI use were subsequently asked to report general AI use in the past 12 months.

<sup>1</sup> <https://www.bilendi.com/>, last accessed: August 28, 2025.

<sup>2</sup> <https://www.unipark.com/en/survey-software/>, last accessed: August 28, 2025.

**Table 1** Sociodemographic characteristics of online survey participants in Germany (N=2,658), absolute and relative frequencies and comparison with target distribution

Characteristic	Survey participants		Target distribution	$\chi^2$	df	p
	n	%	%			
Gender <sup>a</sup>				0.12	1	.727
Women	1320	49.7	50.0			
Men	1338	50.3	50.0			
Age				13.60	2	.001
18–39	891	33.5	33.3			
40–59	961	36.2	33.3			
≥ 60	806	30.3	33.3			
Marital status				11.33	1	.001
Unmarried	1202	45.2	42.0			
Married	1456	54.8	58.0			
Education				3.93	2	.140
Low	843	31.7	30.0			
Moderate	794	29.9	31.0			
High	1021	38.4	39.0			
Federal state of Germany				11.07	15	.748
Baden-Württemberg	339	12.8	13.0			
Bavaria	429	16.1	15.0			
Berlin	116	4.4	4.0			
Brandenburg	81	3.1	3.0			
Bremen	31	1.2	1.0			
Hamburg	55	2.1	2.0			
Hesse	190	7.2	7.0			
Mecklenburg-Western Pomerania	54	2.0	2.0			
Lower Saxony	263	9.9	10.0			
North Rhine-Westphalia	548	20.6	22.0			
Rhineland-Palatinate	138	5.2	5.0			
Saarland	29	1.1	1.0			
Saxony	134	5.0	5.0			
Saxony-Anhalt	62	2.3	3.0			
Schleswig-Holstein	110	4.1	4.0			
Thuringia	79	3.0	3.0			
Sexual identity				N/A <sup>b</sup>		
Heterosexual	2360	88.8				
Homosexual	112	4.2				
Bisexual	117	4.4				
Pansexual	20	0.8				
Asexual	19	0.7				
Other	30	1.1				

*Note.* The targeted distribution is based on the b4p structural analysis with Sinus Milieus (<https://gik.media/best-4-planning/>), a widely used quota plan in online survey research in Germany. The chi-square tests show whether the observed absolute frequencies deviate from the targeted b4p quotas. Percentage values are rounded

<sup>a</sup> At the time of data collection, the panel provider Bilendi could only provide representative quotas and recruiting plans for participants who identified as women or men as quotas for non-binary or other gender identities were not yet established in their sampling infrastructure

<sup>b</sup> No quota plan was available for sexual identity

To assess the prevalence of AISA, participants were asked how often they had used AI in the past 12 months for six specific purposes, corresponding to the defined AISA types and based on established single-item measures of OSA types (Döring & Mohseni, 2018; Döring et al., 2017): (1) accessing AI-generated sexual information, (2) receiving AI-assisted sexual counseling, (3) engaging in sexual interactions with AI agents, (4) participating in AI-mediated sexual interactions with other humans, (5) consuming AI-generated pornography, and (6) creating AI-generated pornography. Each item presented to participants included a brief description of the respective AISA type. For example: “In the past 12 months, how often have you engaged in erotic or sexual communication with an AI (e.g., with an adult chatbot, a Replica, or a virtual girlfriend/boyfriend app)?” Response options ranged from 1 = (almost) daily to 6 = never.

### Satisfaction with AISA

Participants who reported using a particular type of AISA in the past 12 months were asked to rate their satisfaction with that experience by answering the question “How satisfied were you with [AISA type]?” (adapted from a similar measure assessing perceived satisfaction in sexual contexts over a specified period; Mark et al., 2014). Perceived satisfaction was measured with a single-item measure on a 5-point rating scale from 1 = *very dissatisfied* to 5 = *very satisfied*. Subjective satisfaction was assessed as it offers a first-person perspective on how users evaluate their experiences with AISA, providing important insight into the perceived value, acceptability, and emotional outcomes of these emerging practices.

### Statistical Analysis

Data analysis was conducted using R version 4.5.1. AISA prevalence was estimated with 99% confidence intervals using multinomial methods implemented in the *DescTools* package. Gender, age, and sexual identity differences were examined using chi-square tests with the corresponding effect size measure Cramér’s  $V$  (small: .10, medium: .30, large: .50; Cohen, 1988), calculated with the *gmodels* and *DescTools* packages. To describe the statistical power associated with the observed effect sizes, we conducted post hoc power analyses using the *pwr* package. Given the large sample size, a stricter significance threshold of 1% was applied to reduce the risk of Type I errors.

Descriptive statistics (means and standard deviations with corresponding confidence intervals) were calculated using the *dplyr* package to summarize participants’ satisfaction with each type of AISA.

For age-related analyses, participants were categorized into three groups: younger adults (18–39 years), middle-aged adults (40–59 years), and older adults (60 years and above).

This categorization reflects common distinctions across stages of adulthood (Lachman, 2001).

## Results

The survey results are presented separately for each of the study’s five research questions.

### Prevalence of AISA

Overall, nearly half of the survey participants (48.2%, 99% CI [45.6, 50.7]) reported having used AI at least once in their lives. Specifically, 26.4% (99% CI [24.2, 28.7]) reported having used AI for professional purposes, while 45.1% (99% CI [42.6, 47.6]) had used it in private contexts. The prevalence of general AI use in the past 12 months was 47.9% (see Table 2; detailed 12-month frequency data for each AISA type are provided in Supplementary Table S1 on <https://osf.io/zqxdp/>).

Regarding RQ1, we found that 31.6% of respondents indicated engaging in at least one form of AISA within the past 12 months. This means that the majority of AI users (66.0%) engaged in some sort of sexuality-related AI use in the past year. Among the six AISA types, the most commonly reported were accessing AI-generated sexual information (20.3%), consuming AI-generated pornography (20.2%), and using AI-assisted sexual counseling or therapy (19.0%). A chi-square goodness-of-fit test revealed statistically significant differences in the prevalence of the six AISA types,  $\chi^2(5) = 108.94$ ,  $p < .001$ , Cramér’s  $V = .09$ , indicating small

**Table 2** Engagement in different types of AI-supported non-sexual and sexual activities among survey participants in Germany (N=2,658), absolute and relative 12-month prevalences

Types of AISA	Total (N=2,658)	
	<i>n</i>	
AI use overall (past 12 months)	1274	47.9 [45.4, 50.5]
AISA overall (past 12 months)	841	31.6 [29.5, 33.9]
(1) AI-generated sexual information	539	20.3 [18.5, 22.1]
(2) AI-assisted sexual counseling	506	19.0 [17.3, 20.8]
(3) Sexual interactions with AI agents	375	14.1 [12.6, 15.6]
(4) AI-mediated sexual interactions	409	15.4 [13.8, 16.9]
(5) Consumption of AI-generated pornography	538	20.2 [18.5, 22.0]
(6) Creation of AI-generated pornography	300	11.3 [10.0, 12.6]

*Note.* AI = Artificial Intelligence. AISA = AI-Supported Sexual Activities, displayed in the same sequence as they appear in the manuscript. CI = 99% Confidence Interval. Statistical significance was set at 1% due to the large sample size

but statistically reliable variation in how frequently different AISA practices were reported (see Table 2).

### Prevalence of AISA by Gender

With regard to RQ2, men were significantly more likely than women to report engaging in AISA (see Table 3). Overall, 41.5% of men indicated they had engaged in at least one form of AISA in the past 12 months, compared to 21.7% of women,  $\chi^2(1) = 120.60, p < .001, V = .21$ . This gender gap was evident across all six AISA types but particularly pronounced in the consumption of AI-generated pornography, reported by 29.8% of men versus 10.5% of women. Similarly, the prevalence of engaging in sexual interactions with AI agents was more than twice as high among men (20.5%) compared to women (7.7%).

All chi-square tests exceeded 99% statistical power ( $\alpha = .01$ ), confirming that the analysis was sufficiently sensitive to detect observed effects.

### Prevalence of AISA by Age

Concerning RQ3, AISA engagement varied strongly across age groups, with younger adults consistently showing significantly higher engagement than older users across all six AISA types (see Table 4). More than half of younger adults (54.7%) reported AISA use, compared to 24.2% of middle-aged adults and 15.0% of older adults,  $\chi^2(2) = 345.57, p < .001, V = .36$ . The most pronounced age-related differences were observed for AI-assisted sexual counseling (younger adults: 41.6%, middle-aged adults: 10.5%, older adults: 4.2%) and sexual interactions with AI agents (younger adults: 33.6%, middle-aged adults: 5.9%, older adults: 2.4%), both approaching large effect sizes ( $V = .41$  and  $V = .40$ , respectively). Similarly, the

creation of AI-generated pornography was reported by 27.6% of younger adults, but only by 4.3% of middle-aged and 1.6% of older adults.

All chi-square tests exceeded 99% statistical power ( $\alpha = .01$ ), confirming that the analysis was sufficiently sensitive to detect observed effects.

### Prevalence of AISA by Sexual Identity

With respect to RQ4, AISA engagement was more frequently confirmed by non-heterosexual participants than by heterosexual participants across all six AISA types (see Table 5). Overall, 43.4% of non-heterosexual respondents had engaged in at least one type of AISA in the past 12 months, compared to 30.4% of heterosexual respondents,  $\chi^2(1) = 19.28, p < .001, V = .08$ . The most pronounced differences were observed in the use of AI-assisted sexual counseling (non-heterosexual participants: 29.0%, heterosexual participants: 19.7%;  $V = .09$ ). While all differences were statistically significant, effect sizes were small, indicating modest but consistent variation in AISA engagement by sexual identity.

All chi-square tests demonstrated adequate statistical power (range: 0.69–0.98;  $\alpha = .01$ ), indicating that the analysis was sufficiently sensitive to detect observed effects.

### Satisfaction with AISA

Focusing on RQ5, participants who had engaged in AISA within the past 12 months disclosed moderate levels of satisfaction across the various activity types (see Table 6). On a scale from 1 = *very dissatisfied* to 5 = *very satisfied*, the highest satisfaction ratings were reported for sexual interactions with AI agents ( $M = 3.69, SD = 0.99, 99\% \text{ CI } [3.56, 3.83]$ ) and the creation of AI-generated pornography ( $M = 3.65,$

**Table 3** Engagement in different types of AI-supported sexual activities among women and men survey participants in Germany (N=2,658), absolute and relative 12-month prevalences

Types of AISA	Total (N=2,658)		Women (n=1,320)		Men (n=1,338)		$\chi^2(1)$	p	V
	n	% [95% CI]	n	% [95% CI]	n	% [95% CI]			
AISA overall (past 12 months)	841	31.6 [29.5, 33.9]	286	21.7 [19.1, 24.3]	555	41.5 [38.0, 44.9]	120.60	<.001	.21
(1) AI-generated sexual information	539	20.3 [18.5, 22.1]	193	14.6 [12.5, 16.8]	346	25.9 [23.1, 28.7]	51.91	<.001	.14
(2) AI-assisted sexual counseling	506	19.0 [17.3, 20.8]	170	12.9 [10.9, 14.9]	336	25.1 [22.3, 27.9]	64.52	<.001	.15
(3) Sexual interactions with AI agents	375	14.1 [12.6, 15.6]	101	7.7 [6.1, 9.2]	274	20.5 [18.0, 23.0]	90.22	<.001	.18
(4) AI-mediated sexual interactions	409	15.4 [13.8, 16.9]	126	9.5 [7.9, 11.3]	283	21.2 [18.6, 23.7]	68.74	<.001	.16
(5) Consumption of AI-generated pornography	538	20.2 [18.5, 22.0]	139	10.5 [8.8, 12.4]	399	29.8 [26.8, 32.8]	153.16	<.001	.24
(6) Creation of AI-generated pornography	300	11.3 [10.0, 12.6]	90	6.8 [5.4, 8.3]	210	15.7 [13.5, 17.9]	52.29	<.001	.14

*Note.* AI=Artificial Intelligence. AISA=AI-Supported Sexual Activities, displayed in the same sequence as they appear in the manuscript. CI=99% Confidence Interval. Statistical significance was set at 1% due to the large sample size. Cramér's V as the standardized effect size measure

**Table 4** Engagement in different types of AI-supported sexual activities among younger, middle-aged, and older survey participants in Germany ( $N=2,658$ ), absolute and relative 12-month prevalences

Types of AISA	Total ( $N=2,658$ )		Younger adults ( $n=891$ )		Middle-aged adults ( $n=961$ )		Older adults ( $n=806$ )		$\chi^2(2)$	$p$	$V$
	$n$	%	$n$	%	$n$	%	$n$	%			
AISA overall (past 12 months)	841	31.7	487	54.4	233	24.2	121	15.0	345.57	< .001	.36
(1) AI-generated sexual information	539	20.2	375	42.1	124	12.9	40	5.0	411.43	< .001	.39
(2) AI-assisted sexual counseling	506	19.0	371	41.6	101	10.5	34	4.2	455.48	< .001	.41
(3) Sexual interactions with AI agents	375	14.1	299	33.6	57	5.9	19	2.4	423.01	< .001	.40
(4) AI-mediated sexual interactions	409	15.4	310	34.8	69	7.2	30	3.7	391.65	< .001	.38
(5) Consumption of AI-generated pornography	538	20.2	322	36.1	132	13.7	84	10.4	212.82	< .001	.28
(6) Creation of AI-generated pornography	300	11.3	246	27.6	41	4.3	13	1.6	359.72	< .001	.37

Note. AI = Artificial Intelligence. AISA = AI-Supported Sexual Activities, displayed in the same sequence as they appear in the manuscript. Younger adults: 18 – 39 years old; middle-aged adults: 40 – 59 years old; older adults:  $\geq 60$  years old. CI = 99% Confidence Interval. Statistical significance was set at 1% due to the large sample size. Cramér's  $V$  as the standardized effect size measure

$SD = 1.00$ , 99% CI [3.50, 3.80]). In contrast, the lowest satisfaction was reported for the consumption of AI-generated pornography ( $M = 3.40$ ,  $SD = 1.10$ , 99% CI [3.28, 3.52]). The largely overlapping confidence intervals across AISA types suggest that satisfaction levels were relatively consistent, with no substantial differences in participants' subjective satisfaction perception.

## Discussion

This study offers the first empirical examination of the prevalence, demographic patterns, and subjective experiences of AISA in a national online sample of German adults, providing timely insights into how AI is becoming embedded in intimate domains. The findings demonstrate that AISA is already a substantial aspect of contemporary digital sexuality, with about one-third of participants and two-thirds of AI users reporting engagement in at least one type of AISA over the past 12 months (RQ1). This prevalence suggests that AI is no longer a peripheral or experimental presence in people's sexual lives, but is beginning to take shape as a component of contemporary digital practices.

These findings are broadly consistent with recent U.S.-based studies, which have shown that AI-facilitated sexual engagement is becoming increasingly common, especially among younger adults and men (Gesselman et al., 2023; Willoughby et al., 2025). However, unlike these studies, which focused largely on broader sextech or romantic AI use in the U.S., the current study provides a focused examination of six distinct AISA types in a culturally and regulatory distinct European context. This adds much-needed comparative perspective to a growing body of international research on AI in intimate life.

In addition, our findings extend a well-established body of research on OSA, which has long demonstrated how digital technologies expand the possibilities for seeking sexual information, stimulation, and contact (Döring et al., 2017, 2021). In particular, in line with existing literature on OSA (e.g., Ballester-Arnal et al., 2021; Döring & Mohseni, 2018; Downing et al., 2017), our study found that AISA engagement is shaped by demographic factors such as gender, age, and sexual identity.

The presented findings highlight a pronounced gender gap, with men reporting higher AISA use overall and across all its types, particularly favoring sexually explicit and interactive formats, such as consuming AI-generated pornography and sexually engaging with AI agents (RQ2). This extends prior findings from OSA studies that point toward higher male engagement in OSA (Döring & Mohseni, 2018). The consistent but small-to-moderate gender differences in AISA engagement can be explained by both biological and socio-cultural factors influencing gendered sexual expression, such

**Table 5** Engagement in different types of AI-supported sexual activities among heterosexual and non-heterosexual survey participants in Germany ( $N=2,658$ ), absolute and relative 12-month prevalences

Types of AISA	Total ( $N=2,639$ ) <sup>a</sup>	Heterosexual ( $n=2,360$ )		Non-heterosexual ( $n=279$ )		$\chi^2(1)$	$p$	$V$
		$n$		$n$				
AISA overall (past 12 months)	839	718	30.4 [28.1, 32.7]	121	43.4 [35.8, 50.9]	19.28	<.001	.08
(1) AI-generated sexual information	537	456	19.3 [17.5, 21.2]	81	29.0 [22.9, 35.8]	14.51	<.001	.07
(2) AI-assisted sexual counseling	504	423	17.9 [16.2, 19.7]	81	29.0 [22.9, 35.8]	19.93	<.001	.09
(3) Sexual interactions with AI agents	373	314	13.3 [11.8, 14.8]	59	21.1 [15.8, 26.7]	12.64	<.001	.07
(4) AI-mediated sexual interactions	407	345	14.6 [13.1, 16.3]	62	22.2 [16.8, 28.1]	11.06	<.001	.06
(5) Consumption of AI-generated pornography	536	454	19.2 [17.4, 21.1]	82	29.4 [23.3, 36.2]	15.89	<.001	.08
(6) Creation of AI-generated pornography	299	246	10.4 [9.1, 11.8]	53	19.0 [14.0, 24.4]	18.25	<.001	.08

*Note.* AI=Artificial Intelligence. AISA=AI-Supported Sexual Activities, displayed in the same sequence as they appear in the manuscript. CI=99% Confidence Interval. Statistical significance was set at 1% due to the large sample size. Cramér's  $V$  as the standardized effect size measure

<sup>a</sup>Respondents identifying as asexual were excluded from sexual identity comparisons due to the non-applicability of sexual engagement measures

as men showing more interest in novelty, variety, and sexually explicit material (Cross et al., 2013; Petersen & Hyde, 2010).

Age-related differences of AISA use were even more distinct (RQ3). Younger adults were significantly more likely to explore all forms of AISA than middle-aged and older adults, particularly in regard to interactive applications such as AI-assisted counseling. This generational divide echoes broader research on digital media adoption, in which younger adults consistently lead in adopting and experimenting with new technologies (González-Anleo et al., 2024). Younger adults are also typically more engaged with sexuality-related activities, partly due to higher sexual activity levels, greater openness to sexual experimentation, and stronger integration of digital tools into their everyday intimate practices (Beutel et al., 2008; Döring & Mohseni, 2018). Nonetheless, the finding that approximately one in seven (15%) adults over the age

of 60 engaged in at least one type of AISA in the past year points to increasing digital inclusion among aging populations, challenging common assumptions of technological and sexual disengagement in later life (Birkland, 2024; Scandurra et al., 2022).

With regard to sexual identity, non-heterosexual participants consistently reported higher engagement in AISA than heterosexual participants (RQ4). This finding is in line with prior studies that show that LGBTQ+ individuals often rely on digital spaces for identity exploration, access to information, and community building in response to social exclusion or underrepresentation in offline contexts (Coyne et al., 2022; Paciente et al., 2024). The greater uptake of AISA in this group may reflect their need to find additional safe spaces for sexual expression.

Along with the relatively high prevalence of AISA, participants reported above-moderate satisfaction levels with such experiences, with slightly higher ratings for more interactive and personalized AISA types such as creating AI-generated pornography and sexually interacting with AI agents, compared to more passive activities like consuming AI-generated pornography. This pattern suggests that participants place particular value on customization, agency, and active participation in AISA, reflecting broader patterns in digital media engagement (Chang & Hwang, 2020; Sundar & Marathe, 2010). At the same time, the small differences across AISA types indicate a consistent experience across activity formats. One might speculate that AISA satisfaction may grow over time with more accessible AI technologies catering specifically to sexual needs, and users improving their overall and sexuality-related AI literacy (Schepman & Rodway, 2020).

**Table 6** Satisfaction with different types of AI-supported sexual activities among practitioners in Germany (subsamples of the total sample  $N=2,658$ ), 5-point ratings

Types of AISA	$n$	$M (SD)$	
(1) AI-generated sexual information	539	3.64 (0.91)	[3.54, 3.74]
(2) AI-assisted sexual counseling	506	3.58 (0.93)	[3.48, 3.69]
(3) Sexual interactions with AI agents	375	3.69 (0.99)	[3.56, 3.83]
(4) AI-mediated sexual interactions	409	3.59 (1.03)	[3.46, 3.73]
(5) Consumption of AI-generated pornography	538	3.40 (1.10)	[3.28, 3.52]
(6) Creation of AI-generated pornography	300	3.65 (1.00)	[3.50, 3.80]

*Note.* AI=Artificial Intelligence. AISA=AI-Supported Sexual Activities, displayed in the same sequence as they appear in the manuscript. CI=99% Confidence Interval. Statistical significance was set at 1% due to the large sample size. Scale range: 1 = *very dissatisfied* to 5 = *very satisfied*

## Limitations and Outlook

While this study offers important insights into the prevalence, demographic patterns, and subjective experiences with AISA, several limitations should be acknowledged.

First, the data were collected using a quota sample that aimed to reflect key demographic characteristics but was not fully representative of the general online population in Germany. In addition, collecting data through an online panel may introduce self-selection biases, potentially over-representing individuals who are more digitally literate, more receptive to emerging technologies, or more comfortable disclosing sensitive information in online settings. This limitation is especially relevant for interpreting age-related findings, as the older adults in our sample likely represent a more digitally engaged subset of their age group. As such, the results may overestimate AISA prevalence among older adults by primarily capturing early adopters or those already integrating technology into their lives. Furthermore, we were not able to include gender-diverse participants due to their underrepresentation in the online panel, limiting the study's ability to capture the full spectrum of experiences and perspectives across different gender identities.

Second, all constructs, including AISA prevalence and satisfaction, were measured using newly developed single-item measures. While this approach was suitable for the exploratory nature of the present study, the psychometric properties of these measures (e.g., reliability and validity) remain unknown. Future studies should aim to develop and validate multi-item psychometric scales to more accurately capture the complex dimensions of AISA engagement and experiences.

Third, some conceptual overlap between AISA types may have introduced variability in how participants categorized their experiences, which is a common challenge in self-reported digital behavior research. In addition, the study did not distinguish between romantic and sexual AI interactions. As a result, participants who engaged with AI primarily for romantic companionship may have interpreted certain items differently, potentially influencing response accuracy. Future research should aim to disentangle romantic and sexual dimensions of AISA to better capture the full spectrum of experiences.

Finally, the statistical analyses presented here were limited in scope to align with the aims of this brief report. More detailed analytical approaches are needed to understand the interplay between individual, contextual, and technological factors in shaping AISA use and outcomes.

Looking ahead, future research should expand on the initial findings of this study by investigating the motivations, benefits and risks of AISA engagement across diverse populations and cultural contexts. One might ask, for example, if and how countries with more or less positive technology and

sexuality attitudes than Germany show different AISA adoption patterns, or if AISA users—just as OSA users—show similar usage patterns across cultures (Döring et al., 2017).

## Conclusion

By documenting the prevalence, demographic patterns, and perceived satisfaction of AISA use, this study advances the empirical and conceptual understanding of digital sexuality. The findings underscore that AISA is not a fringe phenomenon but part of a broader reconfiguration of intimacy through intelligent systems. Future research should systematically investigate AISA to clarify how sexuality is being reshaped in algorithmic environments.

**Author contributions** N.D. conceived and designed the research, coordinated the project, contributed to the development of the research instrument and the statistical analysis plan. V.M. performed the statistical analyses and wrote the first draft of the manuscript. M.R.M. coordinated data collection. All authors contributed to the interpretation of the findings, participated in reviewing and editing the manuscript, and approved the final version for submission.

**Funding** Open Access funding enabled and organized by Projekt DEAL. No funding was received for conducting this study.

**Data availability** The study instrument, data, and analysis script are publicly available at <https://osf.io/zqxdp/>.

## Declarations

**Conflict of interest** N.D. is one of the Guest Editors of the *Archives of Sexual Behavior* special section Artificial Intelligence and Sexuality. V.M. and M.R.M. have no conflict of interest.

**Ethical approval** The study was conducted in compliance with the Declaration of Helsinki (in the current, revised version) and approved by the Ethics Committee of Technische Universität Ilmenau with ID #2024-07-201. All participants were pre-registered members of Bilen-di's online panel and gave informed consent prior to participating in the study. Participation was entirely voluntary. Respondents were free to pause the questionnaire, resume it at a later time, or discontinue their participation at any point.

**Informed consent** All participants gave informed consent.

**Declaration of generative AI in scientific writing** We included this AI declaration in response to the Guest Editors' request for the special section on "Artificial Intelligence and Sexuality."

The first authors drafted the paper, with all ideas originating from them and being informed by prior research on AI-supported sexual activities. ChatGPT-4 was used for editing and translation purposes with prompts such as "translate to English," "improve flow," "proofread," or "shorten."

**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes

were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

## References

- Adewale, M. D., & Muhammad, U. I. (2025). From virtual companions to forbidden attractions: The seductive rise of artificial intelligence love, loneliness, and intimacy—A systematic review. *Journal of Technology in Behavioral Science*. <https://doi.org/10.1007/s41347-025-00549-4>
- Alizadeh, F., Lawo, D., Stevens, G., Zytka, D., & Eslami, M. (2024). When the "Matchmaker" does not have your interest at heart: Perceived algorithmic harms, folk theories, and users' counter-strategies on tinder. *Proceedings of the ACM on Human-Computer Interaction*, 8(CSCW2), 1–29. <https://doi.org/10.1145/3689710>
- Ballester-Arnal, R., Castro-Calvo, J., García-Barba, M., Ruiz-Palomino, E., & Gil-Llario, M. D. (2021). Problematic and non-problematic engagement in online sexual activities across the lifespan. *Computers in Human Behavior*, 120, Article 106774. <https://doi.org/10.1016/j.chb.2021.106774>
- Bélanger Lejars, V. O., Bélanger, C. H., & Razmak, J. (2020). Exploring new measures of online sexual activities, device use, and gender differences. *Computers in Human Behavior*, 108, Article 106300. <https://doi.org/10.1016/j.chb.2020.106300>
- Beutel, M. E., Stöbel-Richter, Y., & Brähler, E. (2008). Sexual desire and sexual activity of men and women across their lifespans: Results from a representative german community survey. *BJU International*, 101(1), 76–82. <https://doi.org/10.1111/j.1464-410X.2007.07204.x>
- Birkland, J. L. H. (2024). How older adult Information and communication technology users are impacted by aging stereotypes: A multi-generational perspective. *New Media & Society*, 26(7), 3967–3988. <https://doi.org/10.1177/14614448221108959>
- Brauner, P., Glawe, F., Liehner, G. L., Vervier, L., & Zieffle, M. (2024). Cultural dimensions of AI perception: Charting expectations, risks, benefits, tradeoffs, and value in Germany and China. *PsyArXiv*. <https://doi.org/10.48550/arXiv.2412.13841>.
- Chabot, É., Jaworski, E., & Renaud, P. (2024). Pervasive teledildonics: How AI aims to impact human sexuality. 2024 IEEE/WIC International Conference on Web Intelligence and Intelligent Agent Technology, 898–903. <https://doi.org/10.1109/WI-IAT62293.2024.00146>
- Chang, J., & Hwang, J. (2020). The role of media in user participation: Focusing on the knowledge activity in online space. *Telematics and Informatics*, 51, Article 101407. <https://doi.org/10.1016/j.tele.2020.101407>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Routledge. <https://doi.org/10.4324/9780203771587>
- Cooper, A., Griffin-Shelley, E., Delmonico, D. L., & Mathy, R. M. (2001). Online sexual problems: Assessment and predictive variables. *Sexual Addiction & Compulsivity*, 8(3–4), 267–285. <https://doi.org/10.1080/107201601753459964>
- Coyne, C. A., Wongsomboon, V., Korpak, A. K., & Macapagal, K. (2022). We have to figure it out ourselves": Transfeminine adolescents' online sexual experiences and recommendations for supporting their sexual health and wellbeing. *Frontiers in Reproductive Health*, 4, Article 1034747. <https://doi.org/10.3389/frph.2022.1034747>
- Cross, C. P., Cyrenne, D. -L. M., & Brown, G. R. (2013). Sex differences in sensation-seeking: A meta-analysis. *Scientific Reports*, 3, Article 2486. <https://doi.org/10.1038/srep02486>
- Döring, N., Le, T. D., Vowels, L. M., Vowels, M. J., & Marcantonio, T. L. (2025). The impact of artificial intelligence on human sexuality: A five-year literature review 2020–2024. *Current Sexual Health Reports*, 17. <https://doi.org/10.1007/s11930-024-00397-y>
- Döring, N. (2009). The internet's impact on sexuality: A critical review of 15 years of research. *Computers in Human Behavior*, 25(5), 1089–1101. <https://doi.org/10.1016/j.chb.2009.04.003>
- Döring, N., Daneback, K., Shaughnessy, K., Grov, C., & Byers, E. S. (2017). Online sexual activity experiences among college students: A four-country comparison. *Archives of Sexual Behavior*, 46(6), 1641–1652. <https://doi.org/10.1007/s10508-015-0656-4>
- Döring, N., Krämer, N., Mikhailova, V., Brand, M., Krüger, T. H. C., & Vowe, G. (2021). Sexual interaction in digital contexts and its implications for sexual health: A conceptual analysis. *Frontiers in Psychology*, 12, Article 769732. <https://doi.org/10.3389/fpsyg.2021.769732>
- Döring, N., & Mohseni, M. R. (2018). Are online sexual activities and sexting good for adults' sexual well-being? results from a national online survey. *International Journal of Sexual Health*, 30(3), 250–263. <https://doi.org/10.1080/19317611.2018.1491921>
- Döring, N., & Mohseni, M. R. (2025). Anti-AI bias toward couple images and couple counseling: Findings from two experiments. *Archives of Sexual Behavior*. <https://doi.org/10.1007/s10508-025-03318-9>
- Downing, M. J., Schrimshaw, E. W., Scheinmann, R., Antebi-Gruszka, N., & Hirshfield, S. (2017). Sexually explicit media use by sexual identity: A comparative analysis of gay, bisexual, and heterosexual men in the United States. *Archives of Sexual Behavior*, 46(6), 1763–1776. <https://doi.org/10.1007/s10508-016-0837-9>
- Gesselman, A. N., Kaufman, E. M., Marcotte, A. S., Reynolds, T. A., & Garcia, J. R. (2023). Engagement with emerging forms of sextech: Demographic correlates from a national sample of adults in the United States. *Journal of Sex Research*, 60(2), 177–189. <https://doi.org/10.1080/00224499.2021.2007521>
- Gondlach, K. A., & Regneri, M. (2023). The ghost of German angst: Are we too skeptical for AI development? In I. Knappertsbusch & K. Gondlach (Eds.), *Work and AI 2030* (pp. 3–10). Springer Fachmedien Wiesbaden. [https://doi.org/10.1007/978-3-658-40232-7\\_1](https://doi.org/10.1007/978-3-658-40232-7_1)
- González-Anleo, J. M., Delbello, L., Martínez-González, J. M., & Gómez, A. (2024). Sociodemographic impact on the adoption of emerging technologies. *Journal of Small Business Strategy*, 34(2). <https://doi.org/10.53703/001c.122089>
- Hancock, J. T., Naaman, M., & Levy, K. (2020). AI-mediated communication: Definition, research agenda, and ethical considerations. *Journal of Computer-Mediated Communication*, 25(1), 89–100. <https://doi.org/10.1093/jcmc/zmz022>
- Hanson, K. R., & Bolthouse, H. (2024). Replika removing erotic role-play is like grand theft auto removing guns or cars": Reddit discourse on Artificial intelligence chatbots and sexual technologies. *Socius: Sociological Research for a Dynamic World*, 10. <https://doi.org/10.1177/23780231241259627>
- Hatch, S. G., Goodman, Z. T., Vowels, L., Hatch, H. D., Brown, A. L., Guttman, S., Le, Y., Bailey, B., Bailey, R. J., Esplin, C. R., Harris, S. M., Holt, D. P., McLaughlin, M., O'Connell, P., Rothman, K., Ritchie, L., Top, D. N., & Braithwaite, S. R. (2025). When ELIZA meets therapists: A turing test for the heart and mind. *PLOS Mental Health*, 2(2), Article e0000145. <https://doi.org/10.1371/journal.pmen.0000145>
- Jacobs, K. (2024). DIY pornography and the deepfake coup. *Porn Studies*, 11(1), 91–98. <https://doi.org/10.1080/23268743.2023.2297691>

- Jacobsen, B. N., & Simpson, J. (2024). The tensions of deepfakes. *Information, Communication & Society*, 27(6), 1095–1109. <https://doi.org/10.1080/1369118X.2023.2234980>
- Kim, S., & Banks, J. (2024). Expanding experiences and anxieties: Gender-identity and sexual-orientation differences in attitudes toward synthetic pornography. *Porn Studies*. <https://doi.org/10.1080/23268743.2024.2400945>
- Kwok, I., & Wescott, A. B. (2020). Cyberintimacy: A scoping review of technology-mediated romance in the digital age. *Cyberpsychology, Behavior and Social Networking*, 23(10), 657–666. <https://doi.org/10.1089/cyber.2019.0764>
- Lachman, M. E. (2001). Adult development, psychology of. *International Encyclopedia of the Social & Behavioral Sciences*, 135–139. <https://doi.org/10.1016/b0-08-043076-7/01650-8>
- Lapointe, V. A., Dubé, S., Rukhlyadyev, S., Kessai, T., & Lafortune, D. (2025). The present and future of adult entertainment: A content analysis of AI-generated pornography websites. *Archives of Sexual Behavior*. <https://doi.org/10.1007/s10508-025-03099-1>
- Marcantonio, T. L., Avery, G., Thrash, A., & Leone, R. M. (2024). Large language models in an app: Conducting a qualitative synthetic data analysis of how snapchat's "My AI" responds to questions about sexual consent, sexual refusals, sexual assault, and sexting. *Journal of Sex Research*, 62(9), 1905–1919. <https://doi.org/10.1080/00224499.2024.2396457>
- Marcantonio, T. L., Nielsen, K. E., Haikalas, M., Leone, R. M., Woerner, J., Neilson, E. C., & Schipani-McLaughlin, A. M. (2025). Hey chatGPT, let's talk about sexual consent. *Journal of Sex Research*, 62(4), 433–444. <https://doi.org/10.1080/00224499.2023.2254772>
- Mark, K. P., Herbenick, D., Fortenberry, J. D., Sanders, S., & Reece, M. (2014). A psychometric comparison of three scales and a single-item measure to assess sexual satisfaction. *Journal of Sex Research*, 51(2), 159–169. <https://doi.org/10.1080/00224499.2013.816261>
- Nadarzynski, T., Puentes, V., Pawlak, I., Mendes, T., Montgomery, I., Bayley, J., & Ridge, D. (2021). Barriers and facilitators to engagement with artificial intelligence (AI)-based chatbots for sexual and reproductive health advice: A qualitative analysis. *Sexual Health*, 18(5), 385–393. <https://doi.org/10.1071/SH21123>
- OpenAI. (2022). Introducing chatGPT. <https://openai.com/index/chatgpt/>
- Paciente, R., Pranoto, E. P., Woolard, A., Munro, E., & Lombardi, K. (2024). The queers are all right: A content analysis of LGBTQIA+ mental health on tiktok. *Culture, Health & Sexuality*, 26(6), 778–789. <https://doi.org/10.1080/13691058.2023.2253882>
- Pan, S., & Mou, Y. (2024). Constructing the meaning of human–AI romantic relationships from the perspectives of users dating the social chatbot replika. *Personal Relationships*, 31(4), 1090–1112. <https://doi.org/10.1111/pere.12572>
- Pentina, I., Hancock, T., & Xie, T. (2023). Exploring relationship development with social chatbots: A mixed-method study of replika. *Computers in Human Behavior*, 140, Article 107600. <https://doi.org/10.1016/j.chb.2022.107600>
- Petersen, J. L., & Hyde, J. S. (2010). A meta-analytic review of research on gender differences in sexuality, 1993–2007. *Psychological Bulletin*, 136(1), 21–38. <https://doi.org/10.1037/a0017504>
- Puhlman, D. J., & Chen, C. (2025). Challenges and opportunities in using interpretable AI to develop relationship interventions. *Family Relations*, 74(3), 1299–1322. <https://doi.org/10.1111/fare.13172>
- Richter, V., Katzenbach, C., & Zeng, J. (2025). Science communication in the age of artificial intelligence. *Journal of Science Communication*, 24(2). <https://doi.org/10.22323/2.24020208>
- Scandurra, C., Mezza, F., Esposito, C., Vitelli, R., Maldonato, N. M., Bochicchio, V., Chiodi, A., Giami, A., Valerio, P., & Amodeo, A. L. (2022). Online sexual activities in Italian older adults: The role of gender, sexual orientation, and permissiveness. *Sexuality Research and Social Policy*, 19(1), 248–263. <https://doi.org/10.1007/s13178-021-00538-1>
- Schepman, A., & Rodway, P. (2020). Initial validation of the general attitudes towards artificial intelligence scale. *Computers in Human Behavior Reports*, 1, Article 100014. <https://doi.org/10.1016/j.chbr.2020.100014>
- Shaughnessy, K., Fudge, M., & Byers, E. S. (2017). An exploration of prevalence, variety, and frequency data to quantify online sexual activity experience. *Canadian Journal of Human Sexuality*, 26(1), 60–75. <https://doi.org/10.3138/cjhs.261-A4>
- Skjuve, M., Følstad, A., Fostervold, K. I., & Brandtzaeg, P. B. (2022). A longitudinal study of human–chatbot relationships. *International Journal of Human-Computer Studies*, 168, Article 102903. <https://doi.org/10.1016/j.ijhcs.2022.102903>
- Sundar, S. S., & Marathe, S. S. (2010). Personalization versus customization: The importance of agency, privacy, and power usage. *Human Communication Research*, 36(3), 298–322. <https://doi.org/10.1111/j.1468-2958.2010.01377.x>
- Umbach, R., Henry, N., Beard, G. F., & Berryessa, C. M. (2024). Non-consensual synthetic intimate imagery: Prevalence, attitudes, and knowledge in 10 countries. CHI '24: Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems, Article 779, 1–20. <https://doi.org/10.1145/3613904.3642382>
- Vowels, L. M., Francois-Walcott, R. R., & Darwiche, J. (2024). AI in relationship counselling: Evaluating chatgpt's therapeutic capabilities in providing relationship advice. *Computers in Human Behavior: Artificial Humans*, 2(2), Article 100078. <https://doi.org/10.1016/j.chbah.2024.100078>
- Willoughby, B. J., Dover, C. R., Hakala, R. M., & Carroll, J. S. (2025). Artificial connections: Romantic relationship engagement with artificial intelligence in the United States. *Journal of Social and Personal Relationships*, 42, 3363–3387. <https://doi.org/10.1177/02654075251371394>
- Zhang, L., Pan, Y., Wu, X., & Skibniewski, M. J. (2021). Introduction to artificial intelligence. Artificial intelligence in construction engineering and management. *Lecture Notes in Civil Engineering*, 163. [https://doi.org/10.1007/978-981-16-2842-9\\_1](https://doi.org/10.1007/978-981-16-2842-9_1)

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.