

# How does sexual deviance develop?

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# **How does sexual deviance develop?**

Eveline E. Schippers

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# **HOW DOES SEXUAL DEVIANCE DEVELOP?**

PROEFSCHRIFT

voor het behalen van de graad van Doctor aan de Universiteit Maastricht,  
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# Chapter 1

## **General Introduction**



*Swinging and Cuckolding*

S and Z, both in their thirties, have been romantic and sexual partners for some years. They describe themselves as adventurous and open-minded, and as such decided to visit a swingers club some years ago. During their first visit, they limited themselves to looking around and kissing and fondling with each other. They found themselves extremely turned on and had sex with each other back at their hotel room. The following visits they gradually expanded the swingers' experience. First it was kissing with others, then touching, eventually sex. Z found it exhilarating to watch other men have sex with S, his S. He would watch and he would not be allowed to participate. S enjoyed so many men enjoying her. She was in charge.

*Teens are Children*

P's idea of a Saturday evening would not involve social gatherings. Not in real-life, anyway. He would put a pack of beers in the fridge and settle in behind his computer and his beloved chatrooms. He found it easier to talk to people online. He could decide if and when to open up to others. He felt he was drawn towards younger women. The younger, the safer, actually. Teenagers. Not the snobby, know-it-all, early adult types. But the shy, silent ones. They would not mock him, reject him, they could chat with him on his level. And they were still so pretty, so innocent and unspoiled. He would chat with a girl for hours, they would have some confidential bond, it would be them against the world, and she would eventually, after a lot of asking, send him nude pictures and he would masturbate to those. At some point came the realization that he was sexually aroused by teenagers. And for the law, teenagers are children. He realized he was sexually drawn towards children.

*The Looner*

W loved to play with balloons as a kid. The squeaking sound, the feeling of his finger hobbling over the resistance of its skin, it agonized him in a pleasurable manner. As a kid, it was just playing, but as a teenager, he somehow got the idea of masturbating with the balloon rubbing over his erection. The experience was pleasurable enough to repeat it. W, a twentysomething adult now, calls himself a "looner," a balloon fetishist. Balloons have become a part of his lifestyle now as he frequents online looner-forums. He feels like his online looner-friends understand his passion best.

## General Introduction

Sexual deviance is the sexual interest in an inappropriate, nonnormative stimulus, such as leather, pain, public spaces, or children (American Psychiatric Association, 2022; Fernandez et al., 2014). As illustrated by the cases “Swinging and Cuckolding”<sup>1</sup> and “The Looner”, people can live happy, healthy lives with a variety of deviant sexual interests, which they can keep to themselves or act out in appropriate manners with consenting adult partners. In some cases, however, sexual deviance can become problematic. It can stand in the way of a fulfilling sex life with a romantic partner, or it can cause distress because of societal stigma. It can also become problematic when acted upon with illegal behavior, thus resulting in a sexual offense, as illustrated by the “Teens are Children” case. Sexual offenses can cause serious and long-lasting mental health problems in their victims, such as depression, anxiety, or trauma (Oshodi et al., 2020). Additionally, the associated costs and efforts of the justice system and healthcare institutions impact society as a whole (Kalidien & de Heer-de Lange, 2015). When sexual deviance is experienced as problematic, or when it is a risk factor for a sexual offense, it is relevant to address sexual deviance in treatment.

This general introduction discusses how treatment of sexual deviance in its current state may not be optimal to reduce suffering in people with sexual deviance or to prevent sexual offenses. In order to improve treatment of sexual deviance, it is imperative to better understand how sexual deviance develops. Understanding its development, or etiology, may help ensure that the right causes of sexual deviance are treated in the right way. For example, a behavioral view of etiology could promote retraining of learned behavior, whereas a strictly biological view could promote medication to alter innate predispositions. Sexual deviance is a frequently researched topic, however, not much is known about the etiology of sexual deviance (Apostolou & Khalil, 2019; L. A. Craig & Bartels, 2021; A. F. Schmidt & Imhoff, 2021). This thesis therefore centered around the question: how does sexual deviance develop?

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<sup>1</sup> See Table 1 for definitions of the various deviant sexual interests that are mentioned in this thesis.

**Table 1***Definitions of Deviant Sexual Interests Used in This Thesis*

<b>Term</b>	<b>Topic of Sexual Interest</b>
(Auto)Erotic Asphyxiation	Intentional restriction of oxygen to boost sexual arousal by oneself (auto) or other
BDSM	Bondage and Discipline (BD), Dominance and Submission (DS) and Sadism and Masochism (SM)
Cuckolding	Watching one's partner having sex with another person
Exhibitionism	Exposing genitals to unsuspecting people
Fetishism	Inanimate objects or nongenital body parts
Frotteurism	Touching or rubbing one's genitals against an unsuspecting person
Hebephilia	Pubescent children, generally between 12-16 years old
Looner	Balloons, a balloon fetishist
Masochism	Being subjected to physical pain or humiliation
Mysophilia	Dirty, filthy or soiled things
Pedophilia	Prepubescent children, generally younger than 12 years old
Sadism	Inflicting pain or humiliation on another person
Swinging	Partner-swapping, nonmonogamy
Transvestism	Crossdressing, wearing clothes typically associated with a different gender
Upskirting	Secretly filming or photographing under someone's skirt
Voyeurism	Watching an unsuspecting person naked or having sex
Zoophilia	Animals

## Definition of Sexual Deviance

*Sexual deviance can be defined as a deviation from various norms. Sexual deviance is mostly defined by social norms, which include an estimate of inappropriateness, and legal norms, in which the law decides what is nonnormative.*

Sexual deviance is a frequently researched topic, but there is not much unity in defining it. Agreement exists on extreme examples of sexual deviance, such as sexual interest in children or violent rape. There is less agreement on whether less extreme examples, such as sexual interest in latex suits or pain, are seen as sexual deviance (American Psychiatric Association, 2022; L. A. Craig & Bartels, 2021) or, for instance, as “unusual” sexual interests (Joyal et al., 2015; Smid & Wever, 2019). Furthermore, there is no consensus on whether sexual deviance represents an interest, behavior, preference, fantasy, or urge. In some views, thinking about a sexual act may constitute sexual deviance, and in some views only the act itself. This thesis focuses on deviant sexual *interests*.

In order to define deviance, it is necessary to define a norm to deviate from. There are various ways to define a norm. None of these norms is superior in approach nor application, and each of these norms brings along some advantages and disadvantages.

A statistical norm represents whatever is most frequent in a population. Statistical norms depend on which sexual interests are assessed in which populations. Assessing only DSM-5-TR paraphilias and heteronormative sexual intercourse, will make heteronormative sex the norm. Including more sexual interests that are very common (e.g., oral sex, sex outdoors, anal sex, using sex toys) may result in a more nuanced norm that contains more sexual varieties. Questioning a sample representative of the general population might result in different normative sexual interests than a selective sample including a disproportionate number of people with sexual deviance.

#### *Example of Statistical Norm*

Joyal and colleagues asked 1,516 Canadians via Internet to indicate how often they had various sexual fantasies (Joyal et al., 2015). The sample was not representative of the general population: they were younger and more educated. Sexual fantasies shared by more than 50% of the participants were seen as the norm, for example oral sex, masturbation, or being dominated. All sexual fantasies that occurred less frequently were labeled “unusual” or “rare” (respectively one and two standard deviations below the norm). These included sex with urine and sex with a child under 12 years of age.

In a clinical perspective, the norm is mental health. Psychopathology (illness) is a deviation from that norm. Psychopathology is defined by the level of negative consequences for oneself or another (American Psychiatric Association, 2022; World Health Organization, 2022). Deviant sexual interests are approached from a clinical perspective by including them in the medical handbooks DSM-5-TR (American Psychiatric Association, 2022) and ICD-11 (World Health Organization, 2022). Including a deviant sexual interest in a medical handbook is important for the recognition of problems or suffering. At the same time, it may favor stigmatization, and medical criteria are often subject to critique (Beech et al., 2016; Khan, 2015; Krueger et al., 2017).

*Example of Clinical Norm*

In the medical handbooks DSM-5-TR (American Psychiatric Association, 2022) and ICD-11 (World Health Organization, 2022), deviant sexual interests are referred to as paraphilias. In the DSM-5-TR, “[t]he term paraphilia denotes any intense and persistent sexual interest other than sexual interest in genital stimulation or preparatory fondling with phenotypically normal, physically mature, consenting human partners”. If there are negative consequences associated with the paraphilia, such as “distress, impairment, or harm to others”, a paraphilic *disorder* is classified.

In a social or cultural definition, the norm is what is seen as “just” in a specific cultural subgroup or society. This might concur with what is common (statistical norm) but does not necessarily have to. Social norms may differ per geographical location, subculture, or time.

*Examples of Social Norms*

In some cultures, masturbation is a taboo (see e.g., Metropolis, 2011; Tam, 2018), but that does not mean it is not common (N. Fischer et al., 2022; Tenga, 2018).

The Stable-2007 is a widely used instrument to estimate recidivism risk in people who have sexually offended (Fernandez et al., 2014). In the manual, sexual deviance is defined when one “is sexually interested in or is sexually aroused by activities, situations, people, or objects that are illegal, inappropriate, or highly unusual”. How the appropriateness of a sexual interest is determined, is not described. The manual provides some examples of what is considered deviant (children, exhibitionism, fetishism, sadism), but for other sexual interests it is up to the rater to decide.

Legal norms constitute behaviors that are not penalized by the law. The law defines what is transgressive and, thus, nonnormative (deviant). Like cultural norms, legal norms may differ per location and time.

*Example of Legal Norm*

The age of consent is the legal age from which a person is considered capable to give consent for sex. It varies throughout Europe from the ages of 14 in Germany and Italy, to 17 in Ireland, and worldwide from the ages of 11 in Nigeria, to 21 in Bahrein (AgeOfConsent, 2022). Spain has increased the age of consent from 13 to 16 years in 2015, meaning that sex with, for instance, a 15 year old went from legally normative to legally nonnormative.

Out of the various norms, social and legal norms were most often applied to sexual deviance in the systematic review in Chapter 2. Researchers referred to sexual deviance when the associated sexual behavior was illegal in the country in which the research took place, or when the interests were deemed inappropriate by the researchers or clinicians. Unfortunately, social and legal norms do not provide a universal definition of which specific deviant sexual interests constitute sexual deviance. This thesis therefore approached deviant sexual interests using a broad definition. All specific deviant sexual interests that are mentioned in this thesis, are defined in Table 1.

### **A Broad Definition**

*We adopted a broad definition of sexual deviance. Sexual deviance in this thesis included sexual interest in illegal as well as in itself harmless but unusual behaviors.*

A broad definition of sexual deviance includes sexual interest in behavior that in most countries is illegal (e.g., rape, exhibitionism) as well as sexual interest in itself harmless but unusual behaviors (e.g., fetishism, sexual interest in defecation). For this thesis, there are good reasons to apply a broad definition of sexual deviance. One reason is that there are high intercorrelations among various deviant sexual interests. Having one deviant sexual interest increases the likelihood of having another, including interest in harmless as well as illegal behaviors (Bártová et al., 2021; Brown et al., 2020; Dawson et al., 2016; Joyal & Carpentier, 2017; Schippers et al., 2021; Wilpert, 2018). The etiology of sexual deviance might thus reflect a predisposition to sexual deviance in general rather than to a specific interest.

Another reason to apply a broad definition is that “harmless” deviant sexual interests may relate to coercive sexual behavior. Interest in BDSM has been related to the self-reported use of sexual coercion in various studies with samples from the general population as well as BDSM-practitioners (Bondü & Birke, 2020; Martin et al., 2016; C. A. Renaud & Byers, 2005). In a large Finnish population-based twin study ( $N = 5,990$ ), people who reported any deviant sexual behavior were over three times more likely to report that they had committed sexually coercive behavior<sup>2</sup> (21%) than people without deviant sexual behavior (6%) (Baur et al., 2016). Reporting multiple deviant sexual behaviors was related to an even higher risk of sexually coercive behavior (e.g., for exhibitionism alone the odds ratio was 1.88, but 3.15 with co-occurring deviant sexual behaviors).

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<sup>2</sup> The definition of sexual coercive behavior in this study included various behaviors ranging from kissing and touching against someone's will to vaginal/anal rape using physical force.

The evidence is neither overwhelming nor unequivocal, and scholars warn against unnecessary stigmatization (Joyal, 2017). The above findings are mainly based on correlational research. It is therefore impossible to determine if “harmless” interests lead to coercive sex, or that they are related only because all deviant sexual interests are highly intercorrelated. However, it is apparent that various deviant sexual interests often coexist, including sexual interest in both legal *and* illegal topics.

It is important to note that we do not mean to equate an in itself harmless sexual interest with a sexual interest in illegal behaviors. Nor do we imply that sexual interest in illegal behavior will inevitably lead to illegal behaviors. Sexual interest in something, without accompanying behavior can never be illegal. Also, the authors do not mean to imply any judgment when referring to norms or deviations. We choose to adhere to the broadest possible definition of sexual deviance for a scientific approach to fill the gap in the current knowledge.

### **How Common is Sexual Deviance?**

*Sexual deviance is common. It is estimated that nearly half of the people has at least one deviant sexual interest, and about a quarter of the people has ever engaged in deviant sexual behavior.*

Studies with representative population samples have estimated the prevalence of deviant sexual interests and behaviors in the Czech Republic (Bártová et al., 2021), Canada (Joyal & Carpentier, 2017), and Finland (Baur et al., 2016). These studies only included paraphilia that were described in the ICD-10 or DSM-5. Their findings are pretty much in line with each other and are summarized in Table 2. Of all participants, 40-46% reported having at least one deviant sexual interest, and 23-34% reported having actually engaged in at least one deviant sexual behavior. Voyeurism and fetishism were among the most common sexual deviances, followed by frotteurism (not in Table 2 but 4<sup>th</sup> place in Joyal & Carpentier, 2017). Pedophilia was the least common sexual deviance in each study, mere sadism was uncommon as well (or “beating/torture” in Bártová et al.). Men reported significantly more deviant sexual interests and behaviors than women. Masochism was the only sexual deviance that was more popular among women than men. It remains unclear why the prevalence of sexual deviance differs between men and women. One suggested explanation lies in women's lower sex drive (Levaque et al., 2022), but it remains unexplained how this necessarily results in a lower prevalence of sexual deviance. Another suggested explanation is that the cost of reproduction and offspring nurture is higher in women, who are, therefore, more selective in mate choice than men (Bártová et al., 2021), although this does not explain why masochism is more popular among women.

## When is Sexual Deviance Problematic?

*In essence, sexual deviance is not problematic. Sexual deviance can, however, be problematic if it negatively affects health or quality of life, or acts as a risk factor for sexual offenses.*

People can live happy, healthy lives with a variety of deviant sexual interests, which they can keep to themselves, fantasize about, or act out in appropriate manners with consenting adult partners. Not all deviant sexual interests are acted out. Having such interests, however, increases the probability of corresponding behavior. Correlations between various deviant sexual interests and corresponding deviant sexual behaviors are moderate to high, ranging from around  $r = .30$  for pedophilia to  $r = .70$  for sadism and masochism (Bártová et al., 2021; Bondü & Birke, 2020; Joyal & Carpentier, 2021; Seto et al., 2021; K. M. Williams et al., 2009). As long as it concerns legal acts with adults capable of informed consent, deviant sexual behavior is not judicially problematic. BDSM may even be positive for mental health because in interviews and questionnaires, BDSM-practitioners reported improved sense of well-being (Waldura et al., 2016) and better communication about their sexual identity (Wismeijer & Van Assen, 2013).

It is problematic, though, if the person with the deviant sexual interest suffers from it. In some cases, deviant sexual interests can, directly or indirectly, have a negative effect on health or quality of life. Some sexual activities carry a higher risk of physical injuries than others. Most research to legal deviant sexual behaviors is conducted in “kink” or BDSM-practitioners. Possible health problems are sexually transmitted infections; blood-borne pathogens when needles or injuries are part of the activities; nerve damage as a result of breath play or bondage (especially while using drugs or alcohol); burns; rope burns; injuries due to rough vaginal, anal, or urethral play; or infections due to play with excrements (Akemi Ando et al., 2014; Ambrosio, 2023; Mendes de Oliveira Júnior & Najjar Abdo, 2010; Sprott & Randall, 2017; Waldura et al., 2016).



**Table 2***Prevalence of Sexual Deviance in the General Population*

	Bártová et al. (2021)		Joyal and Carpentier (2017)		Baur et al. (2016) <sup>A</sup>	
	Men	Women	Men	Women	Men	Women
Any Interest	40%	19%	Total: 46%		NA	NA
Any Behavior	23%	10%	Total: 34%		25%	14%
1 <sup>st</sup> Most Common	Voyeurism 50%	Voyeurism 39%	Voyeurism 60%	Fetishism 48%	Sexually coercive behavior 19%	Masochism 9%
2 <sup>nd</sup> Most Common	Frotteurism 48%	Fetishism 33%	Fetishism 40%	Voyeurism 35%	Voyeurism 18%	Voyeurism 6%
3 <sup>rd</sup> Most Common	Fetishism 44%	Frotteurism 29%	Exhibitionism, couple <sup>B</sup> 35%	Masochism 28%	Masochism 5%	Sexually coercive behavior 4%
3 <sup>rd</sup> Least Common	Beating/ torture 11%	Zoophilia 4%	Transvestism 7%	Sadism 5%	Exhibitionism 4%	Sadism 1%
2 <sup>nd</sup> Least Common	Zoophilia 7%	Hebephilia 3%	Exhibitionism strict <sup>B</sup> 6%	Exhibitionism strict <sup>B</sup> 3%	Sadism 3%	Transvestism 1%
1 <sup>st</sup> Least Common	Pedophilia 4%	Pedophilia 1%	Pedophilia 1%	Pedophilia ~0%	Pedophilia 1%	Pedophilia ~0%

NB.<sup>A</sup> = Baur et al. assessed behavior rather than interest; they did not assess fetishism and frotteurism.

<sup>B</sup> = Exhibitionism "strict" refers to act committed by individual; "couple" refers to having sex with a partner at risk of being seen.

Indirectly, deviant sexual interests may traverse fulfilling sexuality or relationships because it is difficult to find a partner with the same interest (A. A. Lawrence & Love-Crowell, 2008; Meyer & Chen, 2019; Vilkin & Sprott, 2021). The effect of one's deviant sexual interests on mental health depends on the nature of the interest. BDSM-practitioners have reported no worse – and even better – mental health than the general population (Akemi Ando et al., 2014; Dunkley & Brotto, 2018; Sprott & Randall, 2017; Waldura et al., 2016; Wismeijer & Van Assen, 2013). People with pedophilia experience more negative mental health effects due to stigma and the fear of vigilantism, even if they have never sexually offended. They often fear discovery of their sexual interests, which may cause psychological and emotional problems (Jahnke et al., 2015; A. L. Lawrence & Willis, 2021). Furthermore, the intensity of deviant sexual interests may cause distress or impairment in other areas or functioning: we then refer to a "paraphilic disorder" (American Psychiatric Association, 2022). A high frequency of sexual behaviors with or without a deviant topic (so-called hypersexuality, sexual addiction, or sexual preoccupation) can also have a large impact on life, but this thesis limits its scope to the content of the sexual interests.

Furthermore, sexual deviance is problematic when it leads to sexual offenses. Sexual deviance is consistently shown to be a risk factor for sexual reoffending in samples of people who have sexually offended against children or adults, with contact or noncontact offenses, and in various settings and with various levels of recidivism risk (Brankley et al., 2021; Etzler et al., 2020; Hanson et al., 2007; Helmus et al., 2021). Even deviant sexual interests that do not involve illegal behaviors are still predictive of sexual reoffending (Fernandez et al., 2014). It is assumed that risk factors related to problematic general self-regulation (disinhibition and impulsivity) predict recidivism with all types of offenses, while problematic sexual self-regulation, including sexual deviance, predicts recidivism with sexual offenses specifically (Brouillette-Alarie et al., 2018; Brouillette-Alarie & Proulx, 2019; Etzler et al., 2020; McPhail et al., 2018). Sexual deviance as a risk factor does not mean that all sexual offenses are committed because of sexual deviance, nor that everyone with sexual deviance will commit a sexual offense. It means that having sexual deviance increases the risk of subsequent sexual offense behavior for those who have already offended.

### **How Common is Problematic Sexual Deviance?**

*It is unclear how often deviant sexual interests have a negative life impact or lead to sexual offenses. About two-thirds of the people convicted for sexual offenses have some level of deviant sexual interests.*

It remains difficult to determine how often deviant sexual interests are problematic, i.e., with a negative life impact or related to sexual offenses. Regarding BDSM-related health problems, some cautious estimates are available in nonrepresentative samples. Between 14% and 44% of the BDSM-practitioners has ever experienced BDSM-related injuries or visited a medical provider because of BDSM-related concerns (Kolmes et al., 2006; Kruike & Gruter, 2014; Sprott & Randall, 2021; Waldura et al., 2016). Most BDSM-practitioners who need healthcare do so for reasons unrelated to BDSM (Dunkley & Brotto, 2018; Kolmes et al., 2006). Regarding autoerotic asphyxiation, it is known this may result in death in very rare occasions. Autoerotic accidents were the cause of death in 0.09% of all autopsies in Hamburg, Germany, over a 15-year period (Lohner et al., 2020). This is not very informative about its relative mortality, because, to the best of my knowledge, the prevalence of autoerotic asphyxiation in the general population is unknown. No prevalence estimates are currently known for health problems related to other deviant sexual behaviors.

The prevalence of sexual offenses depends on how they are measured. This can be done through victim-report, self-report by people who have offended, or official judicial offense or recidivism data. Victim-report data indicate that up to 83% of

the European women and 66% of the European men have experienced a form of sexual aggression between the ages of 12 and 25 years (Krahé et al., 2014). Looking at child sexual abuse specifically, 18-30% of the girls worldwide experienced some form of sexual abuse during childhood, as well as 8-17% of the boys (Barth et al., 2013; Kloppen et al., 2016; Stoltenborgh et al., 2011). From the perpetrator viewpoint, up to 80% of the men report to have ever perpetrated sexual aggression (Krahé et al., 2014). This prevalence is much lower – below 1% – in official registrations of sexual offenses (Statistics Netherlands [CBS], 2022). Regarding recidivism, people who have committed a sexual offense more often reoffend with a nonsexual offense than with a sexual offense. After being convicted of a sexual offense, 24% to 67% recidivates with any criminal offense, while 5% to 8% recidivates with a new sexual offense within respectively five (Helmus et al., 2021) to nine (Alper & Durose, 2019) years after release. The difference between self-reported and judicial conviction numbers can partly be explained because subjectively experienced sexual transgressions are not always illegal behaviors as defined by the law. Also, a part of the sexual transgressions that would justify legal actions, is never reported to the police (Morgan & Thompson, 2021) and only a small minority of reported offenses lead to official convictions (National Rapporteur on Trafficking in Human Beings and Sexual Violence against Children, 2021; Scurich & John, 2019).

The above data do not break down whether a sexual offense was associated with sexual deviance or not. Although it is widely accepted that not every person who has sexually offended has sexual deviance, estimates of the prevalence of sexual deviance in offending populations are scarce. Normative data from the widely used Stable-2007 risk assessment tool indicated that 35% of the people who have committed sexual offenses (with either adult or child victims) showed no problems on the item “deviant sexual interests” (score zero), 44% some problems (score one), and 21% definite problems (score two) (Brankley et al., 2017). Results from our client cohort receiving outpatient treatment show a similar pattern (Chapter 8). Specific to pedophilia, 50% of the people who have sexually offended against children are estimated to have a diagnosis of pedophilia (Eher et al., 2019; Seto, 2018). Across Western countries, about 1-2% of men and <1% of women in the general population are estimated to have some sexual interest in prepubescent children (Bártová et al., 2021; Joyal & Carpentier, 2017; Savoie et al., 2021).

### **Sometimes Treatment is Needed**

*It can be necessary to address sexual deviance in treatment to reduce suffering or prevent sexual reoffending.*

As long as someone has not committed a sexual offense or is at risk of committing one, and as long as someone is happy with their sexuality, there is no need to address deviant sexual interests in treatment. This changes as soon as sexual deviance was a driving factor in a sexual offense. The main reason for treatment of sexual deviance is to reduce the risk of future (re)offending. Treatment effectively helps to reduce the number of reoffenses. A recent meta-analysis ( $k = 43$ ,  $N = 25,521$ ) concluded that without treatment, 14.1% of the people in the included samples reoffended with a sex offense within six years, compared to 9.5% with treatment (Gannon et al., 2019). This means that treatment resulted in a 32.6% reduction in sexual recidivism compared to no treatment. The effects were larger when treatment was provided by adequately trained and supervised professionals and when treatment included conditioning techniques to diminish deviant sexual arousal.

Treatment can also be recommended for people who have not committed a sexual offense, but whose deviant sexual interests pose a potential risk for this.<sup>3</sup> This can be a risk experienced by oneself or one's environment. Organizations like Stop it Now (U.S.A., Great-Brittain, Ireland, Netherlands, Flanders) or Kein Täter werden (Germany, Swiss), for example, provide professional help to people with pedophilia who are afraid that they will act on their interests.

Furthermore, treatment may be desired by people who suffer from their deviant sexuality. To the best of my current knowledge, no literature is available to systematically conclude how often people seek help for suffering related to nondelinquent sexual deviance or what are effective treatment approaches to help this target group.

### **What Should Treatment Entail?**

*Treatment to prevent sexual offenses should adhere to the risk, need, responsivity-principles and adopt a cognitive-behavioral approach. This means that sexual deviance must be targeted in treatment if it is an individually relevant risk factor for sexual reoffenses, using cognitive as well as behavioral techniques.*

Due to the lack of literature on nonforensic treatment of sexual deviance, this part will focus on the treatment of people who have sexually offended. Treatment to prevent sexual or any other criminal recidivism is most effective if it incorporates

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<sup>3</sup> In chapter 8, about half of the clients received treatment for sexual transgressive behavior at de Waag as part of a judicial ruling. The other half received "voluntary treatment" and had not necessarily committed an offense. In practice this was not always completely voluntary as these clients often experienced pressure from their social network to enter treatment.

the “risk, need, responsivity principles” (Bonta & Andrews, 2017; Hanson et al., 2009; Olver & Stockdale, 2020). The risk principle entails that the intensity of treatment should be adjusted to the client’s risk of recidivism. Clients at higher risk should receive more intensive treatment than those at lower risk of recidivism.

The need principle entails that treatment should aim to reduce the impact of changeable, or dynamic, risk factors (“needs”) that are individually relevant to the problem behavior. This means that sexual deviance should only be a treatment target when it is related to the individual’s sexual offending behavior. Multiple risk factors may be relevant and may influence each other to cause the sexual offense behavior. This is evident in the case *Teens are Children* at the beginning of this introduction, where loneliness, rejection and alcohol use lowered P’s threshold to sex-chat with teenage girls. Other possibly relevant risk factors are, for instance, capacity for relationship stability, sexual preoccupation, hostility, or impulsivity (Fernandez et al., 2014; Hanson et al., 2007).

The responsivity principle can be subdivided into specific and general responsivity. Specific responsivity means that treatment should be adjusted to the capacities of the individual client. This includes the client’s level of intelligence and understanding, learning style, and motivation for treatment, and the therapeutic relationship between therapist and client. General responsivity means that treatment should include elements that are most effective in the target population.

To date, the most effective treatment modality to reduce recidivism in people who have sexually offended appears to be a cognitive-behavioral approach (Gannon et al., 2019; Schmucker & Lösel, 2017). Cognitive-behavioral therapy tries to alter cognitions related to offense behavior and train skills to control behavioral impulses and replace them with prosocial behavior (Association For The Treatment & Prevention Of Sexual Abuse, 2014; Helmond et al., 2015; Kim et al., 2016). There is evidence that including behavioral techniques in treatment provides larger reductions in deviant sexual arousal and sexual recidivism (A. Allen et al., 2020; Gannon et al., 2019; McPhail & Olver, 2020; Smid, 2021). Such behavioral techniques, for instance, rely on (re)conditioning of the sexual response (McGrath et al., 2010; Ware et al., 2021), modeling and shaping of desired behavior, or experience-based exercises such as role play to practice different viewpoints (Fernandez et al., 2006; Gannon, 2016). The case below provides an example of a behavioral reconditioning technique called closed sensitization, relying on the client to rehearse the chain of events leading to deviant sexual arousal. The chain of events is broken right before the point of transgression by pairing the arousal with negative consequences or

feelings. Cognitive-behavioral therapy can be supplemented with various treatment approaches, such as involvement of the social system (Clarke et al., 2017) or pharmacology (Thibaut et al., 2020).

Following the risk, need, responsivity principles, sexual deviance should thus be targeted in treatment if it is a risk factor for sexual reoffenses for the individual client. Treatment should include cognitive as well as behavioral approaches.

1

*Behavioral Technique: Closed Sensitization*

Therapist: Talk me through what happened. Start by describing to me where you were.

Client D: I was in the store, in the fitting rooms.

Therapist: And where was she?

Client D: She was in the adjoining room.

Therapist: What did you do?

Client D: I placed the little mirror on the floor. I unzipped my pants in anticipation.

Therapist: What could you see?

Client D: I saw her from below. She did not see me then. She took off her skirt, hung it on a hook I presume. I saw her butt. Her butt cheeks, she wore discolored panties, they once used to be red I think.

Therapist: What did you feel at that moment?

Client D: All excitement. What if she saw the little mirror? All sparkles in my belly. Maybe she would like me appreciating her.

Therapist: Okay, stop there. Now we switch to the scenario we rehearsed. You are caught. Describe what happens.

Client D: Damn. She screams. So loud, so loud, it startles me. I awake, or something. People come running. I am not fast enough. Did not know the shopping assistant was so close by. They see me, no hiding.

Therapist: Can you call onto how that makes you feel?

Client D: I have a stone in my stomach. A cold, hard stone. It sinks me. All the butterflies are gone. That scream keeps echoing in my head.

## **Current Treatment may not be Optimal**

*Current treatment may not be optimal, not least because it is unclear how sexual deviance develops.*

There are indications that treatment of sexual offense behavior and sexual deviance is not optimal and can be improved. First, while cognitive-behavioral therapy is a broad framework, specific and practical guidelines for how to treat sexual deviance specifically seem to be lacking. Guidelines for the treatment of sexual offense behavior are provided by several organizations, such as the ATSA (Association For The Treatment & Prevention Of Sexual Abuse, 2014), IATSO (International Association for the Treatment of Sexual Offenders, 2018), and European Psychiatric Association (EPA; Völlm et al., 2018). These guidelines are very generic: The ATSA, for instance, instructs to “use cognitive–behavioral, behavioral, and/or pharmacological techniques to promote healthier sexual interests and arousal, fantasies, and behaviors oriented toward age–appropriate and consensual partners” (p.36). None of these guidelines specify which techniques could be used exactly and how. The EPA even states: “The evidence base for interventions of sex offenders is weak and on the basis of this evidence no psychosocial interventions can currently be recommended for this group” (Völlm et al., 2018, p.70). Treatment providers who wish to find detailed guidelines on how to treat sexual offense behavior, or sexual deviance specifically, are left in the dark.

Second, cognitive-behavioral therapy programs appear to have become more cognitive than behavioral over time, thereby neglecting the behavioral techniques, discussed above, that are effective for change (Fernandez et al., 2006; Gannon, 2016; L. E. Marshall & Marshall, 2012). Behavioral techniques for deviant sexual arousal appear not to be standard treatment practice (Gannon et al., 2019; McGrath et al., 2010; Smid, 2021). Such techniques arose in the 1980s but ran out of favor in the last decades. This is illustrated by the fact that most (~75%) of the included studies in the meta-analyses discussing arousal reconditioning (Gannon et al., 2019; McPhail & Olver, 2020) were from the year of 2000 or earlier. The risk factor sexual deviance may thus not be sufficiently or most effectively addressed in treatment of sexual offense behavior.

A final point is that not much is known about the development, or etiology, of sexual deviance. Etiology is an explanation of the origin or the causes of sexual deviance, or, the developmental pathway to sexual deviance (Oxford University Press, 2021). Sexual deviance is widely acknowledged to be an etiological factor for sexual offenses and a risk factor for sexual reoffending (Huppert et al., 2019; Seto, 2019; Ward

& Beech, 2006). Yet, the only agreement there seems to be regarding the etiology of sexual deviance itself, is that we do not know much about it (Apostolou & Khalil, 2019; L. A. Craig & Bartels, 2021; A. F. Schmidt & Imhoff, 2021).

In order to improve treatment of sexual deviance, it is imperative to understand how sexual deviance develops. This is true for treatment of people who have committed sexual offenses as well as nondelinquent people who suffer from their sexual deviance. To illustrate, a psychoanalytic explanation of the development of sexual deviance could entail that own victimization of sexual abuse is redirected into a desire to sexually abuse other people (e.g., Wood, 2010). Treatment following this explanation would likely focus on resolving childhood trauma to address sexual deviance. A strictly biological view (e.g., Bao & Swaab, 2010) could entail that sexual deviance is a genetic deficit or an innate predisposition, for which medication could be a solution. Learning theories (e.g., Laws & Marshall, 1990) state that deviant sexual behavior is learned behavior based on copying others. This approach implies that behavior could be unlearned by means of copying prosocial sexual behaviors. Naturally, treatment in practice would often address multiple treatment targets using multiple methods. The point is that assumptions about the development of sexual deviance shape the way we approach it. Therefore, this thesis focuses on the question: how does sexual deviance develop?

## This Thesis

**Chapter 2** presents a systematic review to theories on the development of deviant sexual interests. The following chapters 3 through 7 correspond with results from this review. First, the mechanism of excitation transfer was explored: the transfer of arousal from nonsexual emotions to sexual arousal. **Chapter 3** describes an experimental intervention to induce excitation transfer. In a laboratory setting, several emotions were induced in men using film fragments. Sexual arousal in response to an erotic film and vibrostimulation was compared between the emotional conditions and a neutral, nonemotional condition. **Chapter 4** is a protocol of a proposed follow-up study, with improved methodology including film fragments presented in virtual reality to enhance the emotional experience.

Following the idea that emotions can influence sexual arousal, it was investigated if specific deviant sexual interests cluster together. Such clusters might hypothetically be related to a specific emotion. For example, deviant sexual interests that evoke disgust may co-occur more often (feces, urine, vomit). In **chapter 5**, a convenience sample rated the attractiveness of various deviant sexual interests in an online survey. Exploratory factor analysis was used to see if meaningful clusters of



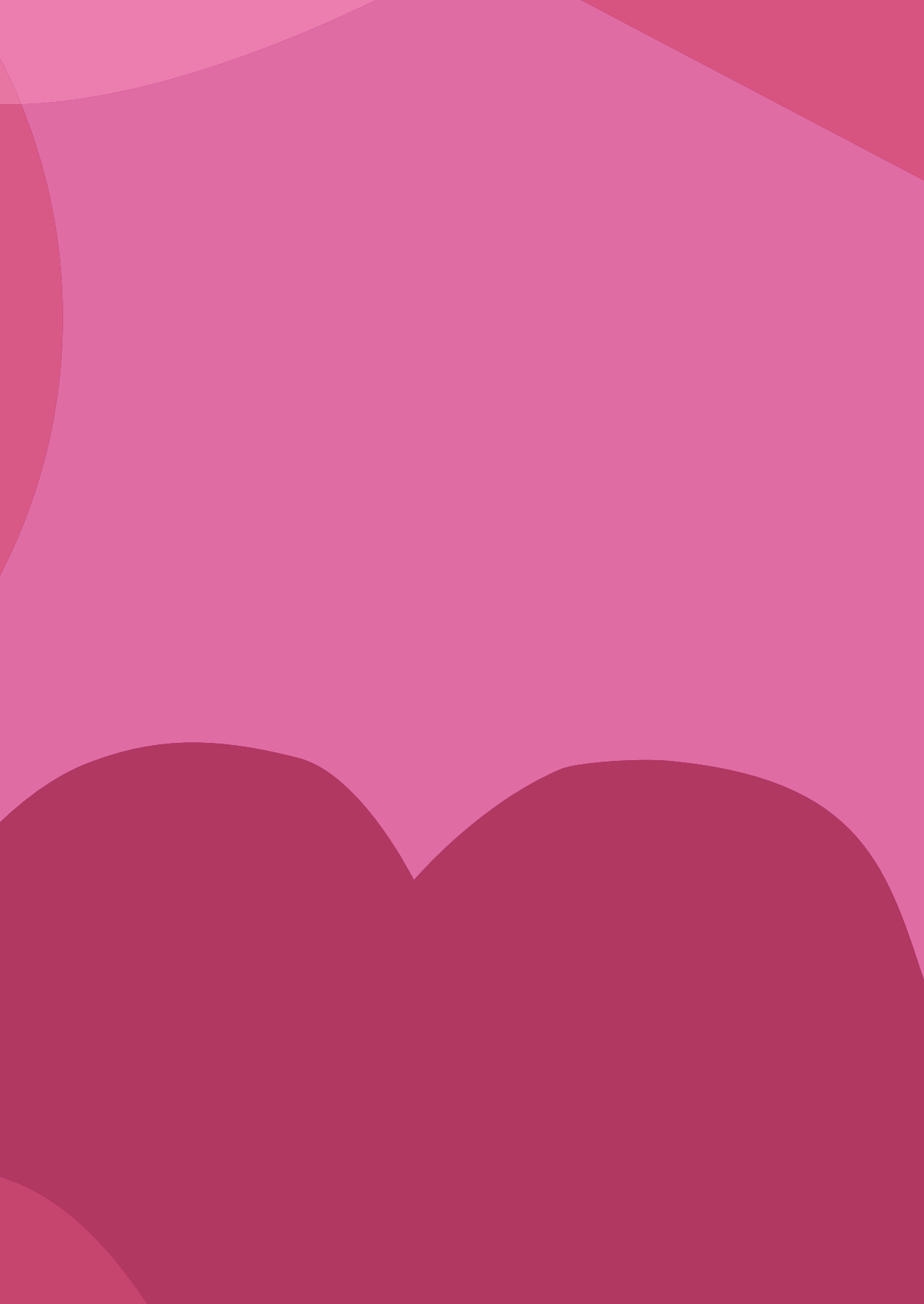
co-occurring interests could be discerned. **Chapter 6** describes a replication of this online survey with a sample representative to the Dutch male adult population, to see if similar clusters were found.

Subsequently, **chapter 7** describes meta-analyses and a systematic review concerning the “normative deficiency” hypothesis. This hypothesis states that decreased sexual interest in normative stimuli contributes to increased sexual interest in deviant stimuli. This was investigated with respect to pedophilia in people who have committed sexual offenses.

Relative to the previous chapters with fundamental research, **chapter 8** reflects the current clinical practice. It describes a pilot study to assess the prevalence of sexual deviance in a cohort of clients receiving outpatient treatment for sexual offending behavior. In a subsample it was additionally explored how sexual deviance was considered in the outpatient treatment of sexual offense behavior.

**Chapter 9** contains a general discussion in which the findings from this thesis were integrated. The general discussion provides a translation of the research findings to clinical practice, open ends, and overall strengths and limitations.





# Chapter 2

## Theories on the Etiology of Deviant Sexual Interests: A Systematic Review

**At the time of finalizing this thesis, a slightly different version of this chapter was *in press*:**

Schippers, E. E., Hoogsteder, L. M., & de Vogel, V. (2024). Theories on the etiology of deviant sexual interests: A systematic review. *Sexual Abuse*.

## Abstract

Not much is known about the etiology, or development, of deviant sexual interests. The aim of this systematic review was to provide a broad overview of current theories on the etiology of sexual deviance. We conducted a systematic search of the databases PubMed and APA PsycInfo (EBSCO). Studies were included when they discussed a theory regarding the etiology or development of sexual deviance. Included studies were assessed on quality criteria for good theories. Common etiological themes were extracted using thematic analysis. We included 47 theories explaining sexual deviance in general as well as various specific deviant sexual interests, such as pedophilia and sadism/masochism. Few studies ( $k = 7$ ) were of acceptable quality. These studies indicated that deviant sexual interests may develop as the result of an interplay of various factors: excitation transfer between emotions and sexual arousal, conditioning, problems with “normative” sexuality, and social learning. Neurobiological findings could not be included as no acceptable quality neurobiological theories could be retrieved. The important roles of excitation transfer and conditioning designate that dynamic, changeable processes take part in the etiology of sexual deviance. These same processes could potentially be deployed to diminish unwanted deviant sexual interests.

**Keywords:** sexual deviance, etiology, systematic review, excitation transfer, conditioning

## Theories on the Etiology of Deviant Sexual Interests: A Systematic Review

There is no uniform definition of what constitutes sexual deviance<sup>1</sup> or normalcy. Many scholars agree on extreme examples of sexual deviance, such as sexual interest in children or violent rape. It varies whether less extreme examples, such as sexual interest in latex suits or pain, are seen as sexual deviance or, for instance, as “unusual” sexual interests (Joyal et al., 2015; Smid & Wever, 2019). Such “unusual” sexual interests actually are pretty common. Up to half of Canadian (Joyal & Carpentier, 2017) and Czech (Bártová et al., 2021) representative population samples reported having at least one deviant sexual interest.

A broad definition of sexual deviance includes sexual interest in behavior that in most countries is illegal (e.g., rape, exhibitionism) as well as sexual interest in harmless but unusual behaviors (e.g., fetishism, defecation). There are good reasons to apply a broad definition of sexual deviance. One reason is the high correlations between deviant sexual interests. Having one deviant sexual interest increases the likelihood of having another (Bártová et al., 2021; Brown et al., 2020; Dawson et al., 2016; Joyal & Carpentier, 2017; Schippers et al., 2021; Wilpert, 2018). Another reason is the indication that in itself “harmless” deviant sexual interests may also lead to nonconsensual, coercive sexual behavior (Baur et al., 2016; Paquette & Brouillette-Alarie, 2020; K.M. Williams et al., 2009). In a large ( $N = 5,990$ ) Finnish population-based twin study, people who reported any deviant sexual behavior were over three times more likely to report that they had committed sexually coercive behavior (21%) than people without deviant sexual behavior (6%) (Baur et al., 2016). Having multiple deviant sexual interests was related to an even higher risk of sexually coercive behavior. In 99 BDSM practitioners from Germany, having a BDSM identity (as opposed to nonpractitioners) significantly predicted *nonconsensual* aggressive sexual behavior (Bondü & Birke, 2020). Likewise, performing sadomasochistic acts (Martin et al., 2016) and interest in sexual dominance (C.A. Renaud & Byers, 2005) have been found to be related to self-reported use of sexual coercion (see also the commentary of Baur et al., 2017). The evidence is not overwhelming nor unequivocal and scholars warn against unnecessary stigmatization (Joyal, 2017). However, it is apparent that various deviant sexual interests coexist and deviant sexual interests *may* be related to nonconsensual, coercive sexual behavior.

<sup>1</sup> The term sexual deviance is sometimes considered to be emotionally loaded. Alternative terms are atypical sexual interests or paraphilic sexual interests. We adopted the term deviant because it reflects the literature in our systematic review. We do not mean to imply any moral judgment regarding one's sexual interests.

### Is Sexual Deviance Problematic?

Not all deviant sexual interests are acted out and the mere sexual *interest* in something without accompanying behavior can never be illegal. Having such interests however increases the probability of corresponding behavior. Correlations between various deviant sexual interests and actual deviant sexual behavior are moderate to high, ranging from  $r = .40$  to  $r = .70$  (Bártová et al., 2021; Bondü & Birke, 2020; Seto et al., 2021; K.M. Williams et al., 2009). Deviant sexual behavior is not necessarily problematic, as long as it concerns legal acts with people who were capable to voluntarily consent. Mild torture, for example, may be appropriate with a consenting adult during BDSM<sup>2</sup> play.

Sexual deviance can become problematic when it negatively affects quality of life, for instance when it traverses fulfilling sexuality with a romantic partner, or when societal disregard causes distress and social isolation (Bezreh et al., 2012; A. L. Lawrence & Willis, 2021; Waldura et al., 2016). Furthermore, sexual deviance is a risk factor for sexual (re)offenses. A subset of sexual offenses is committed because someone has sexual interest in an illegal stimulus and acts accordingly. That is consistently shown in samples of people who have sexually offended against children or adults, with contact or noncontact offenses, and in various settings and with various levels of recidivism risk (Brankley et al., 2021; Etzler et al., 2020; Hanson et al., 2007; Helmus et al., 2021). It is assumed that risk factors relating to disinhibition predict recidivism with nonsexual offenses, while sexual deviance predicts recidivism with sexual offenses (Brouillette-Alarie et al., 2018; Brouillette-Alarie & Proulx, 2019; Etzler et al., 2020; McPhail et al., 2018).

### Improving Treatment

Sexual deviance is thus a relevant factor to address in certain treatment settings, i.e., when it is experienced as a burden or when it acts a risk factor for sexual offending. Treatment of sexual offending behavior is more effective when deviant sexual arousal is explicitly addressed (Gannon et al., 2019; McGrath et al., 2010; McPhail & Olver, 2020; Smid, 2021). However, techniques to directly address sexual deviance, such as (re)conditioning techniques, are not standard in Europe (Smid, 2021), are not applied in a substantial part of the treatments in Northern America and Canada (McGrath et al., 2010), and seem “to have lost favor” in some “Western jurisdictions” (Gannon et al., 2019, p.13). In order to improve treatment of sexual deviance, it is imperative to have a theory on the etiology of sexual deviance.

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<sup>2</sup> Bondage and Discipline (BD), Dominance and Submission (DS), and Sadism and Masochism (SM)

A theory specifies how certain variables relate to each other. It explains behavior that is known and predicts future behavior. It does so in a way that is generalizable beyond the individual level. This definition of theory follows those from authors reporting on an expert group and an evaluation of literature regarding behavior change (resp. Davis et al., 2015; Kwasnicka et al., 2016), and an evaluation of literature regarding operations management (Wacker, 1998). Theory formation is a necessary framework for collecting empirical evidence, which in turn is necessary to know what works best in treatment of unwanted deviant sexual interests.

Etiology is as an explanation of the origin or the causes of sexual deviance, or the developmental pathway to sexual deviance (Oxford University Press, 2021). In illustration, psychoanalytic theories on the etiology of sexual deviance would lead to very different treatment approaches (for instance focused on resolution of childhood trauma) than biological theories (e.g., medication) or behavioral theories (e.g., skills training).

### **Existing Theories**

Sexual motivation is often approached using an incentive motivational model (Ågmo & Laan, 2022; Both et al., 2007; Toates, 2014). In this model, sexual motivation is seen as an emotional response to a sexually relevant stimulus that provides potential reward. Processing emotionally significant stimuli causes activation of the emotion systems in the brain and prepares for behavioral action (LeDoux, 2012). Sexual arousal is tightly coupled with general sympathetic arousal, which allows overflow between sexual motivation and other emotional arousal (Ågmo & Laan, 2022). While the incentive motivational model is commonly adopted in the field of general sexology, its application to sexual deviance is less clear.

Relatively many theories exist that explain the etiology of sexual offending, each including sexual deviance as an important developmental factor for sexual offenses (e.g., Huppert et al., 2019; Seto, 2019; Ward & Beech, 2006). Yet, not much is known about the etiology of sexual deviance itself. Several scholars have concluded from the literature that very few theories explain the etiology of sexual deviance (Apostolou & Khalil, 2019; L. A. Craig & Bartels, 2021; A.F. Schmidt & Imhoff, 2021). No dominant, unified theory exists in either of the related fields of sexology, forensic psychiatry, psychology, nor across various cultures.

### **Current Aim**

The present study focuses on the first step of theory formation by providing a systematic review of theories on the etiology of sexual deviance. In a broad approach



we included any form of deviant sexual interest in both illegal and legal behaviors, as well as any theory explaining how sexual deviance develops. The theories should not just explain how a sexual interest *remains* deviant, but specifically how an inappropriate, nonnormative sexual stimulus *becomes* sexually arousing in the first place. We composed criteria to assess the quality of the included theories, to be able to emphasize good quality theories. Given their relatively extensive covering in the literature, we additionally and specifically searched for theories on the etiology of pedophilia and BDSM. As no uniform definition exists of what exactly constitutes “deviant” and “normative” sexual interest, additional to the main aim we provided a scoping review of the definition of sexual deviance. This was done by reviewing the definitions of sexual deviance from the included theories. Finally, the empirical support for the current findings was shortly discussed.

## Methods

### Transparency and Openness

The guidelines for Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) were followed while drafting this manuscript (Page et al., 2021). All the data and the codebook are available in the tables and appendix of this paper and in the open access online repository DataverseNL<sup>3</sup>. This study was not preregistered.

### Systematic Search

We conducted a systematic search of the databases PubMed and APA PsycInfo (EBSCO). The search terms were built upon three core concepts. First, words reflecting sexual behavior: “psychosexual development” or “psychosexual behavior” or “sexual” or “sexuality”. Second and additional, words reflecting deviance: “deviance” or “deviant” or “paraphilia” or “paraphilic” or “bds” or “sadis\*” or “masochis\*” or “sdomasochis\*” or “fetish\*” or “domination” or “submissi\*” or “pedophil\*” or “paedophil\*”. Third and additional, words reflecting etiology: “etiology” or “etiological” or “development” or “developmental” or “theory” or “theoretical”. Much research to sexual deviance has been conducted in recent decades and because we aimed for a topical overview, only theories after the year 2000 were included, except when they were cited in empirical papers or review papers post-2000 (see Inclusion/Exclusion Criteria). Only studies in English or Dutch were included. The final inclusion date was May 12, 2023. The first author scanned all titles and abstracts on their eligibility for this systematic review based on the inclusion and exclusion criteria (see Inclusion/Exclusion Criteria). Full texts were collected of all eligible studies, which were again

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<sup>3</sup> <https://doi.org/10.34894/ILFUQC>

assessed on the inclusion and exclusion criteria by the first author. The third author independently repeated this process to rate a random 10% ( $k = 230$ ) of the screened studies. There was “almost perfect” agreement on the included and excluded studies (Cohen’s kappa  $\kappa = .89$ ) (Landis & Koch, 1977). Any differences ( $k = 1$ ) were subsequently resolved by consensus.

### **Inclusion/Exclusion Criteria**

Studies were included when they reported a *theory* to explain the *etiology* or *development* of *sexual deviance*, following the definitions described in the introduction. Papers were excluded when they concerned: (a) nondeviant sexual interests, e.g., same-sex attraction or hypersexuality/sexual compulsion with normative stimuli; (b) the etiology of sexual offense behavior but not the etiology of deviant sexual interests; (c) an etiological analysis of the behavior of one individual that was not generalizable beyond the individual as per the definition of a theory; (d) a presentation of merely correlates or predictors of sexual deviance, not integrating this into a theory; or (e) commentaries, replies, book/film reviews, or editorials. Some reviews and empirical papers did not generate new theories, but drew on existing work. In these instances we included the original publications and not the secondary sources. Such original theories (as presented in review papers or empirical papers) were included in the search results and marked as “retrieved from additional sources”. These original theories could be from before the year 2000, since topical reviews and empirical studies indicated that they could still be relevant today.

### **Data Collection Process**

The first author read the full texts of all included studies to extract the following information: author(s), year of publication, type of sexual deviance, given definition of sexual deviance, target population, and core message of the theory. Also, the quality of the theories was assessed with six quality criteria (see paragraph below). The first author assessed the quality criteria for all included theories. Each theory was rated “yes” or “no” on all six criteria. Theories were qualified as “acceptable quality” if they complied with at least five of the six criteria and as “nonacceptable quality” if they complied with four or less criteria. The third author independently qualified another random 10% of all included theories, as well as all theories that were assigned acceptable quality by the first author (total  $k = 13$ ). There was “substantial” agreement on acceptable and nonacceptable quality studies (Cohen’s kappa  $\kappa = .69$ ) (Landis & Koch, 1977). Any differences ( $k = 2$ ) were subsequently resolved by consensus.

Reflexive thematic analysis (Braun & Clarke, 2006; 2021) was used to identify etiological themes from the core messages of the acceptable quality theories. Using Taguette.org software (Rampin & Rampin, 2021), text fragments pertaining to etiology were highlighted and a label was given to describe their content. When relevant, labels that belonged to a similar theme were grouped. Labels that were given more than once were included in the synthesis of the results. Subsequently, we applied thematic analysis to the theories that were of *non*acceptable quality. The aim was to assess how often the themes from the acceptable quality theories were present in the nonacceptable quality theories (deductive thematic analysis). Also, additional themes could be identified (inductive thematic analysis) (Braun & Clarke, 2006).

An additional study aim was to provide a scoping review of the definition of sexual deviance. Using thematic analysis, we sought common themes in the definitions of sexual deviance as given in *all* included studies, regardless of quality status.

### **Quality of Theory**

To our knowledge, no standardized instrument exists to assess the quality of explanatory theories in the field of psychology. A nonsystematic search of the literature was performed including search terms such as “good theory,” “theory quality,” “evaluation of theory.” This search identified various scholars who have provided criteria that distinguish just any theory from a *good* theory (Davis et al., 2015; Gawronski & Bodenhausen, 2015; Gieseler et al., 2019; E.T. Higgins, 2004; van Lange, 2013; Ward & Beech, 2006). Most of these authors work in the field of social psychology, except Ward and Beech, who work in forensic psychology. The authors based their quality criteria on information from Delphi-groups (Davis et al., 2015), scientific literature (Gawronski & Bodenhausen, 2015; Gieseler et al., 2019; Ward & Beech, 2006) and own insights (E.T. Higgins, 2004; van Lange, 2013). The quality criteria of all authors were very similar. Putting their criteria side by side allowed us to make a synthesis of quality criteria for good theories (see Table 1). As an example, all authors had included a criterion regarding “parsimony” (Davis et al., 2015; Gawronski & Bodenhausen, 2015; Gieseler et al., 2019), or “simplicity” (Ward & Beech, 2006), “abstraction” (van Lange, 2013) or being “economical” (E.T. Higgins, 2004), stating that theories should be as simple as possible. This was synthesized under our current criterion of parsimony. Similarly, five out of six papers mentioned the criterion of “falsifiability” (Gieseler et al., 2019), “truth” (van Lange, 2013), “testability” (Davis et al., 2015; E.T. Higgins, 2004), or “refutability” (Gawronski & Bodenhausen, 2015), which was summarized as our current criterion of testability. We refer readers to the online supplement of the published article, Table S1, to see the synthesis of the

current quality criteria from the original criteria of the various scholars. To further operationalize each criterion, aiding questions were devised from the criteria of the various scholars. These aiding questions could be used to support a yes/no decision on each criterion. If one of the aiding questions was scored “no”, the criterion was not met. The first and third author calibrated and operationalized the quality criteria on 10% ( $k = 5$ ) of the included studies. Most judgments (clinical utility, explaining known empirical findings) remained partly subjective and were based on the raters’ knowledge of the field, but the current criteria are believed to be the best possible attempt currently available for a systematic quality assessment of a theory. Following the cited scholars, theories were valued when they had broad generalization power. This does not mean that, outside of the current aim, very specific theories cannot be useful for certain target groups.

**Table 1**  
*Quality Criteria for Good Theories and Aiding Questions*

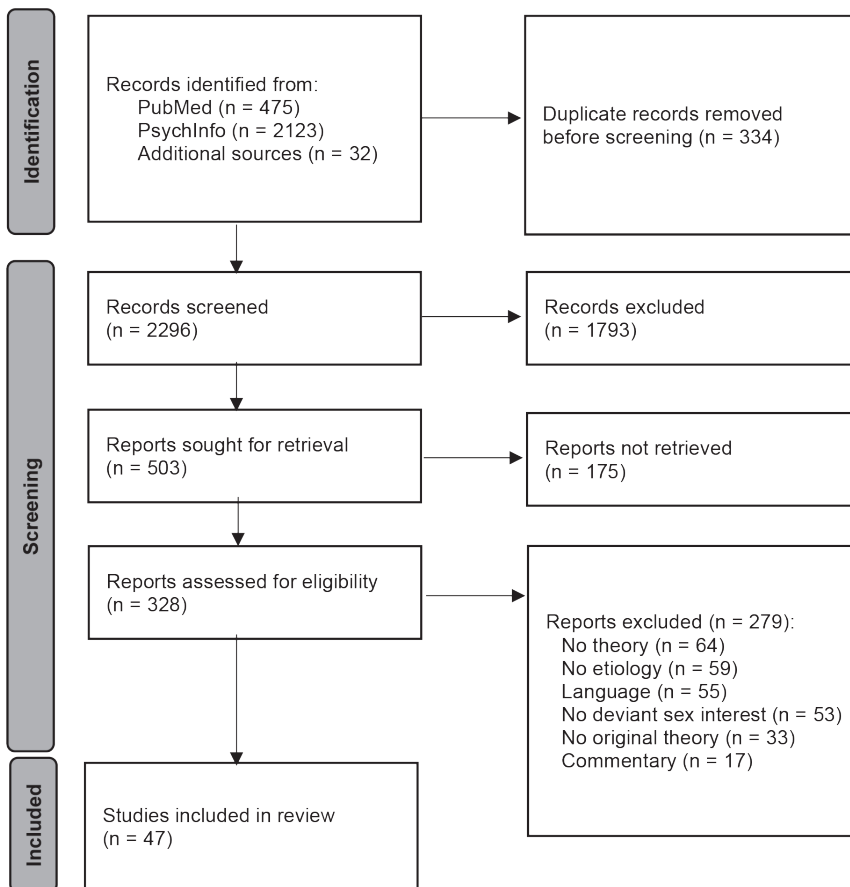
Quality Criteria	Aiding Questions
<p><b>1. Explain known findings.</b> A good theory should explain known observations and empirical findings.</p>	<p>Does the theory align with empirical findings? Does the theory align with clinical observations?</p>
<p><b>2. Precision and coherency.</b> Describing a theory in a precise, clear and logical manner limits subjective or confused interpretation.</p>	<p>Does the theory provide a clear definition of the sexually deviant topic and other variables involved? Does the theory clearly describe how the variables relate to each other? Does the theory clearly describe how a deviant stimulus becomes sexually arousing?</p>
<p><b>3. Parsimony.</b> “Explain more with less,” use as few parameters or assumptions as possible to explain an event.</p>	<p>Does the theory not have unnecessary parameters or assumptions? Is the theory as simplified as possible?</p>
<p><b>4. Testability.</b> A good theory can produce hypotheses to not only support, but also oppose the theory.</p>	<p>Can testable hypotheses be made to support (parts of) the theory? Can testable hypotheses be made to oppose (parts of) the theory? <i>NB. It is not necessary that hypotheses are formulated by the original authors.</i></p>
<p><b>5. Generalizability.</b> A good theory is broadly applicable and generalizes beyond individual phenomena or specific contexts.</p>	<p>Is the theory generalizable across various deviant sexual behaviors and populations? Can the theory be applied in clinical setting?</p>
<p><b>6. Progress.</b> A good theory should contribute beyond what is already known, set forth new research ideas, and promote progress.</p>	<p>Does the theory add new insight or knowledge? Does the theory provide starting points for further research? Does the theory have clinical utility? <i>NB. This refers to the time the article was published.</i></p>

## Results

### Inclusion Process

The systematic search identified 2,264 unique records. An extra 32 records were identified from additional sources, i.e., from reviews and empirical studies in the search results. See Figure 1 for the PRISMA flow chart of the study selection procedure (Page et al., 2021). A total of 47 records met the inclusion criteria. These studies and their characteristics can be found in the Appendix, Table A1. Examples of exclusion reasons were studies that discussed: the etiology of sexual offending behavior but not of sexual deviance (Stinson et al., 2008), characteristics of sexual deviance but not etiological processes (Pflugradt & Allen, 2012), etiological implications but not theory forming (Levenson & Ackerman, 2017).

**Figure 1**  
PRISMA Flow Chart of Study Inclusion Process



## Acceptable Quality Theories

Seven studies were of acceptable quality, complying with five or all six quality criteria (Critelli & Bivona, 2008; Dawson et al., 2016; Dunkley et al., 2020; Finkelhor & Araji, 1986; Laws & Marshall, 1990; McGuire et al., 1964; Smid & Wever, 2019). See the open access data file at [DataverseNL<sup>4</sup>](https://doi.org/10.34894/ILFUQC) for the quality coding of all studies, and see the Appendix, Table A1, for a description of the theories and their core messages. Examples of not meeting the criteria were: precision and clarity (Dawson et al., 2016; Laws & Marshall, 1990; McGuire et al., 1964), generalizability (Dunkley et al., 2020), or parsimony (Finkelhor & Araji, 1986). Three of the acceptable quality theories discussed specific deviant sexual interests: rape fantasies, physical masochism, and pedophilia. The other four theories discussed sexual deviance in the general sense. Two theories were applied to offending populations, the other theories to general populations. Two theories were gender specific: one regarding women, one regarding men. Three of the seven theories were from 1990 or before.

## Etiological Themes

Through thematic analysis several etiological themes were identified that were repeated throughout the acceptable quality theories: excitation transfer, conditioning, problems with normative sexuality, and social learning. Table 2 shows how often each theme was present. The themes are discussed below and supplemented with findings from the thematic analysis of the nonacceptable quality theories. Four themes consisted of several subordinate labels. Conditioning was a grouped theme of the labels conditioning and reinforcement. Social learning was a grouped theme of the labels social learning, modeling, and trauma. Modules was a grouped theme of the labels modules and target errors. Problems with normative sex was a grouped theme of the labels problems with normative sex and habituation of sexual stimuli (requiring stronger stimuli).

**Table 2**  
*Etiological Themes from Thematic Analysis*

Theme	Frequency (n) of Theme in Theories	
	Acceptable Quality (k = 7)	Nonacceptable Quality (k = 40)
Conditioning	5	12
Excitation Transfer	5	10
Problems with Normative Sex	3	6
Social Learning	2	15
Biological Predispositions	2	12
Evolution	1	6
Higher Cognitive Goals	1	3
Modules		4
Imprinting		3
Attachment		2

<sup>4</sup> <https://doi.org/10.34894/ILFUQC>

### **Conditioning**

The oldest included theories describe how conditioning theory can be applied to sexual deviance (Finkelhor & Araji, 1986; Laws & Marshall, 1990; McGuire et al., 1964). These theories were included because they were often referred to by other, topical papers in the screening process, an indication that despite of their age they are still relevant today. Sexual arousal may be coupled to a deviant stimulus by means of classical conditioning. “[A]ny stimulus which regularly precedes ejaculation by the correct time interval should become more and more sexually exciting” (McGuire et al., 1964, p.186). This coupling might also occur through operant conditioning. Deviant sexual acts are then reinforced by “e.g., genital stimulation, ejaculation, social approval of the partner, or increased responsiveness of the partner” (Laws & Marshall, 1990, p.213). According to Smid and Wever (2019), operant conditioning, where sexual climax is a reinforcer for responding to a deviant stimulus, is a stronger mechanism than classical conditioning, where the deviant stimulus and sexual climax appear in temporal succession. Other reinforcing motivators for the sexual behavior might be to “relieve psychological stress, allow the momentary suspension of the burdensome responsibilities of day-to-day life, and promote intimacy and connection between partners” (Dunkley et al., 2020, p.433). Thirty percent of the nonacceptable quality theories included conditioning and reinforcement of sexual behavior as etiological theme.

### **Excitation Transfer**

Latent sexual arousal that is already present, can be increased by another emotion that occurs at the same time. Smid and Wever (2019) refer to this process as “excitation transfer”. An example is the thought of being raped. This might induce fear, which increases the fantasy’s sexual impact (Critelli & Bivona, 2008). Emotional arousal can also be mislabeled as a sexual response. For instance, children may elicit strong emotional reactions, such as “protective” or “affectionate” that can be misattributed as sexual arousal (Finkelhor & Araji, 1986). A similar transfer mechanism between various forms of arousal may exist in physical masochism. Emotional states are theorized to work together with sexual arousal to create a receptivity for pain (Dunkley et al., 2020). At the same time, sexual arousal counteracts the physical experience of pain. The theme of excitation transfer was also present in a quarter of the nonacceptable quality studies.

### **Problems with Normative Sexuality**

According to Finkelhor and Araji (1986), one of the four factors potentially causing pedophilia is a blockage to obtain sexual and emotional gratification from more normatively approved sources. Other authors theorized that problems with

normative sexuality may strengthen the deviant sexual conditioning process. "Men who are not easily aroused by normative stimuli will be more likely to experience strong positive reinforcement from their engagement with the deviant stimulus and will be inclined to revisit the experience where they did find sufficient arousal, thus further promoting the conditioning process" (Smid & Wever, 2019, p.746). Meanwhile, other, normative sexual stimuli are less and less reinforced and are ultimately extinguished (McGuire et al., 1964). From the conclusions of Dawson et al. (2016), an opposite hypothesis could be drawn. "[P]eople who have a high sex drive may choose to expend their vast energy toward not only their preferred targets and activities (which in most cases will be nonparaphilic), but also other targets and activities as well, including atypical ones" (p.35). They might hypothesize that people with a high sex drive have interest in *both* normative and deviant sexual stimuli. Problems with normative sexuality were also a theme in about 15% of the nonacceptable quality theories.

### ***Social Learning***

The theme of social learning included social learning from or modeling of early sexual experiences or sexual acts by parents or peers, and traumatic victimization of (sexual) abuse. In the acceptable quality studies, it was mentioned twice (Finkelhor & Araji, 1986; Laws & Marshall, 1990). Social learning and modeling may shape the conditioning process, for instance by means of early sexual experiences or exposure to sexuality via parents or porn (Finkelhor & Araji, 1986). Social learning may be interwoven with conditioning, for instance when coercion and sexual arousal are presented together in childhood sexual victimization (Laws & Marshall, 1990). The theme of social learning was the most common theme in the nonacceptable quality studies (in one third of the studies). It was for instance hypothesized that an individual may have learned to assert a dominant sexual role as a means to "undo" previous victimization (Gee & Belofastov, 2007). Seven psychoanalytic studies included trauma as an etiological factor, but these theories failed to meet most quality criteria.

### ***Biological Predispositions***

One acceptable quality study mentioned biological predispositions "such as hormone levels or chromosomal make-up" (p.152) as possible contributors to pedophilia (Finkelhor & Araji, 1986). One acceptable quality study concluded that a "biological predisposition to surrender" should be explored, but this is more an evolutionary than a neurobiological approach (Critelli & Bivona, 2008). Much neuropsychological and biological research in the last decades has advanced the state of knowledge. Many of these recent relevant findings could not be included in



the current systematic review, because very few neurobiological theories have yet been developed that complied with the inclusion criteria of this study, and the few included ones were of nonacceptable quality. In the nonacceptable quality theories, biological predispositions or mechanisms were often mentioned in general, but not specified, e.g., “aberrant cortical development” (L.J. Cohen & Galynker, 2002) or “general biological sexual preparedness” (O’Keefe et al., 2009).

### **Other Findings**

One acceptable quality and seven nonacceptable quality theories reported evolutionary factors as causing sexual deviance. An example is that women would accommodate dominant men because they would produce better offspring (E.A. Harris et al., 2017). This example could explain submissive *behavior*, but does not explain how submission becomes *sexually arousing*. Evolutionary theories often could not precisely describe how a deviant stimulus becomes sexually arousing (criterion of precision and clarity) and were hardly falsifiable (testability). Remaining etiological themes that were mainly mentioned in nonacceptable quality theories included: higher cognitive goals (e.g., pleasure seeking or dominance), imprinting, modules, and problems with attachment. Modules or targets define what features are attractive to an individual, for instance regarding age, gender, body features. These theories failed to meet most quality criteria.

### **Definition of Sexual Deviance**

The definitions of sexual deviance from all 47 included studies are presented in the Appendix, Table A1. Most ( $k = 14$ ) of the included studies discussed masochism and/or sadism, e.g., “masochism”, “submission”, “sadism”, “beating phantasies”, “sadistic sexual fantasies”. The definitions from the original authors most often included “physical pain” (seven theories), sometimes supplemented with “humiliation” (three of these seven theories). Three definitions included control or dominance, two included the word “consensual”. Remarkably, most definitions (eight) did not explicitly couple masochism and/or sadism with sexual arousal. For instance, “the consensual receiving and enjoyment of physical sensations that would characteristically be classified as painful” (Dunkley et al., 2020), and “violence and humiliation [appear] as an important nucleus of phantasy” (Antinucci, 2016). In other theories, humiliation and pain were defined to be causal to sexual arousal (e.g. Abrams & Stefan, 2012) or only needed to both be present at the same time (e.g. MacCulloch et al., 2000).

Thirteen studies discussed “paraphilia” or “sexual deviance” in a general sense, without specifying the content of the sexual interest. Three studies defined sexual deviance as sexual behavior, two as sexual interest, two as sexual fantasies, and

three studies followed the DSM-IV(-TR) definition in which paraphilia can be urges, fantasies or behavior. Authors defined “deviance” relative to a combination of various norms, most often social or societal norms (six studies) and judicial norms (six studies). Examples of societal norms were “contravenes the norms of society” (Bhugra, 2000), “socially unconventional” (Birchard, 2011) or “inappropriate” (Maniglio, 2011, 2012). Examples of judicial norms were “illegal” (Gee & Belofastov, 2007) or “nonconsent” (Ward et al., 2016). Other norms included statistical norms (three studies), e.g., “atypical” (Dawson et al., 2016) or “unusual” (Smid & Wever, 2019), and psychopathological norms including DSM classifications (four studies). Finally, three studies mentioned the infliction of harm or pain as one of the possible defining features of sexual deviance.

Eight studies discussed pedophilia or sexual preferences towards children. In their definitions most authors (four studies) referred to the DSM or ICD manual valid at that time. The remaining twelve studies included theories discussed specific types of sexual deviance that could not be grouped under one topic.

## Discussion

Few good quality theories explained the etiology of sexual deviance. In a systematic review with broad inclusion criteria 2,296 articles were scanned, 47 theories were included, and only seven theories were of acceptable quality. From these seven, three were from 1990 or before. The fact that these remaining theories shared common etiological themes indicates that there is agreement in the field about relevant factors in the development of sexual deviance. This also indicates a similarity in the development of general sexual deviance and various specific deviant sexual interests. The extent to which this “agreement” is funded by empirical evidence, is an important next question in research.

## Synthesis of Findings

The following synthesis was made from the included etiological theories. Stimuli that elicit a strong emotion, such as fear, pain, or endearment, might enhance sexual response when presented closely together (Critelli & Bivona, 2008; Smid & Wever, 2019). The extra emotional impact might make this a stronger sexual stimulus that results in sexual gratification. This might especially be a working mechanism for people that experience no satisfying amount of sexual arousal in normative sex; they profit from additional stimulation (Finkelhor & Araji, 1986; Smid & Wever, 2019). At the same time, a ceiling effect might exist where too much stimulation disrupts sexual

response (Critelli & Bivona, 2008; Smid & Wever, 2019). An intermediate optimum of arousal seems desired for sexual response. Sexual gratification is a strong reinforcer, but also social, behavioral or cognitive events might reinforce the sexual response to a deviant stimulus. Examples are an appraising partner, sex-stimulating environment, or the impression of being desired (Critelli & Bivona, 2008; Dunkley et al., 2020; Laws & Marshall, 1990). Conscious or unconscious revisitation of the successful experience and sexual climax strengthens the connection between sexual arousal and deviant stimulus in a process of operant conditioning (Laws & Marshall, 1990; McGuire et al., 1964; Smid & Wever, 2019). In this process, the focus may increasingly lie on the deviant stimulus rather than on any normative, less successful alternatives (McGuire et al., 1964). Social learning may influence this process throughout, as well as at the start by providing sexual contexts for conditioning to take place in, for example, during early sexual experiences (Finkelhor & Araji, 1986; Lussier et al., 2005). The role of biological predispositions is not yet clear-cut. Biological predispositions may explain necessary or supporting conditions for the development of a deviant sexual interest. Examples of such predispositions are the brain's sensitivity for reward (Roszyk & Łukaszewska, 2011), interpretation of sexual cues and erectile sensitivity (Imhoff et al., 2017; Smid & Wever, 2019), or baseline level of sympathetic arousal (Critelli & Bivona, 2008; Dunkley et al., 2020).

### **Incentive Motivational Model**

The synthesis above concurs with the incentive motivational model of sexual motivation that is commonly adopted regarding general sexology (Ågmo & Laan, 2022; Both et al., 2007; Toates, 2014). In this model, sexual motivation is seen as an emotional response to a sexually relevant stimulus that provides potential reward. Smid and Wever (2019) were the only included authors who literally borrowed from this model. The other acceptable quality theories fit well into this model, centering around arousal transfer between emotions and the reinforcing properties of deviant sexual stimuli (Critelli & Bivona, 2008; Dunkley et al., 2020; Finkelhor & Araji, 1986; Laws & Marshall, 1990; McGuire et al., 1964).

Slightly different from the rest is the theory of Dawson et al. (2016), which states that high sex drive leaves extra energy to expend towards other than normative stimuli. The authors defined sex drive as “the strength of an individual's sexual motivation” (p.23). This theory is the only one hypothesizing that an excess rather than a lack of (normative) sexual motivation might lead to sexual deviance. While an excess of sexual motivation might explain an excess of sexual *behavior* towards an excess of stimuli, including deviant ones, it does not explain precisely how a deviant sexual stimulus may become sexually arousing.

## **Empirical Evidence for the Etiological Factors**

Good quality theories should be built upon empirical and clinical evidence (conform the “explain known findings” criterion). An extensive test of the empirical evidence for the etiological theories is an important future, second step to supplement and expand the current aim. In a brief contemplation, we will address the current state of empirical findings for each etiological theme.

### **Conditioning**

Reviews to the conditioning of the sexual response conclude that empirical evidence mainly comes from animal studies and that studies with humans are still scarce (Brom, Both, et al., 2014; Hoffmann, 2017). Classical conditioning of the sexual response seems possible, but the evidence for operant conditioning is too scarce to make conclusions. Conditioning seems to work best with stimuli that resemble a sexual stimulus (e.g., the abdomen of an individual of the opposite gender for humans; or a female with colored feathers for quail), as opposed to random stimuli (e.g., a gun for humans; or a stuffed animal for quail) (resp. Hoffmann et al., 2004; Domjan & Hollis, 1988). Yet, irrelevant stimuli can also be associated with sexual response (Brom, Both, et al., 2014). Results obtained in a lab setting do not appear to be very robust (Hoffmann, 2017). The challenge remains to test this in realistic settings, for instance by using online conditioning paradigms that can be implemented at home.

### **Excitation Transfer**

It has often been demonstrated that arousal can transfer from one emotion to the other, adding up to increase the emotional response, a process called “excitation transfer” (Wang & Lang, 2012). Most empirical evidence is quite dated, but it is clear that sexual arousal can transfer *to and from* other emotions, such as aggression and fear (M. Allen et al., 1995; A. N. Craig et al., 2017; Hoon et al., 1977; Lalumière et al., 2017; Malamuth et al., 1986; Wolchik et al., 1980). A recent empirical study showed that being in an emotional state (e.g., aggression, endearment) can increase subjective and physiological sexual response to erotica in healthy men (Schippers et al., 2022), Smid, Both, & Smit, 2022). Not everyone seemed as susceptible for excitation transfer, as there were large interindividual variations, but 60% of the 30 subjects showed some form of excitation transfer. Future research should explore which people are most susceptible to these effects and why.

### **Problems with Normative Sexuality**

To our knowledge there is no empirical research to problems with normative sexuality as an etiological cause for sexual deviance. The available evidence merely concerns sexual offending, especially pedophilia, and is correlational. A lack of experience with

romantic relationships has been found to predict later sexual recidivism in people who have sexually offended (Hanson et al., 2007; Hanson & Thornton, 2000). People who have sexually offended against children and people with pedophilia have been found to be single more often than nonoffenders or community controls (Bartels et al., 2018; Cazala et al., 2019). There are empirical studies in which sexual responses were elicited to child and adult stimuli in people who have sexually offended against children and various control groups. Meta-analyses of these studies showed that people who have sexually offended against children with and without pedophilia have less sexual interest in adults than control groups (Schippers et al., 2022). There is a need for research to this topic with nonoffending, sexually deviant groups.

### **Neurobiology**

For more information about neurobiological findings regarding sexual deviance, we refer to recent reviews (e.g., Krüger & Kneer, 2021; van Kessel et al., 2022; Wuyts & Morrens, 2021). Most neurobiological research regards pedophilia and is hampered by a lack of proper comparison groups. It seems that neurobiological aberrations are mainly found in delinquent groups (Dillien et al., 2020; Krüger & Kneer, 2021). Nondelinquent participants with pedophilia may display rather normal neurobiology (Krüger & Kneer, 2021; van Kessel et al., 2022). A recent meta-analysis of the biology of BDSM concluded that during BDSM interactions, brain systems regarding reward (for both dominants and submissives) and pain and stress (for submissives) were involved (Wuyts & Morrens, 2022). Yet, their etiological account remains unclear.

### **Social Learning**

There seems to be no empirical evidence regarding social learning, trauma, or early sexual experiences as an etiological factor for sexual deviance (Smid & Wever, 2019). Again, most research includes sexual offending samples and correlational and retrospective data. Trauma is found to be more common among sex offenders than among the general population (Dillard & Beaujolais, 2019; Lateef & Jenney, 2021). The same is true for early exposure to pornography (Simons et al., 2008). Interviews with BDSM-practitioners revealed social learning as one of the pathways of entrance into BDSM, for instance via online popular culture or via a sexual partner (A.M. Walker & Kuperberg, 2022).

### **Definition of Sexual Deviance**

Additional to our review of the etiology of sexual deviance we reviewed the definitions of sexual deviance from the included studies. General sexual deviance was most often defined as sexual fantasies, interests, or behavior that deviate from societal and judicial norms. Possible problems with a definition based on societal

norms, and to a lesser extent judicial norms, is that these are not fixed and can change in time, place, and culture. Masochism/sadism was most often defined as a – not necessarily sexual – interest in or behavior with painful or humiliating stimuli. Whether or not this is consensual was often not specified. Pedophilia was pathologized more than masochism/sadism or general sexual deviance, as it was typically defined according to the medical handbooks DSM and ICD.

## Strengths and Limitations

Some strengths of the current systematic review could be identified. We adopted a broad approach, thereby increasing the number of studies to be included. A strength was the endeavor to qualify each theory as objectively as possible using strict criteria. This allowed us to emphasize good quality theories. While this quality judgment remained partly subjective, it seems like a step forward as none of the included studies explicitly addressed theory quality. Additional, several limitations could be identified. Only English or Dutch articles were included, which left out 54 screened articles in different languages (mostly French and German). As we aimed to provide a topical overview, the systematic search only sought for articles published after 2000. Earlier theories were only included if they were referred to in these articles. A general limitation in the study of etiology is the issue of causality. Most findings stem from correlational research, therefore it is impossible to conclude if they are causal to sexual deviance or the result of repeated deviant sexual interest/behavior. Some theories only discussed specific sexual deviances in specific groups, for instance, pedophilia in offending populations and BDSM in nonoffending populations. However, very similar etiological themes were extracted from these specific theories. This indicates that the found etiological themes and incentive motivational framework could be broadly applied to any form of sexual deviance in any context.

## Implications

This systematic review indicated that deviant sexual interests seem malleable, to some extent. The important roles of excitation transfer and conditioning designate that dynamic, changeable process take part in the etiology of sexual deviance. These same processes could potentially be deployed to diminish unwanted deviant sexual interests. Speculatively, several possible interventions include abstinence to prevent further reinforcement of the deviant stimulus, aversive conditioning to couple negative consequences (e.g., bitter taste or bad smell) to deviant sexual arousal, conditioning to strengthen sexual arousal to normative sexual stimuli, arousal regulation to reduce general sympathetic arousal (e.g., relaxation), or emotion regulation to reduce emotional reactions. Techniques to directly target deviant sexual

arousal, such as (re)conditioning techniques, are known to be effective in reducing sexual offending (A. Allen et al., 2020; Gannon et al., 2019; McPhail & Olver, 2020), but it remains unclear which specific techniques work best.

Scholars have emphasized the lack of theory forming around the etiology of sexual deviance (L. A. Craig & Bartels, 2021; Smid & Wever, 2019). To our knowledge, we are the first to systematically review theories on the etiology of sexual deviance. It appears there is not necessarily a lack of theories, as we could include 47 records. There is, however, a lack of good quality theories, as well as a lack of empirical evidence substantiating these theories. Two areas of attention are problems with normative sexuality and social learning. Both need empirical research in general populations beyond the level of retrospective or correlational data.

It seems that general theories can be used to explain a variety of deviant sexual interests, eliminating the need for all too specific theories of separate deviant sexual interests. If one desires a good quality theoretical framework for the etiology of sexual deviance, we recommend those listed in Table 2, which are mostly in line with the incentive motivational model (Ågmo & Laan, 2022; Both et al., 2007; Toates, 2014). Based on the current state of research, an incentive motivational model seems not only appropriate to explain general sexual motivation, but deviant sexual interests as well. This is a useful framework for treatment purposes to diminish unwanted deviant sexual interests.





## Appendix

**Table A1**

*Theory Characteristics, Core Message, and Quality*

<b>Study, Theory Name</b>	<b>Topic</b>
Abrams & Stefan, 2012	Masochism
Airaksinen, 2017	BDSM
Allely, 2020	Zoophilia
Antinucci, 2016	Beating phantasies
Apostolou & Khalil, 2019	Aggressive and humiliating sexual acts
Arrigo & Purcell, 2001, "integrated theoretical model of paraphilia and erotophonophilia"	Erotophonophilia, sadistic sexual homicide
Bhugra, 2000	Paraphilia
Birchard, 2011, "the opponent process theory of acquired motivation"	Paraphilia
Blanchard, 1991, "erotic target location errors"	Auto-gynephilia
L.J. Cohen & Galynker, 2002, "abused abuser theory"	Pedophilia
Critelli & Bivona, 2008	Rape fantasies
Dahan, 2019, "the evolutionary hypothesis"	Submission/ masochism
Dawson et al., 2016	Paraphilic interests
Dunkley et al., 2020, "pain as pleasure"	Physical masochism
Enquist et al., 2011, "sexual imprinting"	Sexual attraction to pregnancy and lactation
Finkelhor & Araji, 1986, "four factor model"	Pedophilia

Core Message	Quality Acceptable?
Masochism is an adaptive response to abuse, wherein the rage and shame become integral to sexual arousal. The theme becomes fixed in early development (lovemap).	No
Pain and pleasure may feel mutually undistinguishable. Simple pain is part of a complicated mental process that in the end satisfies ones' desires, or achieves certain complex cognitive goals.	No
Early, inadvertent conditioning to sensory stimuli may lead to a powerful union between specific ASD sensory-seeking and sexual arousal through masturbation.	No
The beating phantasies shore up a precarious sense of self, threatened with psychic depletion and death, in identification with the absent mother of early infancy.	No
A preference to perform aggressive and humiliating sexual acts has evolved to enable men to bypass women's resistance, but also to intimidate and warn them about the consequences of infidelity or running away.	No
Anger is expressed in the content of image making. Social isolation mobilizes the paraphilic system into operation. The paraphilic process consists of the following mutually interactive elements: (a) paraphilic stimuli and fantasy, (b) orgasmic conditioning process, and (c) facilitators (e.g., alcohol, drugs, pornography).	No
<b>Fetish:</b> The physical beauty of the female receives more explicit consideration than that of the male. This may explain why men get turned on by objects. <b>BDSM:</b> The culturally accepted patterns of precoital play are strongly influenced by learning.	No
Traumatic events in childhood are automatically reversed by the brain and are made pleasurable by eroticization.	No
The failure of some developmental process that, in normal males, keeps heterosexual learning "on track," perhaps by biasing erotic response toward external rather than internal stimuli.	No
Childhood sexual abuse leads to aberrant cortical development. In effect, pedophiles become imprinted by premature sexual stimulation to develop deviant sexual desire.	No
Anxiety, fear, and anger, which activate sympathetic arousal, can enhance sexual response. Adversary transformation suggests that the idea of rape produces the danger and excitement that gives the fantasy sexual and emotional impact.	Yes
The psychophysical altered state during natural and undisturbed childbirth can serve as (at least) a partial lower level explanation of the enigmatic appeal of being a submissive in a BDSM scene.	No
People who have a high sex drive may choose to expend their vast energy toward not only their preferred targets and activities, but also other targets and activities as well, including atypical ones.	Yes
Sexual arousal prior to the infliction of pain stimuli serves as an analgesic. Sexual arousal and orgasm influence neural chemistry and emotional state. This relieves psychological stress, allows the momentary suspension of the burdensome responsibilities of day-to-day life, and promotes intimacy and connection between partners; which motivates to seek out such experiences again.	Yes
Sexual preferences may be acquired through exposure to particular stimuli during a specific period early in life, between age 1.5 and 5, similar to sexual imprinting in birds and mammals.	No
Sexual arousal is explained by early sexual experiences, conditioning, modeling, misattribution of arousal, biological factors, or exposure to child-erotizing media.	Yes

**Table A1***Continued*

<b>Study, Theory Name</b>	<b>Topic</b>
FitzGerald, 2000	Fetishism
Fox et al., 2022, "anxiety-sexual arousal hypothesis"	Paraphilias
Gannon, 2021, "a compositional explanatory theory of pedophilia"	Pedophilia
Gee & Belofastov, 2007	Deviant sexual fantasies
L. Grossman, 2015, "the object-preserving function of sadomasochism"	Sado-masochism
Grov, 2004, "labeling theory and social learning theory"	Barebacking and bug chasing
E.A. Harris et al., 2017, "social cognitive theory and evolutionary theory"	Dominance/ submission
Hawley & Hensley IV, 2009, "resource control theory perspective"	Forceful submission fantasies
Imhoff et al., 2017, "a theory of chronophilic sexual orientation"	Sexual orientation (chronophilia) and sexual motivation (e.g. fetish)
Juni, 2009, "drive-theory and object relations theory; libidinal spillover model"	Sadism
C. Klein, 2014, "The Penumbral Theory"	Masochism
A.A. Lawrence, 2006, "sex print or lovemap, erotic target location errors"	Apotemno-philias and auto-gynephilia
Laws & Marshall, 1990, "conditioning and social learning model"	Sexual deviance

Core Message	Quality Acceptable?
A baby's dreaming mind interprets the various inputs from society. If the environmental input is one of mixed messages, the fetish may be heterosexual/homosexual or homosexual, or vary along a number of socially unsanctioned lines.	No
Paraphilic interests may develop in men when anxiety is elicited by an unconventional sexual stimulus, and when anxiety potentiates already existing sexual arousal.	No
The environmental pathway refers to a relatively malleable sexual interest that will be non-exclusive. The biological pathway refers to a relatively unchangeable sexual preference that may or may not be exclusive.	No
Deviant sexual fantasy can be generated from either internal imaginary processes or external sources. By utilizing mental simulation, cognitive rehearsal, and covert modeling, an individual can modify those aspects of a fantasy that become boring or unstimulating. Sexual arousal may become conditioned through masturbation to the deviant sexual fantasies.	No
Object seeking and pleasure seeking become overlapping goals. At some point in early childhood development, sadism appears naturally as one such derivative of pleasure as an object-related aim.	No
Labeling theory: the labeling of the primary deviance may produce secondary deviance in which the individual attempts to fulfill the expectations that accompany the label. Social learning theory: deviant behavior is largely learned through peer associations, perceptions of costs and rewards, and personal definitions.	No
Social cognitive perspective: the trait of dominance has become normatively masculine through a process of socialization, including exposure to media. Evolutionary account: dominance is more likely to be valued by women because having a dominant partner was associated with greater chances of survival.	No
Women who themselves are dominant and aggressive should entertain forceful submission fantasies more than subordinate women because they are especially drawn to dominant men.	No
Sexual motivation: Repeated co-occurrence with sexual satisfaction could turn a stimulus into a conditioned stimulus that is potent enough to elicit a sexual reaction. Arousal transfer from transgressive stimuli raises sexual arousal. Sexual satisfaction or orgasm increase the likelihood of consuming such deviant/transgressive material again. Sexual orientation: Some men are insensitive to information about breast size and waist-to-hip ratio. For these men, the ideal sexual object would now be the one that maximizes skin smoothness and facial neoteny, i.e., a prepubescent child.	No
Any areas of excitation can be energized by the acute release of energy in another domain. The sexuality in re-enacted sadism is intrinsically linked to an imagined emotional relationship with the victim that is intended to ameliorate and undo past trauma that haunt the perpetrator.	No
Masochistic pleasure is possible in cases where pains are in the shadowy border just shy of being too much to bear, because: it is novel, there is a pleasure in exercising self-control, they stand as unique signifiers of trust and intimacy, and helps you grow and change.	No
Apotemnophilia may represent the intersection of an uncommon erotic target preference (attraction to amputees) and an erotic target location error (the erotic target is located in themselves).	No
Sexual arousal can occur through classical conditioning or operant conditioning. Social learning and modelling elaborate and refine behaviors already learned.	Yes

**Table A1***Continued*

<b>Study, Theory Name</b>	<b>Topic</b>
Lussier et al., 2005, "psychosocial deficits pathway"	Sexual preferences towards children
MacCulloch et al., 2000	Sadistic sexual fantasy
Maniglio, 2011	Deviant sexual fantasies
Maniglio, 2012	Deviant sexual fantasies
Massa et al., 2022, "object-relation theory"	Paraphilic attraction to sex robots
McGuire et al., 1964, "conditioning theory"	Sexual deviations
Mitchell, 2021	Sexual orientation toward men's short haircuts
Munroe & Gauvain, 2001, "Zeigarnik effect"	Paraphilias
O'Keefe et al., 2009	Inserted object-assisted sexual behaviors
Quinsey & Lalumière, 1995	Sexual preference for prepubescents
Roszyk & Łukaszewska, 2011, "temporal-limbic theory"	Sexual deviations, paraphilias
Ryan, 2005	Transvestism
Scarpazza et al., 2021	Acquired pedophilia

Core Message	Quality Acceptable?
The psychosocial deficits pathway: Individuals who did not develop a secure attachment will tend to feel inadequate and alienated and could decide to turn to children to fulfill their sexual and intimacy needs. The sexualization pathway: A violent extrafamilial sexual abuse can favor the development of violent sexual fantasies used during masturbation, and reenactment of the same type of victimization he experienced.	No
Sadistic fantasy either has direct benefit via instrumental gain or has an indirect benefit by reducing negative consequences and emotions. To acquire an enduring effect it is necessary to have many pairings of the two stimuli, via repeated and chronic abuse.	No
Deviant sexual fantasy functions as a coping strategy or self-medication mechanism employed to separate psychologically from the environment and temporarily reduce certain psychiatric symptoms or unpleasant internal states associated with an abuse history.	No
Fantasies involving coercion and control over potential partners, and the representation of partners as objects of sexual pleasure or intimacy, may satisfy attachment-related needs for intimacy, emotional closeness, or power through fantasy.	No
Sexual robots could become the perfect territory for the enacting of different types of objectual bonds, in which the otherness of the other is totally available.	No
Any stimulus which regularly precedes ejaculation by the correct time interval should become more and more sexually exciting. The belief that a normal sex life is not possible can drive an individual away from normal sexual outlets.	Yes
The boy used something related to short haircuts (e.g., clippers) to arouse himself sexually, or experienced touch during haircuts as pleasurable, or experienced other sexual feeling in relation to short haircuts. Once sexually aroused, men seemed to re-enact procedures to experience it again.	No
Sexual arousal is elicited but remains unmet. The goal, nonetheless, remains and becomes fixated upon, but by its nature (its location in the past) it cannot be completed and is then, to all intents, a permanent part of the individual's repertoire.	No
As a result of general biological sexual preparedness and influences from sexual interaction with partners, random individual innovative ideas occur that inserted objects could be used during masturbation. If sexual arousal occurs, operant conditioning and Pavlovian conditioning are activated.	No
A malfunctioning set of body shape detectors may lead to pedophilia.	No
(1) Disruptions in the reward system result in that the person either seeks new sources of positive experiences or repeats known pleasurable activities many times.	No
(2) Sexual deviance is due to a dysfunction in the network regulating the instinctive and emotional functions, where the hypothalamus generates a sexual reaction in response to perceived, external stimuli.	No
Fetishistic cross-dressing protects the cross-dresser's fragile sense of self from the perceived intrusions of an overwhelming and controlling mother whilst attempting to reconcile her loss through his strong identification with her.	No
Acquired pedophilia may be considered as a behavioral manifestation of pre-existent latent pedophilic urges due to general impulse disinhibition.	No

**Table A1***Continued*

<b>Study, Theory Name</b>	<b>Topic</b>
Schrut, 2005, "psychodynamic nonoedipal and brain function hypothesis"	Masochism
Smid & Wever, 2019, "incentive motivational model of sexual deviance"	Sexual deviance
Stroebe et al., 2010	Inserted object-assisted sexual behaviors
Ward et al., 2016, "integrated theory of sexual offending"	Paraphilia
Wood, 2010	Pedophilia

*NB.* This table is a shortened version; the complete table can be found in the Online Supplement, Table S2. All text comes from the original papers and is redacted from the authors' words for comprehensibility when isolated from context. ASD = Autism Spectrum Disorder

Core Message	Quality Acceptable?
A painful childhood life experience regarding severely forbidden sexual pleasure is associated with feared physical and psychological punishment resulting in sexual pleasure. If this takes place with sufficient frequency during the critical phases of childhood sexual development, it becomes recorded as long-term memory.	No
Sexual arousal is an emotional reaction comparable to other emotional reactions coupled with strong bodily reactions. Low level sexual arousal can be increased by a co-occurring emotion. This serves as positive reinforcement for the approach of the (deviant) stimulus.	Yes
As a result of general biological sexual preparedness and influences from sexual interaction with partners, random individual innovative ideas occur that inserted objects could be used during masturbation. If sexual arousal occurs, operant conditioning and Pavlovian conditioning are activated.	No
The inability to effectively manage attachment issues and mood problems, in the presence of dysfunctional schemas/implicit theories may lead to the occurrence of deviant sexual fantasies and sexual preoccupation. Coupled with a failure to regulate sexual desire, this might lead an individual to use sex to meet their emotional and sexual needs.	No
Psychological separation from the first attachment figure/object causes distress. The solution is to sexualize the aggression felt towards the object, so that the urge to destroy is converted into a sado-masochistic desire to hurt and make the other suffer.	No





# Chapter 3

## **Excitation Transfer Between Sexual Arousal and Other Emotions in a Community Sample**

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## Abstract

Excitation transfer, the transfer of arousal from one emotion to another, might be a mechanism in the development of unusual sexual interests. In this pilot study, we investigated if we could induce excitation transfer between various emotions and sexual arousal in a lab setting with 30 male volunteers. We induced low-level sexual arousal in four different emotional states (aggression/dominance, endearment, fear, disgust) and a neutral state. Sexual arousal was measured using penile plethysmography and self-report. Although there was no mean group effect, possibly due to large interindividual variations, 60% of the subjects showed more sexual arousal in response to sexual stimulation in at least one of the emotional states than in the neutral state. Excitation transfer was most prominent with aggression/dominance and least prominent with disgust. Genital excitation transfer was strongly related to lower penile reactivity and to higher self-reported erotophilia. This pilot study paves the way for further research into excitation transfer as a mechanism to increase the salience of stimuli that otherwise would not have been sexual in nature.

**Keywords:** excitation transfer, sexual deviance, genital sexual arousal, penile plethysmography, PPG

## Excitation Transfer Between Sexual Arousal and Other Emotions in a Community Sample

Statistically speaking, unusual sexual interests refer to any sexual interest deviating from the norm, the norm being the most frequent sexual interest in the population. Although certainly not inherently problematic, unusual sexual interests can be experienced as a heavy burden by individuals, for instance when it traverses their relationships, or by society, when it concerns inappropriate or illegal stimuli (i.e., “sexual deviance”; Fernandez et al., 2012). To date, very little is known about the etiology of sexual interests in general and unusual sexual interests specifically. In this study we explore excitation transfer between various emotions and sexual arousal and possible parameters associated with excitation transfer effects, to assess if and how excitation transfer can be researched as a possible factor in the development of unusual sexual interests, or, eventually, sexual deviance.

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### Incentive Motivation and Excitation Transfer

In the previous century, the study of sexual desire often adopted a Freudian approach where desire was seen as an intrinsic drift or lust (Both et al., 2007; Freud, 1953). A different, more modern approach to sexual desire is the Incentive Motivational Model, which entails that sexual arousal and desire result from the processing of a competent stimulus, for example, an attractive member of the preferred sex (Both et al., 2007; Toates, 2014). Sexual arousal is seen as an emotional reaction to a stimulus, comparable to other emotional responses such as fear, that is instigated by stimuli appraised as dangerous (Both et al., 2007; Smid & Wever, 2019). Processing stimuli with emotional significance results in excitation of emotion systems and in action readiness expressed in bodily reactions that prepare for adequate behavioral responses (LeDoux, 2012). The incentive motivational approach of sexual arousal enables us to include insights acquired in emotion research, such as the process of *excitation transfer*, first described by Zillmann (1971). If an emotion surges while another lingering emotion is still present it will “inseparably combine with the excitatory reaction to the present stimuli and thereby intensify both emotional behavior and emotional experience” (Zillmann, 1996, p. 250). In other words: excitation will transfer from one emotion to another, resulting in a stronger emotional experience, because the remaining arousal of one prior emotion is cognitively (mis) attributed to another subsequent emotional stimulus.

With regard to unusual or deviant sexual interests, it leaves one wondering how certain stimuli that seem very nonsexual in nature, such as young children, pain, or dead bodies, could trigger sexual desire. It is suggested that through excitation

transfer, sexual salience could be attributed to stimuli that would otherwise not be sexual in nature (Smid & Wever, 2019). As such, excitation transfer could contribute to the very beginning of unusual sexual interests. Being in an emotional state facilitates emotional learning. Activated emotional systems facilitate the attention to emotionally significant stimuli, as well as retrieval of relevant memories and strengthening of previously learned responses, from which new learning occurs (LeDoux, 2012). Repeatedly co-occurring experiences become associated at the brain level (Löwel & Singer, 1992). If an emotional stimulus is repeatedly coupled with a sexual stimulus, learning and conditioning processes might ultimately make the stimulus potent enough to induce sexual arousal itself (Brom, Both, et al., 2014; Pavlov, 1927; Skinner, 1937). This repeated co-occurrence of sexual arousal and other emotional arousal does not have to be coincidental. An individual may purposefully strive for it because it worked well before, especially if other, more common stimuli, do not induce the desired level of sexual arousal. Sexual excitement and gratification are such strong reinforcers that even sexually irrelevant stimuli can become associated with sexual reward (Brom, Both, et al., 2014). This way, unusual stimuli like pain (masochism) or emotions like disgust (coprophilia) may become associated with sexual arousal. It is unlikely and not claimed here that excitation transfer between sexual arousal and another emotion equals definite unusual sexual interests, however, it could be one of the working mechanisms in the very early stages of stimulus appreciation and appreciation motivation (Wang & Lang, 2012).

### **Empirical Support for Excitation Transfer**

Currently, most research into excitation transfer is carried out in the media and advertisement domain, where the interaction between arousal and valence of television shows and response to subsequent advertisements is researched (Wang & Lang, 2012). From this, it seems that both of the transferring emotions do not necessarily have to be of comparable valence. Also, the optimal window in experimental studies seems to be within the first two minutes after initial arousal induction (Wang & Lang, 2012).

Much of the research into *sexual* excitation transfer is quite dated; yet, these studies indicate that sexual arousal can indeed transfer to or from other emotions. For example, it is generally accepted that there is a bidirectional relation between feelings of affection or love and sexual desire (Diamond, 2003). Furthermore, some studies found that emotional arousal induced by, for instance, rollercoaster rides (Meston & Frohlich, 2003), exciting sports films (Staley & Prause, 2013; White et al., 1981) or arousing music (Marin et al., 2017) transferred to feelings of affection or increased attractiveness of (potential) partners.

Most studies regarding sexual excitation transfer consider the transfer between sexual stimuli and aggression. For instance, it was found that pre-exposure to erotic videos led to more aggressive behavior in male students than neutral pre-exposure (Zillmann, 1971; Zillmann et al., 1981). A meta-analytic review concluded that sexual stimuli and, to a larger extent, violent sexual stimuli, increase subsequent aggressive behavior (M. Allen et al., 1995). Vice versa, it was found that listening to both sexually aggressive and nonsexually aggressive stories increased penile tumescence in male students more than listening to neutral stories (Malamuth et al., 1986). These studies indicate that transfer from sexual arousal to aggression is possible, as is transfer from aggression to sexual arousal.

Other studies investigated the transfer between fear and sexual arousal. It was found that, compared to a neutral state, video-induced anxiety increased subsequent genital sexual arousal in response to an erotic video in women (Hoon et al., 1977) and men (Wolchik et al., 1980). Likewise, fear of receiving an electric shock while watching erotic films increased erectile response in men (Barlow et al., 1983). Dissimilar results have been found as well, for instance in a study with women, who showed less genital sexual arousal after a pain threat than in a neutral condition (Brauer et al., 2007). Another study injected male volunteers with epinephrine as a “physiological analogue of clinical anxiety” (Lange et al., 1981, p. 449). The authors found that injected subjects showed the same erectile response as subjects receiving no injection during a sexual video and decreased erections after the video. A possible explanation for these discrepancies could be the existence of a curvilinear relationship between emotional arousal and sexual arousal, where both too low or too high emotional arousal would inhibit sexual arousal. Such a curvilinear relationship has been found in a study in which women with moderate state anxiety showed increased sexual arousal when watching an erotic video compared to women with either low or high state anxiety (Bradford & Meston, 2006).

Finally, Zillmann (1996) mentioned a ceiling effect: if a sexual stimulus induces the maximum sexual arousal under the given circumstances, then the transfer of another emotion has no room to further increase that sexual arousal. This was also illustrated by a recent study that compared genital responses in 48 male students exposed to consensual and violent sexual audio stimuli (Lalumière et al., 2017). The induction of both a happy and a sad mood increased genital response to the violent sexual stimuli but not to the consensual sexual stimuli, as these apparently had already reached their maximum.

## The Current Study

In conclusion, most research into *sexual* excitation transfer with male samples is from the previous century. Given its hypothesized role in the development of unusual or deviant sexual interests (Smid & Wever, 2019), it is relevant to renew and expand the investigation of this mechanism. In this pilot study we primarily aimed to assess whether it is possible to induce excitation transfer between emotions and sexual arousal in a community sample of healthy adult men. We hypothesized that sexual arousal in response to sexual stimulation, at least for some men, would be higher in an emotional state than in a nonemotional, neutral state. Additionally, we aimed to explore the optimal parameters to create this effect, to pave the way for larger-scale follow-up studies. Therefore, we focused on the following secondary research questions, which will be illustrated below:

- a) Do excitation transfer effects vary between two different test conditions, i.e., consecutive vs. simultaneous, found in the literature (i.e., Barlow et al., 1983; Zillmann, 1996)?
- b) Do excitation transfer effects vary between different emotions?
- c) Are specific subject characteristics associated with excitation transfer effects?

Regarding a); In accordance with Zillmann (1996) and most other studies that create excitation transfer in a consecutive approach (e.g., Lange et al., 1981), the combined arousal effect is attributed to the most recent stimulus. Initial anxiety followed by sexual arousal will result in stronger sexual arousal, but initial sexual arousal followed by anxiety will result in stronger anxiety and less sexual arousal (Hoon et al., 1977). The findings of Barlow et al. (1983), however, are slightly different. Participants watching an erotic video showed larger erectile responses when they *simultaneously* anticipated an electric shock. Even though the consecutive Zillmann method is most frequent in previous research findings, the simultaneous Barlow method appears intuitively closer related to sexual deviance, since deviant stimuli are usually present throughout and not just preceding the deviant sexual activity. Therefore, we included both methods in our experimental procedure. We hypothesized that both methods would be able to induce excitation transfer.

Regarding b); Emotions that increase sympathetic arousal are considered more obvious candidates for enhancing sexual arousal than emotions that decrease sympathetic arousal (Toates, 2014). We included four different emotions: aggression/dominance, endearment, fear and disgust. These emotions can be organized across a valence axis, contrasting positive and negative value, and an activation axis, contrasting increased sympathetic arousal and decreased sympathetic arousal (Damen et al., 2008; Kreibig,

2010; Lalumière et al., 2017; Mikels et al., 2005; Wang & Lang, 2012). Moreover, various unusual or deviant sexual interests can be traced to these four emotions. Aggression/dominance, a more instrumental kind of aggression, can be seen as the feeling of having the upper hand, being the victor, and as such represents a subjectively positive emotion that increases sympathetic arousal (Hamer et al., 2007; Kreibig, 2010; Schachter, 1957). This emotion appears to play a role in sexual interest in rape, sadism, and BDSM (Fedora et al., 1992; Pfattheicher & Schindler, 2015). Fear represents a negative emotion that increases sympathetic arousal (Aue et al., 2007; Baldaro et al., 1996; Kreibig, 2010). This emotion might be reflected in sexual interests such as masochism (cf. the mechanism described in Rozin, Guillot, & Fincher, 2013) or “extended” exhibitionism, i.e., having sex while at risk of being seen (Joyal & Carpentier, 2017, p.165), where a component of fear of pain, discovery, or embarrassment seems present. Endearment represents a positive emotion that decreases sympathetic arousal (Boiten, 1998; N. Eisenberg et al., 1988; Kreibig, 2010; Tsai et al., 2002). It is suggested that this emotion may play a role in pedophilia (J. M. Cantor & McPhail, 2016; Smid & Wever, 2019). An often stated claim of pedophiles is that not sexual attraction per se, but rather affection and endearment primarily or initially draw them toward a child (Collings, 1997; Martijn et al., 2020; G. Schmidt, 1991). Likewise, recent neuropsychological findings indicate that child stimuli activate nurturing brain areas in pedophilic men and not in healthy controls (Ponseti et al., 2018). Disgust represents a negative emotion that decreases sympathetic arousal (Cisler et al., 2009; Kreibig, 2010) and seems to play a role in extremely rare sexual interests like coprophilia (sexual attraction to feces) or necrophilia (sexual attraction to corpses) (Joyal & Carpentier, 2017). We hypothesized that aggression/dominance and fear, emotions that increase sympathetic arousal, would show higher excitation transfer effects than endearment and disgust (Toates, 2014).

Regarding c); We explored several subject characteristics in relation to excitation transfer. Firstly, decreased erectile functioning could be a motivator to seek excitation transfer: one needs stronger stimuli to achieve sexual arousal or gratification (Smid & Wever, 2019). Also, higher sympathetic arousal has been related to smaller erections (Harte, 2013), less orgasms through normal intercourse (Costa & Brody, 2012), and more problematic erectile functioning (Rowland, 2010; Turan & Gürel, 2020). Therefore, we hypothesized that excitation transfer would be associated with decreased erectile functioning and increased resting state sympathetic arousal. Furthermore, there is a high comorbidity between various deviant sexual interests (Dawson et al., 2016; Joyal & Carpentier, 2017). Also, sexual stimuli activate the brain in a largely nonspecific manner (Both et al., 2007). Therefore, we expect that excitation transfer would be associated with an underlying sensitivity to unusual sexual interests in general (i.e., “erotophilia,” the love of any erotic stimulus; Fisher et al., 1988).



## Method

### Sample

The sample consisted of  $N = 30$  male volunteers, aged 19-40. Given that  $N = 12$  is a rule of thumb for pilot studies where inferential statistics are calculated (Julious, 2005), two groups of  $N = 15$  (total  $N = 30$ ) seemed sufficient and allowed for 20% drop out in each group. Subjects were recruited in the Netherlands by advertorials on university sites and campuses, advertorials on social media outlets, and snowball sampling from the experimenters' social networks. Potential subjects were informed that they would join a study about the influence of emotions on sexual arousal and were screened on the following indication criteria: no cardiovascular problems, no organic erectile dysfunctions, and age within the range 18-40 years. All subjects reported having the Dutch nationality and completing at least secondary education. Subjects were alternately assigned to the Barlow condition ( $N = 15$ ) or the Zillmann condition ( $N = 15$ ). There were no a priori differences between the two conditions regarding age, educational level, relationship status, or sexual orientation (see Table 1).

### Instruments

#### *Sexual Arousal Induction*

Sexual arousal was induced with genital vibrostimulation. This enabled the simultaneous presentation of sexual stimuli and emotional film fragments in the Barlow condition (see Procedure section). Vibrostimulation is known to induce significantly less sexual arousal than erotic film clips (Janssen et al., 1994) which matched our purpose to avoid possible ceiling effects in sexual arousal that would leave too little room for excitation transfer (Lalumière et al., 2017; Zillmann, 1996). Genital vibrostimulation was administered following the procedure used by Brom, Laan, et al. (2014). Participants were instructed to place a hands-off ring-shaped vibrator just below the coronal ridge of the penis. In each experimental block, vibrostimulation was induced for 40 seconds. In order to prevent measurement issues due to extremely low levels of genital sexual arousal, vibrostimulation was combined with a 20 second erotic film fragment, which started 10 seconds prior to vibrostimulation and continued 10 seconds parallel to the vibrostimulation. The preceding erotic film fragments were five different fragments originating from the same erotic movie, depicting heterosexual coitus, and were presented in a different order for each participant. The total duration of sexual arousal induction was 50 seconds per experimental block. This procedure was tested beforehand in a small ( $N = 10$ ) feasibility sample. The vibration and film stimuli were presented using the stimulus delivery and experiment control software Presentation (NeuroBehavioral Systems, CA, USA).

**Table 1***Demographic Information of the Total Sample and Condition Subgroups*

	<b>Total (n=30)</b>	<b>Barlow (n=15)</b>	<b>Zillmann (n=15)</b>	<b>Effect Size</b>	<b>95% CI [LB, UB]</b>
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>d</i>	
Age	25.50 (5.24)	26.47 (6.20)	24.53 (4.05)	0.38	[-1.43, 2.19]
	<b>%(n)</b>	<b>%(n)</b>	<b>%(n)</b>	<b>OR</b>	
Last Completed Education					
Secondary Education	36.70 (11)	33.40 (5)	40.00 (6)	0.75	[0.17, 3.33]
High School/Bachelor	30.00 (9)	40.00 (6)	20.00 (3)	2.67	[0.52, 13.66]
University/Master	33.30 (10)	26.70 (4)	40.00 (6)	0.55	[0.12, 2.55]
Relationship Status					
Single	60.00 (18)	66.70 (10)	53.30 (8)	1.75	[0.40, 7.66]
<2yr Partner	23.30 (7)	20.00 (3)	26.70 (4)	0.69	[0.12, 3.79]
>2yr Partner	16.70 (5)	13.30 (2)	20.0 (3)	0.62	[0.09, 4.34]
Sexual Orientation					
Exclusively Hetero	73.30 (22)	66.70 (10)	80.00 (12)	0.50	[0.10, 2.63]
Predominantly Hetero	13.30 (4)	20.00 (3)	6.70 (1)	3.50	[0.32, 38.23]
Other	13.30 (4)	13.40 (2)	13.40 (2)	1.00	[0.12, 8.21]

**Emotion Induction**

Emotional arousal was induced by means of film fragments, which is the most common method to induce emotions (Kreibig, 2010). Four different emotional film fragments of 30 seconds were presented. Aggression/dominance was induced by a fight scene from the movie "Transporter 3" (2008). Fear was induced by a film fragment of a shark attack. Endearment was induced by a film fragment of a kitten. Disgust was induced by a cannibalism scene from the movie "Hannibal" (2001). Also, a 30 second neutral film fragment was composed of scenes from a nature documentary containing time-lapse recordings of forests, meadows, and icebergs. The emotional film fragments were prior validated in a stimulus validation study ( $N = 171$ ) and proved to effectively induce the intended emotions (film fragments and report available upon request).

### **Sexual Arousal Assessment**

**Genital Sexual Arousal.** Indium/gallium-in-rubber strain gauges (Behavioral Technology INC, Salt Lake City, USA) were used to assess changes in penile circumference (penile plethysmography; PPG). PPG is a common and validated measure of male genital sexual arousal (Bancroft et al., 1966; Janssen et al., 2007; Merdian & Jones, 2011) and has been used in previous studies in the same sexology laboratory (Both et al., 2020; Brom et al., 2015, 2016; Brom, Laan, et al., 2014). Increases in penile circumference result in corresponding changes in resistance. Changes in electrical output caused by expansion of the gauge were recorded by a continuous DC signal registered by the software program Vsrrp98 (Molenkamp, 2011). The participants were instructed to place the indium/gallium gauge halfway up the shaft of the penis, between the vibrator ring and the body. Research has indicated that PPG assessment is experienced by participants as relatively nonintrusive (Huberman & Chivers, 2015). In the current study, we asked subjects during the exit interview how comfortable they felt during the experiment: 27% of the subjects reported feeling “very comfortable,” 43% “comfortable,” 17% “neutral,” 13% “uncomfortable,” and no-one indicated “very uncomfortable.”

For each participant, we calculated the percentage penile increase in response to sexual stimulation relative to the baseline status at the start of each experimental block. The percentage increase in the neutral block was used as a measure of penile reactivity. Penile reactivity represents the reactivity to mere, plain sexual stimulation without added emotion, and as such was used as a physiological indication of general sexual functioning. To calculate the final genital excitation transfer scores, we subtracted the percentage penile increase in the neutral block (i.e. penile reactivity) from the percentage penile increase in each emotional block, resulting in four excitation transfer scores regarding aggression/dominance, endearment, fear, and disgust. As such, positive genital excitation transfer scores indicated that sexual arousal was higher in the emotional blocks than in the neutral block.

**Subjective Sexual Arousal.** In addition to the genital assessment of sexual arousal, participants rated the extent to which they felt sexually aroused on a 10-point scale, ranging from 1 (not at all aroused) to 10 (extremely aroused), following each sexual arousal induction. To calculate subjective excitation transfer scores, we subtracted the sexual arousal rating in the neutral block from the sexual arousal rating in each emotional block. As such, positive subjective excitation transfer scores indicated that sexual arousal was higher in the emotional block than in the neutral block.

### ***Sympathetic Arousal Assessment***

**Heart Rate.** Heart rate data was recorded continuously using Vsrp98 software (Molenkamp, 2011) and electrode placement according to a standard Lead-II configuration (Nikolić et al., 2017). Heart rate is reported in mean number of beats per minute. Heart rate during the emotional manipulation was used as a manipulation check to verify if the emotional films had the intended reactions. Heart rate during the three-minute pre-experimental resting phase was used as a measure of resting state sympathetic arousal.

**Self-Assessment Manikin.** In addition to the physiological assessment of sympathetic arousal, in each block participants rated their affective reaction to each of the emotional film clips and the neutral film clip by means of the Self-Assessment Manikin (SAM; Bradley & Lang, 1994). The SAM directly assesses valence, arousal and dominance of a stimulus using graphic depictions. Only the SAM scores regarding arousal and valence were used in this study. The valence dimension is depicted by five manikins ranging from smiling to unhappy. The arousal dimension is depicted by five manikins ranging from aroused, wide-opened, excited, to relaxed, sleepy. Subjects indicate their rating by marking the corresponding figure on each dimension (1 to 5), where higher scores indicate more positive value and more emotional arousal. Judgements from the SAM show sufficient content validity when compared to other measures (Bradley & Lang, 1994).

### ***Self-Reported Sexual Functioning***

The International Index of Erectile Function (IIEF) is a 15-item self-report questionnaire that assessed sexual and erectile functioning (Rosen et al., 1997). A sample question is: "How often were you able to get an erection during sexual activity?" Items 1 to 10 were rated on a 6-point Likert scale ranging from 0 (not at all, negative) to 5 (always, positive) and items 11 to 15 were rated on a 5-point scale ranging from 1 (weakly, unsatisfied) to 5 (strongly, very satisfied). Sum scores range from 15 to 85 and lower sum scores indicate more problematic sexual functioning. The IIEF has shown good test-retest reliability and construct validity (Rosen et al., 1997). In the current study, the IIEF showed very high internal consistency with Cronbach's  $\alpha = .93$ .

### ***Self-Reported Sexual Interests***

The Sexual Opinion Survey (SOS) is a 21-item self-report questionnaire that rated interest in sexual behaviours along a dimension ranging from erotophobia, i.e., a negative evaluation of sex, to erotophilia, i.e., a positive evaluation of sex (Fisher et al., 1988). A sample question is: "I think it would be very entertaining to look at hard-

core pornography.” We adapted the SOS by adding four items, specifically reflecting sexual interests associated with the emotional stimuli used in the current study, for example: “The thought of engaging in unusual sexual practices involving *fear* is highly arousing”; and likewise for aggression/dominance, endearment and disgust (not further reported upon in this paper). Items were rated on a 7-point Likert scale, ranging from 1 (strongly agree) to 7 (strongly disagree). For the sake of consistency with the other measures, ultimately all SOS scores were reversed such that higher sum scores (maximum score 175) reflected more erotophilia and lower sum scores (minimum score 25) reflected less erotophobia. In previous research, the original SOS showed good internal consistency (Cronbach’s  $\alpha = .88$ ) and good convergent and discriminant validity (Fisher et al., 1988). In the current study, the SOS showed low internal consistency with pretest SOS Cronbach’s  $\alpha = .38$ . Deletion of the added items did not considerably improve the internal consistency.

## Procedure

This experiment was carried out in a sexology laboratory of a university medical center. All subjects signed the informed consent form. Subjects digitally completed demographic questions regarding age, educational level, relationship status, and sexual orientation, and the pretest questionnaires IIEF and SOS (NB. The Sexual Inhibition/Excitation Scales [Janssen et al., 2002] were also part of the study but are not reported upon in this paper). The researcher then adjusted the heart rate electrodes to the subject’s bare chest. The researcher provided instructions for the subject to adjust the penile strain gauge and vibrating ring to his penis and left the subject in private in the experimental room to prepare for the experiment. The experimental room consisted of a comfortable chair from which subjects could view the television screen on which the emotional stimuli and questions were projected, along with a side table with a mouse to answer the on-screen questions. The experiment consisted of the induction of sexual arousal by means of a short sexual film fragment followed by penile vibrostimulation and the induction of emotional arousal by means of film fragments in five different blocks presented in a different order for each participant: an aggression/dominance block, endearment block, fear block, disgust block, and a neutral block with nature documentary fragments. Subjects were alternately assigned to the Barlow et al. (1983) condition with simultaneous emotion induction and sexual arousal induction, or the Zillmann (1996) condition in which sexual arousal induction followed emotion induction.

Each experiment started with a three-minute neutral nature film in order for the subject to get adjusted to the setting. Then, each of the five experimental blocks started with one more minute of neutral film: the baseline window for each

experimental block. After this, in the Barlow condition, the sexual arousal induction (total 50 seconds) preceded (20 seconds) and paralleled the emotional film fragment (30 seconds). In the Zillmann condition, the sexual arousal induction (50 seconds) followed the emotional film (30 seconds). Following this, subjects indicated their subjective level of sexual arousal on the television screen with the mouse. Then, subjects rated arousal and valence of the emotional film fragment with the SAM. The subjects' levels of emotional and sexual arousal were then during two minutes returned to baseline with a simple counting task, i.e., counting backwards from a given number, and neutral film fragments. Heart rate and penile circumference were recorded throughout the experiment.

After the experiment, subjects were given the time they needed to recover, remove the strain gauge and vibration ring, and get dressed. Subsequently, they were asked to fill out the posttest questionnaire SOS (not reported in this paper) and an exit interview in which they rated the strength of the emotional stimuli and the erotic stimuli. Afterwards, subjects were fully debriefed regarding the rationale behind the study. Subjects received a €35 gift card for their participation. The procedure was approved by the Institutional Review Board of the Amsterdam University Medical Centers (location VUmc, Amsterdam, the Netherlands) and follows the ethical standards from the 1964 Declaration of Helsinki and its later amendments.

### **Data Preparation**

**Genital Arousal.** Genital sexual arousal was assessed during a baseline window and a response window in each experimental block. The baseline window was the 60-second window at the start of each block, prior to the emotion induction and sexual arousal induction. The response window was the 60-second window starting with the vibrostimulation. For the data preparation, we followed the procedures described in Huberman and Chivers (2015) and Barlow et al. (1983). This means that within these 60-second windows, we averaged data across 15-second epochs, yielding 4 data points for the baseline window and 4 data points for the response window. We selected the epochs with the highest mean, indicating the maximum genital reaction within the baseline and the response windows. The use of the maximum reaction is appropriate when assessing sexual reactions that may not be sustained for prolonged time (Huberman & Chivers, 2015). With these highest epochs, we calculated the percentage increase from baseline to response for each of the four emotional blocks and for the neutral block.

**Heart Rate.** Heart rate scores were calculated in a similar manner to genital arousal scores. For the manipulation check, we used the 60-second window following the

start of each emotional and neutral film fragment. Heart rate data was averaged across 15-second epochs, from which the highest epoch was used as outcome measure. As such, heart rate during emotional blocks was compared to heart rate during the neutral block. For the resting state sympathetic arousal, we used the highest of the 15-second epochs during the three-minute resting phase at the start of the experiment (cf. Harte, 2013; Lorenz et al., 2012; Stanton & Meston, 2017).

### **Statistical Analyses**

**Manipulation Check.** Nonresponders on the PPG assessment were defined as those subjects whose percentage penile increase in response to sexual stimulation was zero or negative on all emotional blocks and the neutral block. (NB. Negative responses could exist when their sexual arousal after sexual stimulation, i.e., in the response window, was lower than their sexual arousal without sexual stimulation, i.e., in the baseline window.) These nonresponders were discarded from the analyses of genital sexual arousal. Nonresponders on subjective sexual arousal were defined as those subjects who scored 1 (lowest score) on self-reported sexual arousal in all emotional blocks and the neutral block, and were discarded from the analyses of subjective sexual arousal. Furthermore, in order to verify if the emotion manipulation succeeded as intended, analyses of variance (ANOVAs) were used to compare heart rate scores, SAM arousal scores, and SAM valence scores between the experimental blocks. The emotional manipulation check for heart rate could only be calculated for condition Zillmann, because in condition Barlow the sexual vibrostimulation coincided with emotional manipulation and could cause interference.

**Main Analyses.** To assess if excitation transfer was induced, an ANOVA was used to test if genital sexual arousal (percentage increase) differed between the neutral, aggression/dominance, endearment, fear and disgust blocks. A second ANOVA was used to test if subjective sexual arousal differed between the blocks. Since the effects may be not linear, we also explored the effects on the individual level. The total sample was divided into a subgroup of subjects showing genital excitation transfer in at least one of the emotional blocks (excitation transfer group) and a subgroup showing no genital excitation transfer in any of the emotional blocks (no excitation transfer group), and likewise for subjective excitation transfer. With these subgroups, two separate ANOVAs were used to test again if genital sexual arousal and subjective sexual arousal differed between the emotional and neutral blocks.

For the whole group, a MANOVA was used to assess whether overall genital and subjective excitation transfer scores (i.e., sexual arousal in emotional block minus neutral block) differed between condition Barlow and Zillmann. Also, a Chi-square

test was used to assess whether the frequency of the occurrence of excitation transfer effects differed between condition Barlow and Zillmann. To compare excitation transfer effects across the different emotions, we calculated Pearson correlations between both genital and subjective excitation transfer scores in the various emotional blocks. Finally, to explore the relation between excitation transfer and various subject characteristics, we calculated Pearson correlations between both genital and subjective excitation transfer scores and resting state sympathetic arousal (heart rate), penile reactivity (percentage penile increase in the neutral block), self-reported erectile functioning (IIEF scores), and self-reported erotophilia (SOS scores). All statistical analyses were performed using *IBM SPSS Statistics 21*. Effect sizes are reported according to Cohen's standards, where  $d = .20$  is considered a small effect,  $d = .50$  medium, and  $d = .80$  a large effect (J. Cohen, 1992), together with the 95% confidence intervals of  $d$ .

## Results

### Manipulation Check

Two subjects from condition Barlow qualified as nonresponders on genital sexual arousal. One subject from condition Zillmann qualified as a nonresponder on subjective sexual arousal. Heart rate did not differ significantly between the emotional blocks in condition Zillmann,  $F(4, 70) = .43, p = .788, d = .31$ , a small effect size. However, heart rate changes were in the expected directions, with aggression/dominance and fear slightly increasing and endearment and disgust slightly decreasing sympathetic arousal, relative to neutral. SAM emotional arousal scores differed significantly between emotional blocks for the whole sample,  $F(4, 145) = 7.95, p < .001, d = .94$ , a large effect size. As expected, aggression/dominance and fear caused increased arousal and endearment caused decreased arousal. Contrary to expectations, subjects reported increased arousal to the disgust film (while heart rate data pointed in the opposite direction). SAM emotional valence scores differed significantly between the experimental blocks,  $F(4, 145) = 36.38, p < .001, d = 2.00$ , a large effect size. In agreement with expectations, valence was positive (higher scores) for aggression/dominance and endearment, and negative (lower scores) for fear and disgust. Online Supplement Table S1 displays means, standard deviations and effect sizes of heart rate and SAM scores. We conclude that the emotional manipulations could be improved, but were sufficiently successful.



### Excitation Transfer Effects

Genital sexual arousal differed significantly between the experimental blocks,  $F(4, 135) = 3.49, p = .010, d = .64$ , a medium effect. Post hoc tests showed that genital sexual arousal was higher in the neutral block than in the endearment, fear, and disgust blocks (see Figure 1 and Online Supplement Table S2). Also, subjective sexual arousal differed significantly between the experimental blocks,  $F(4, 140) = 6.54, p < .001, d = .86$ , a large effect. Post hoc tests showed that subjective sexual arousal was higher in the neutral block than in the endearment, fear, and disgust blocks. Thus, on the group level, no excitation transfer could be discerned, as the average sexual arousal was lower in all emotional blocks than in the neutral block.

Comparable results were found when repeating the analyses with a split sample (excitation transfer group vs. no-excitation transfer group), with the exception that genital sexual arousal did not differ significantly anymore between the experimental blocks in the excitation transfer group,  $F(4, 45) = 1.25, p = .304, d = .67$ , a medium effect. From Figure 1 (and online supplement Table S2) it is visible that the excitation transfer group showed lower genital sexual arousal on all blocks than the no-excitation transfer group, with remarkably lower genital arousal on the neutral block (a large effect,  $d = 1.49$ ), a difference much larger than the differences on the other emotions. Conversely, subjective arousal was higher on all experimental blocks for the excitation transfer group than for the no-excitation transfer group.

Looking at individual scores, 18 out of the 30 subjects (60%) displayed some type of excitation transfer (see Table 2). Regarding genital sexual arousal, 10 out of 28 subjects (36%) scored higher in at least one emotional condition than in the neutral condition. Regarding subjective sexual arousal, 15 out of 29 subjects (52%) scored higher in at least one emotional condition than in the neutral condition. These subgroups overlapped partly: seven subjects (23%) showed excitation transfer on both genital arousal and subjective arousal.

A post hoc power analysis indicated that, with a moderate effect size, a potential follow-up study would need 21 participants who showed excitation transfer. As 60% of our sample showed excitation transfer, this translates to a sample size of  $N = 35$ . This number is likely a lower bound estimate as suggested changes in the procedure may lead to a different outcome.

### Comparison of Condition Barlow and Zillmann

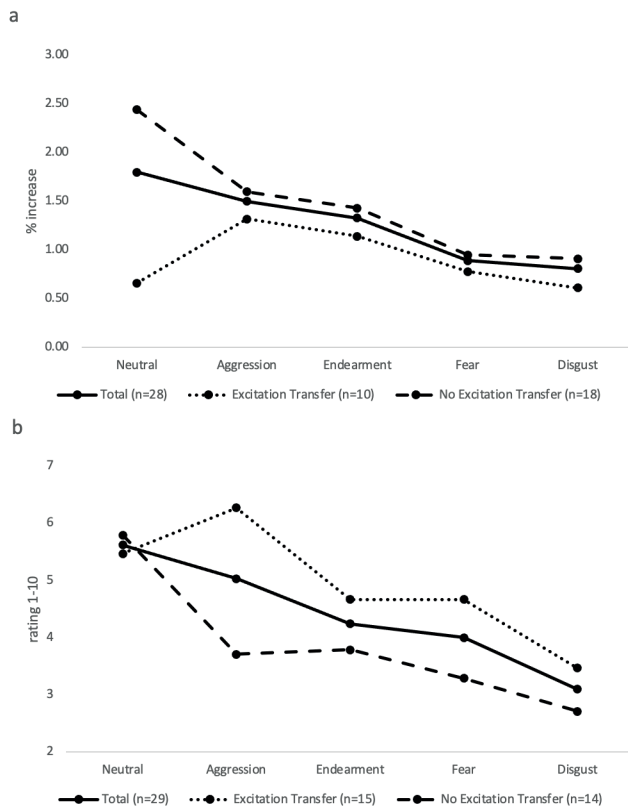
Condition Zillmann and Barlow did not have significantly different effects on genital or subjective excitation transfer scores, Wilks'  $\Lambda(2, 106) = .99, p = .760, d = .14$ , a

small effect. Also, there was no significant difference between the frequency of the occurrence of excitation transfer (as in Table 2) in both conditions; genital  $\chi^2(3) = .22, p = .975$ ; subjective  $\chi^2(3) = .80, p = .850$ .

**Table 2**  
*Frequency of Occurrence of Excitation Transfer per Emotion*

	Genital Excitation Transfer			Subjective Excitation Transfer		
	Total (n=10/28)	Barlow (n=4/13)	Zillmann (n=6/15)	Total (n=15/29)	Barlow (n=6/15)	Zillmann (n=9/14)
Aggression	8	3	5	11	5	6
Endearment	8	3	5	3	1	2
Fear	7	2	5	6	3	3
Disgust	5	2	3	2	0	2

**Figure 1**  
*Genital (1a) and Subjective (1b) Sexual Arousal Scores in the Experimental Blocks*



NB. All blocks were presented in quasi-randomized order (different order for each subject).

### Comparison of the Different Emotions

Figure 1 (and online supplement Table S2) shows that in general, aggression produced the highest sexual arousal levels in the excitation transfer group, followed closely by endearment. Table 2 shows that aggression/dominance also caused excitation transfer most frequently, followed by endearment and fear, and disgust caused excitation transfer the least. Furthermore, the genital excitation transfer levels in the various emotional blocks showed significant medium to large inter-correlations ( $p < .012$ ,  $r$  between .47 and .77), as did the subjective excitation transfer levels in the various emotional blocks ( $p = .054$ ,  $r$  between .36 and .61), indicating that subjects who showed higher levels of excitation transfer in one emotional condition were more likely to also show higher levels of excitation transfer in other emotional conditions. The overall correlation between genital and subjective excitation transfer was  $r = .38$ ,  $p = .049$ , indicating a moderate agreement between genital and subjective assessment of excitation transfer.

### Subject Characteristics

Pearson correlations are displayed in Table 3. Additionally, resting state sympathetic arousal (HR) was not related to penile reactivity ( $r = -.04$ ,  $p = .835$ ) but did show a moderate and significant negative correlation with self-reported erectile functioning on the IIEF ( $r = -.38$ ,  $p = .038$ ). The two measures of erectile functioning, i.e. penile reactivity and IIEF scores, showed a small-moderate intercorrelation ( $r = .18$ ,  $p = .335$ ).

**Table 3**

*Pearson Correlations Between Subject Characteristics and Excitation Transfer*

	Genital Excitation Transfer ( $n = 28$ )		Subjective Excitation Transfer ( $n = 29$ )	
	$r$	$p$	$r$	$p$
Penile Reactivity (% increase)	-.79	<.001	-.28	.145
Erectile Functioning (IIEF)	-.23	.240	-.06	.774
Resting State Sympathetic Arousal (HR, bpm)	.20	.317	.01	.948
Erotophilia (SOS)	.56	.002	.33	.078

## Discussion

The current study assessed if it was possible to create excitation transfer between sexual arousal and other emotions in a sample of healthy adult men. Also, we investigated whether excitation transfer effects varied between the two conditions Barlow and Zillmann, whether effects varied between different emotions, and whether effects were associated with specific subject characteristics. On a group level, we found no excitation transfer, as subjects were less sexually aroused in the emotional blocks than in the neutral block. Looking at individual scores, however, 60% of the subjects showed excitation transfer between at least one emotion and sexual arousal. This indicates that there were large individual differences, which were averaged out on the group level. This is for instance comparable to the relatively large variance reported by Brauer et al. (2007), who could not find an effect on the group level either. In line with our expectations, there was no evidence to indicate that either the Zillmann (1996) condition, with consecutive emotional and sexual stimuli, or the Barlow et al. (1983) condition, with simultaneous emotional and sexual stimuli, was more effective in creating excitation transfer.

Earlier studies did find excitation transfer on the group level, e.g., J. R. Cantor et al., (1975) with subjective arousal and Barlow et al. (1983) with genital arousal. While the current sample was of comparable nature and size, there are also some differences. Both the sexual and emotional stimuli in the prior studies were likely stronger: Barlow et al. used the actual threat of an electrical shock and Cantor et al. recorded increased heart rate after physical exercise. Our manipulation check showed that the strength of the emotional responses could be improved, especially the physiological response (heart rate) to the emotional manipulation. In the Cantor et al. study, the sexual stimuli also lasted longer (3 minutes) than our 50 seconds. We deliberately aimed for low-level sexual arousal to avoid a ceiling effects and to leave room for transfer (cf. Lalumière et al., 2017; Zillmann, 1996), yet, in doing so we may have come near the opposite. It is notable that there was still a large significant correlation between penile reactivity and genital excitation transfer (less reactivity was associated with higher excitation transfer) that cannot be explained in the light of such a floor effect. Future research should include stronger stimuli to assess if this relationship still exists when sexual and emotional arousal are higher. We were restricted to using vibrostimulation to enable simultaneous presentation to the emotional film fragments in the Barlow condition, however, future studies might use visual stimuli as these generally produce the strongest sexual arousal effects (Cabral et al., 2018).

Overall, emotional arousal more often transferred to subjective, self-reported sexual arousal than to genital sexual arousal. Sixty percent of the participants showed some form of excitation transfer, 36% showed excitation transfer between at least one emotion and genital sexual arousal, 52% showed excitation transfer between at least one emotion and subjective sexual arousal, and 23% showed both types of transfer. These results suggest that subjective sexual arousal was more easily manipulated than physiological, genital sexual arousal. It must be considered that conscious processing of emotions may be an enforcing condition for excitation transfer. This emphasizes the important role of cognitive control on sexual arousal and emotion processing (Toates, 2009). Subjective and genital excitation transfer were moderately correlated (overall  $r = .38$ ). These relations are lower than previous findings regarding subjective and genital sexual arousal ( $r = .66$ ), which can be due to the low-level sexual arousal and the relatively young sample in the current study (Chivers et al., 2010). It seems important to use both physiological and subjective measures, since they may diverge quite substantially.

### **Comparison of the Different Emotions**

Aggression/dominance was the most effective emotion to induce excitation transfer in terms of both intensity and frequency, whereas disgust was the least effective. This is partly according with our expectations that aggression/dominance and fear, emotions that increase sympathetic arousal, would show higher/more excitation transfer effects. Also, this is in accordance with the relative prevalence of associated sexual interests, where for instance BDSM (dominance) is more common than urophilia or coprophilia (disgust) (Dawson et al., 2016; Joyal & Carpentier, 2017).

Endearment did not cause excitation transfer in many participants, but when it did, it caused relatively large excitation transfer effects, specifically to genital sexual arousal. This is interesting given the hypothesized link between pedophilia and intense feelings of endearment towards children (J. M. Cantor & McPhail, 2016; Smid & Wever, 2019). A recent neurobiological study (Ponseti et al., 2018) showed over-responding to nurturing stimuli in pedophilic subjects in various motivational brain areas also related to the mating domain (e.g., the left anterior insula). This functional overlap of nurturing and sexual processing led the authors to the tentative conclusion that the functional division between the domains of nurturing and mating behavior in pedophilia may be incomplete. These and the current results emphasize that feelings of endearment or nurturement and excitation transfer are a relevant topic for future research in pedophilic samples.

Previous literature finds that disgust lowers physical arousal (Kreibig, 2010) and the same trend was visible in our heart rate data. Subjectively, participants in our study rated the disgusting film fragment as *more* emotionally arousing than the neutral film fragment. It is possible that the disgust film included a scare/shock effect, which may have resulted in higher self-reported emotional arousal. Subjects from both the stimulus validation study and the exit interview however reported that they distinctively found the disgust film fragment “disgusting.” The possible discrepancy between physiological and subjective effects of disgust warrants further investigation.

### **Subject Characteristics**

Several subject characteristics were related to excitation transfer. According to our hypothesis, especially genital excitation transfer was strongly related to decreased penile reactivity. Excitation transfer subjects did not show much larger sexual reactions on the emotional blocks, but rather, they showed distinctively lower reactions on the neutral block (penile reactivity). A similar trend was visible on self-reported erectile functioning (IIEF). These results provide tentative support for the “deficiency perspective” described by Smid and Wever (2019): for subjects that are less easily sexually aroused in general, extra emotional loadings may be specifically useful to facilitate sexual arousal.

In agreement with our hypothesis, higher resting state sympathetic arousal (heart rate) was moderately related to lower self-reported erectile functioning and larger genital excitation transfer effects, albeit the latter not significantly. Future aims may include larger sample sizes to increase statistical power when investigating the effects of the various parameters. To increase variance, these samples may also include subjects that have substantially higher than average baseline sympathetic arousal, as is often the case in samples with psychiatric symptoms (Bergman et al., 2020; Pereira-Morales et al., 2019; Thorsen et al., 2016).

Finally, our cognitive, self-report measures showed that more erotophilia (interest in various sexual activities) was strongly related to especially genital excitation transfer effects, which was in agreement with our expectations. It must be noted that the internal consistency of the Sexual Opinion Scale (SOS) was low, which indicates a large variability in answers within respondents, therefore caution must be used when generalizing these results. Also, excitation transfer scores in all emotional blocks were substantially intercorrelated. It seems that a general excitation transfer susceptibility might exist, rather than a specific and exclusive preference for one specific stimulus, which provides a possible explanation for the notable overlap between deviant sexual interests as found in the literature (Dawson et al., 2016; Joyal & Carpentier,

2017; Wilpert, 2018). Openness towards various forms of sexuality could be a relevant factor in one's proclivity to excitation transfer, either as a cause, a consequence or both. Further research is needed to replicate and extend these findings.

### **Limitations**

Using a relatively young and well-educated sample to provoke excitation transfer in a lab setting limits generalizations to a broader population or real-life settings. Yet, a substantial part of the current healthy community sample was prone to excitation transfer between sexual arousal and other emotions. Pilot testing proved to be valuable: follow-up studies should consider the reliability of the SOS, the strength of the emotional manipulation, and whether to incorporate a simultaneous or consecutive design (Barlow vs Zillman). Clearly larger scale replications are needed, however, it is a strength that this pilot study explored individual patterns beyond the group level. This paves the way for research in more sexually diverse samples.

### **Clinical Implications**

If the current results are replicated, this provides more understanding about a mechanism that may play a role in the development of unusual sexual interests and maybe, eventually, deviant sexual interests. Possible research or clinical avenues include the deficiency perspective, which points attention to more problematic general sexual functioning as possible facilitator of unusual sexual interests. Our results underscore research findings that, alongside a physiological component, cognitive appraisal and learning processes are important working mechanisms in sexual arousal and the appreciation of sexual stimuli (e.g., Brom, 2016; Toates, 2009). Sole pharmacological treatment of unusual sexual interests, for instance in sex offenders, might have adverse effects when penile reactivity is simply decreased and paves the way to -consciously or unconsciously- search for stronger emotional stimuli to feed the lacking sexual arousal. The finding that lower penile reactivity was related to more excitation transfer also implies that low PPG-responders should not be excluded from analyses, as is often done in research (Merdian & Jones, 2011), without thorough consideration.

### **Conclusion**

This study aimed to create and measure excitation transfer between subjective and genital sexual arousal and various emotions in healthy men. The experimental manipulation resulted in the majority of the subjects being more sexually aroused by sexual stimulation in at least one emotional state than in the neutral state, although interindividual variability was large and effects were averaged out on the group level. Men with lower general erectile functioning seemed more susceptible

to excitation transfer than men who were more easily sexually aroused. A general openness towards sexuality was associated with this mechanism. Our results indicate that for some people, excitation transfer increased the salience of stimuli that otherwise would not have been sexual in nature. This is important knowledge in the understanding of sexual behavior and the development of unusual sexual interests.

### **Consent to Participate and Publish**

Informed consent was obtained from all individual participants included in the study.





# Chapter 4

## **Excitation Transfer Between Sexual Arousal and Other Emotions: Study Protocol**

**This chapter is published as:**

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## Abstract

**Background:** Sexual deviance is regarded as an important risk factor for sexual offending. However, little is known about the development of deviant sexual interests. The transfer of arousal between emotions, i.e., excitation transfer, could attribute sexual salience to stimuli that would otherwise not be sexual in nature. As such, excitation transfer could contribute to the very beginning of unusual or deviant sexual interests. The current protocol proposes a study to investigate to what extent excitation transfer occurs, i.e., to what extent genital and subjective sexual arousal to sexual stimuli is higher in an emotional state than in a neutral state. Following a prior pilot study, several adjustments were made to the study protocol, including a stronger emotional manipulation by using 360-degree film clips and the inclusion of a larger and more sexually diverse sample.

**Methods:** We will recruit 50 adult male volunteers with diverse sexual interests. We will induce sexual arousal in four different emotional states (aggression/dominance, endearment, fear, disgust) and a neutral state. Sexual arousal will be measured genitally using penile plethysmography and subjectively via self-report. Using paired samples t-tests, sexual arousal in the emotional states will be compared with sexual arousal in the neutral state.

**Discussion:** We aim to show that arousal in response to emotional stimuli that are initially nonsexual in nature, can enhance sexual arousal. These findings have potential important implications for the development of unusual and/or deviant sexual interests and possibly for the treatment of such sexual deviant interests in people who have committed sexual offenses.

**Keywords:** emotional arousal, excitation transfer, sexual arousal, virtual reality

## Excitation Transfer Between Sexual Arousal and Other Emotions: Study Protocol

Global prevalence estimates indicate that up to 31% of girls and 17% of boys have experienced some form of sexual abuse before their eighteenth birthday (Barth et al., 2013; Kloppen et al., 2016; Stoltenborgh et al., 2015). Sexual offenses and reoffenses seem mostly driven by sexual deviance and/or impulsive and antisocial behavior (Brouillette-Alarie & Proulx, 2019; Seto, 2019; Smid & Wever, 2019). Sexual deviance can be defined as an interest in- or preference for anomalous or illegal sexual stimuli (Fernandez et al., 2012). In terms of the DSM-5, these interests would be referred to as paraphilia (American Psychiatric Association, 2013). To date, very little is known about the nature or the etiology of sexual interests per se and sexual deviance specifically (A.F. Schmidt & Imhoff, 2021), neither about interests with an illegal theme, such as pedophilia or exhibitionism, nor about those with a legal theme, such as transvestic fetishism (cross-dressing) or autonepiophilia (adult baby). To support the efforts to reduce sexual (re)offending behavior, e.g., by providing treatment for (potential) offenders, it is crucial to increase our knowledge on the nature and development of sexual deviance.

4

### Incentive Motivational Model of Sexual Deviance

In the previous century, the study of sexual desire often adopted a Freudian approach where desire was seen as an intrinsic urge or lust (Both et al., 2007; Freud, 1953). A different, more modern approach to sexual desire is the Incentive Motivational Model, which entails that sexual arousal and desire result from the processing of a competent stimulus, for example, an attractive member of the preferred sex (Ågmo & Laan, 2022; Both et al., 2007; Toates, 2014). Sexual arousal is seen as an emotional reaction to a stimulus, comparable to other emotional responses such as fear, that is instigated by stimuli appraised as dangerous (Ågmo & Laan, 2022; Both et al., 2007; Smid & Wever, 2019). Processing stimuli with emotional significance results in excitation of emotion systems and in action readiness expressed in bodily reactions that prepare for adequate behavioral responses (LeDoux, 2012).

The incentive motivational approach of sexual arousal enables us to include insights acquired in emotion research, such as the process of *excitation transfer*, first described by Zillmann in 1971. If an emotion surges while another lingering emotion is still present it will “inseparably combine with the excitatory reaction to the present stimuli and thereby intensify both emotional behavior and emotional experience” (Zillmann, 1996, p. 250). In other words: excitation will transfer from one emotion to another, resulting in a stronger emotional experience, because the remaining

arousal of one prior emotion is cognitively (mis)attributed to another subsequent emotional stimulus.

With regard to unusual or deviant sexual interests, excitation transfer provides a possible explanation for how certain stimuli that seem nonsexual in nature, such as young children, pain, or dead bodies, could trigger sexual desire. Sexual salience could be attributed to stimuli that would otherwise not be sexual in nature through excitation transfer (Smid & Wever, 2019). As such, excitation transfer could contribute to the very beginning of the development of unusual sexual interests. Being in an emotional state facilitates emotional learning. Activated emotional systems facilitate the attention to emotionally significant stimuli, as well as retrieval of relevant memories and strengthening of previously learned responses, from which new learning occurs (LeDoux, 2012). Repeatedly co-occurring experiences become associated at the brain level (Löwel & Singer, 1992). If an emotional stimulus is repeatedly coupled with a sexual stimulus, learning and conditioning processes might ultimately make the stimulus potent enough to induce sexual arousal by itself (Brom, Both, et al., 2014; Pavlov, 1927; Skinner, 1937). This repeated co-occurrence of sexual arousal and other emotional arousal does not have to be coincidental. An individual may purposefully strive for this because it worked well before, especially if other, more common stimuli, do not induce the desired level of sexual arousal. Sexual excitement and gratification are such strong reinforcers that even sexually irrelevant stimuli can become associated with sexual reward (Brom, Both, et al., 2014). This way, unusual stimuli like pain (masochism) or emotions like disgust (coprophilia) may become associated with sexual arousal. It is unlikely and not claimed here that excitation transfer between sexual arousal and another emotion equals definite unusual sexual interests, however, it could be one of the working mechanisms in the very early stages of stimulus appreciation and appreciation motivation (Wang & Lang, 2012).

### **Empirical Evidence**

Much research into excitation transfer is carried out in the media and advertisement domain, where the interaction between arousal from television shows and response to subsequent advertisements is researched (Wang & Lang, 2012). Most of the research into *sexual* excitation transfer is quite dated. Yet, these studies indicate that sexual arousal can indeed transfer to or from other emotions such as aggression (M. Allen et al., 1995; Malamuth et al., 1986; Zillmann, 1971; Zillmann et al., 1981), fear and anxiety (Barlow et al., 1983; Hoon et al., 1977; Wolchik et al., 1980), or general excitement or arousal (Marin et al., 2017; Meston & Frohlich, 2003; Staley & Prause, 2013; White et al., 1981). Effects might be stronger in people with nonnormative

sexual histories. For instance, men with a self-reported history of sexual aggression have shown stronger excitation transfer between positive affect and sexual arousal than men without such histories (A.N. Craig et al., 2017).

### **Normative Deficiency**

Excitation transfer from nonsexual emotions to sexual arousal might, among other factors, explain the initial development of deviant sexual interests. It has been hypothesized that this effect is strengthened by a lack of sexual arousal to “normative”, nondeviant stimuli (Smid & Wever, 2019). For instance, a recent meta-analysis concluded that men who had sexually offended against children showed higher sexual interest in children than control groups, but also showed lower sexual interest in adults than controls (Schippers, Smid, Hoogsteder, Planting, et al., 2023). A deficiency for normative sexual stimuli might explain why some people persist in their unusual or deviant sexual behavior, even if it leads to offending. Interviews with people with pedophilia indicated that if they could have sexual activities with adults, this could offer an alternative for sexual satisfaction that attenuates their need for sexual stimuli involving children (Houtepen et al., 2016). Similarly, it is suggested that when individuals lack the skills to reach intimacy with an adult, they might feel that children are easier and safer to approach (Houtepen et al., 2016; Thornton, 2013; Ward & Gannon, 2006). In line with this “normative deficiency” hypothesis, it is expected that a proclivity for sexual excitation transfer might be inversely related to one’s level of normative sexual interests or functioning. People that respond less to normative sexual stimuli are expected to show more excitation transfer, i.e., increased response to deviant sexual stimuli.

### **Optimal Window of Arousal**

There are indications that the effect of excitation transfer on genital sexual arousal is not linear. More sympathetic arousal does not simply facilitate more sexual arousal, but rather there appears to be an optimal window for sympathetic arousal levels to facilitate sexual arousal, neither too low nor too high. Lalumière and colleagues found that the induction of either a happy or sad mood increased sexual response to sexually violent stimuli, but there was no effect of mood state on consensual sexual stimuli (Lalumière et al., 2017). It is possible that a ceiling of sexual arousal to the consensual stimuli was already reached that could not be increased further by added emotions. Furthermore, there is ample evidence that sympathovagal balance (the autonomic state resulting from the sympathetic and parasympathetic influences) is important in genital sexual arousal (C.J. Chen et al., 2009; Harte, 2013; Lee et al., 2011; Lorenz et al., 2012). An optimal sympathetic arousal window for sexual arousal, or an optimal ratio between sympathetic and parasympathetic arousal, has

implications for excitation transfer. Hypothetically, both emotions associated with increased sympathetic arousal and emotions associated with decreased sympathetic arousal may be able to facilitate sexual arousal, depending on the subject's baseline arousal levels. Relaxed people may become more sexually aroused following arousing emotions, while stressed people may become more sexually aroused following calming emotions. It is worthwhile to investigate if emotions with different sympathetic/parasympathetic arousal patterns have different effects with regard to excitation transfer.

### **Pilot Study**

In a prior pilot study, we investigated if we could induce excitation transfer between various emotions and sexual arousal in a laboratory setting with 30 male volunteers (Schippers et al., 2022). Additionally, we aimed to explore the optimal parameters to create this effect, to pave the way for the currently proposed follow-up study. In this prior pilot study, we induced sexual arousal in four different emotional states (aggression/dominance, endearment, fear, disgust) and a neutral state. Sexual arousal was measured genitally using penile plethysmography and subjectively via self-report. Although there was no mean group effect, possibly due to large interindividual variations, 60% of the subjects showed more sexual arousal in response to sexual stimulation in at least one of the emotional states than in the neutral state. Excitation transfer was most prominent with aggression/dominance and least prominent with disgust. In line with the normative deficiency hypothesis, greater genital excitation transfer was strongly related to lower penile reactivity. Greater genital and subjective excitation transfer was also related to more erotophilia, i.e., a general positive evaluation of sex.

### **The Current Study**

Results from the pilot study warrant us to continue investigating excitation transfer with several adjustments to the experimental protocol (see Protocol Adjustments). The current follow-up study includes the following aims and hypotheses.

1. The primary aim is to investigate to what extent excitation transfer occurs, i.e., to what extent sexual arousal to sexual stimuli is higher in an emotional state than in a neutral state. Sexual arousal is genitally assessed by means of penile circumference as well as subjective by means of self-report on a 10-point scale. We hypothesize that sexual arousal will be higher in an emotional state than in a neutral state.

2. Second, we aim to assess whether there is an association between excitation transfer from specific emotions and specific unusual sexual interests, as measured with a checklist of unusual sexual interests (Schippers et al., 2021; Schippers, Smid, Hoogsteder, & de Vogel, 2023). We hypothesize that larger excitation transfer effects are related to more unusual/deviant sexual interests.
3. Third, we aim to assess whether there is an association between excitation transfer and normative sexual functioning. Normative sexual functioning is assessed by means of self-reported sexual outlet (Kafka & Hennen, 2003; V. Klein et al., 2015; Schippers et al., 2021) and the genital response to sexual stimuli in the neutral block. We hypothesize that larger excitation transfer effects are related to decreased normative sexual functioning.
4. Fourth and exploratory, we aim to assess if there is an association between excitation transfer and sympathetic arousal (measured in the form of heart rate variability), and if so, to assess whether this association is linear or nonlinear.

### ***Protocol Adjustments***

The following adjustments will be incorporated in the current study. First, we aim to create a stronger emotional manipulation by displaying emotional film clips via Virtual Reality (VR)-goggles and 360-degree film. It is found that 3D/VR effectively can be used to induce emotions (Diniz Bernardo et al., 2021) and has led to more intense emotional experiences than 2D film fragments (Chirico et al., 2017; Estupiñán et al., 2014; Voigt-Antons et al., 2020). Second, we aim to include a larger and more sexually diverse sample. The previous pilot study included male volunteers between 18 and 40 years old without any problems with sexual functioning. Given that we expect the mechanism to be more evident in more erotophilic, sexually diverse samples, we aim for more variation in the sample, including people with various nonnormative sexual interests. Third, the pilot study opposed two conditions based on a) consecutive presentation of emotional and sexual stimuli (Zillmann, 1996) or b) simultaneous presentation of these stimuli (Barlow et al., 1983). In the current design, we will adopt a consecutive design in which emotional stimuli are followed by sexual stimuli. Fourth, the current study uses a different battery of self-report questionnaires that fit better with the conclusions from the previous study, including a more thorough assessment of the occurrence and content of normative and unusual or deviant sexual interests.



## Methods

### Sample

We will recruit 50 male volunteers, aged 18 or older. In the prior pilot study, 50% of the participants showed some form of excitation transfer with medium to large effect sizes (Cohen's  $f > .27$ ) (Schippers et al., 2022). We expect that the improvements implemented in the current study will increase this percentage. A power analysis with Cohen's  $d = .50$  (medium effect), alpha level  $\alpha = .006$  (Bonferroni-corrected for eight tests), and power  $\beta = .85$ , indicates that 50 participants should be included for the planned statistical analyses (see Statistical Analyses). Subjects will both be recruited from the general population by means of directed snowball sampling aimed at people with diverse sexual interests and from various sexual-themed online platforms, such as BDSM, fetish, etc. Five additional subjects, recruited among colleagues, take part in the feasibility phase of the study, which serves to test and optimize the lab settings. Potential subjects will be excluded if they report insufficient understanding of the Dutch language to complete questionnaires or have a visual handicap.

### Study Procedures

The experimental intervention consists of inducing emotional arousal and sexual arousal in subsequent experimental blocks, separated by return-to-baseline assignments. Emotional arousal will be induced by means of 60-second 360-degree film clips. Four different emotions will be induced that reflect positive and negative valence and increasing as well as decreasing sympathetic arousal (Kreibig, 2010; Moreira et al., 2018; Siegel et al., 2018), displayed in the first two columns of Table 1. To select the appropriate emotional stimuli, 17 volunteers<sup>1</sup> watched 13 different emotional films using VR goggles and rated for each of them how aggressive/dominant, fearful, endearing, or disgusting they were on a 1-10 scale. The film clips used for the experiment were those that scored highest for each emotion category (scores between 6.2 – 8.7) and discriminated best between emotions, see the final column of Table 1.

A neutral, nonemotional state will be induced by means of a film fragment with a moving dot accompanied by a follow-the-dot assignment. Sexual arousal will be induced with various 60-second erotic film fragments originating from the same erotic movie, depicting heterosexual interaction in 360-degrees from the man's point of view. Comparable homosexual film clips will be used for participants indicating a homosexual preference.

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<sup>1</sup> 9 male and 8 female co-workers, average age 36 years.

**Table 1**  
*Emotion Induction Film Clips*

<b>Emotion</b>	<b>Valence and Arousal</b>	<b>Content Film Clip</b>
Aggression/Dominance	Positive valence, increases sympathetic arousal	You are winning a street fight with someone.
Fear	Negative valence, increases sympathetic arousal	Horror nightmare, a ghost-like figure is approaching you as you lie on a couch.
Endearment/Affection	Positive valence, decreases sympathetic arousal	Kittens are playing around you.
Disgust	Negative valence, decreases sympathetic arousal	Zombies are approaching a corpse and eating it's flesh and intestines.

All subjects must provide written informed consent in order to participate. At the start of the experimental appointment, subjects will fill out the questions regarding demographic information, sexual functioning, and sexual interests. In a separate laboratory area, the researcher will then attach the electrodes for the heart rate measures. The researcher instructs the subject and then leaves the subject alone to adjust the penile strain gauge and VR headset. The researcher remains in a separate room from the subjects and can communicate with the subject via intercom. The experiment starts, following the study procedures described in Table 2. To prevent order effects and carry-over effects, the order of the specific emotional and neutral films and the erotic films will be pseudorandomized among subjects, meaning that each subject will receive a different order. Subjects will receive reimbursement for their participation (€ 35 + max. €40 travel reimbursement). At the end of the appointment, subjects will be debriefed on the purpose and expected effects of the study i.e., increased sexual arousal induced by emotions. Participants may experience nausea and dizziness from VR, this will diminish after use. No adverse effects are expected to occur. Participants are provided with the contact details of an independent expert in case they have any remaining questions or concerns that they do not wish to address to the researcher. The total expected duration of the appointment is approximately one hour.

## Measures

The used materials are described below. All devices are used for their intended use and are CE certified (Conformité Européenne).

**Table 2**  
*Study Procedures*

<b>Block</b>	<b>Contents</b>
Baseline Measurement	Neutral film (80 seconds)
Experimental Block 1	<ul style="list-style-type: none"> <li>- Emotional manipulation: in counterbalanced order either the aggression/ dominance, fear, endearment, disgust or neutral film (60 seconds)</li> <li style="padding-left: 40px;">- Neutral film (10 seconds)</li> <li>- Sexual arousal manipulation: heterosexual or homosexual erotic film (60 seconds)</li> <li style="padding-left: 40px;">- Neutral film (10 seconds)</li> <li style="padding-left: 40px;">- Sexual arousal rating</li> <li>- Return to baseline: Follow the dot assignment</li> </ul>
Experimental Block 2	Same as above
Experimental Block 3	Same as above
Experimental Block 4	Same as above
Experimental Block 5	Same as above

### ***Sexual Arousal***

Genital sexual arousal is measured during the emotional and erotic film fragments using strain gauges that assess penile circumference ([www.biopac.com](http://www.biopac.com)). This is an often used and validated measure of sexual arousal (Meridian & Jones, 2011; Murphy et al., 2015; Seto, 2008). The gauge measures the change in diameter of the penis and is placed halfway up the shaft of the penis by the participant himself. This method appears to be relatively non-intrusive to research participants: When asked how uncomfortable they felt during the assessment, 89% of the 27 men reported “not at all” and 11% reported “a little bit” (Huberman & Chivers, 2015). Penile circumference during the neutral stimulus will be used as the baseline measure. Subjective sexual arousal is measured at the end of each experimental block. Participants will rate the extent to which they feel sexually aroused on a 10-point Likert scale, ranging from 1, *not at all sexually aroused*, to 10, *extremely sexually aroused*.

### ***Unusual and Deviant Sexual Interests***

Unusual and deviant sexual interests are assessed with a checklist of 32 items, including less rare interests, such as BDSM, as well as more rare interests, such as coprophilia and necrophilia (Schippers et al., 2021; Schippers, Smid, Hoogsteder, & de Vogel, 2023). A single item describing “sex with an intimate partner” is included as a reference point. Participants rate each item on a 7-point Likert scale ranging from 1, *very unappealing*, to 7, *very appealing*. It is explicitly specified that responses do not have to reflect actual sexual activities, but simply the level to which participants

consider the described activities appealing or unappealing. Also, participants are provided with the option to list and rate sexual interests not mentioned in the list, if so desired. The items on this checklist can be categorized in four factors representing: (1) extreme and illegal sexual activities such as with children, force, or corpses; (2) light BDSM<sup>2</sup> such as being tied or blindfolded; (3) heavy BDSM that may include pain or suffering, such as gagging or seriously hurting someone; and (4) fetishistic and illegal but lower-sentenced sexual activities such as sex with a family member, exposing your genitals, or sex dressed as a plush animal. The internal consistency of these factors showed to be good to excellent (Schippers, Smid, Hoogsteder, & de Vogel, 2023).

### ***Sexual Outlet***

Sexual outlet is assessed using the following questions: “in the last month, how many orgasms did you have each week?”, “in the last month, how many hours did you invest in sexual activity each week?”, and “in the last month, how long were you involved in sexual activity before you reached orgasm?” Additionally, we asked about sex life satisfaction, and frequency and function of pornography use (Kafka & Hennen, 2003; V. Klein et al., 2015; Schippers et al., 2021).

### ***Demographic Information***

A short demographic information form assesses age, current relationship status, cultural identification, educational level, and sexual orientation. Furthermore, we will ask subjects to report recent or current use of medication or medical disorders that may affect erectile response or heart rate.

### ***Heart Rate***

Heart rate data will be recorded during the baseline measurement phase using Biopac software ([www.biopac.com](http://www.biopac.com)). Heart rate will be recorded using a standard Lead-II configuration (Nikolić et al., 2017), where electrodes are placed on the upper body using adhesive patches (Molenkamp, 2011). From heart rate, baseline heart rate variability will be calculated.

### ***Statistical Analyses***

The primary aim is to assess to what extent sexual arousal to sexual stimuli is higher in an emotional state than in a neutral state. Eight paired samples t-tests will be performed, comparing two measures of sexual arousal (genital and subjective) in four emotional manipulations to the neutral state. Effect sizes and 95% confidence intervals will be used to assess the size of excitation transfer.

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<sup>2</sup> Bondage and Discipline (BD), Dominance and Submission (DS) and Sadism and Masochism (SM)

For the following aims, four excitation transfer scores will be calculated by subtracting sexual arousal in the neutral state from sexual arousal in each emotional manipulation (e.g., genital sexual arousal in fear manipulation minus genital sexual arousal in neutral state). The second aim is to assess the association between excitation transfer from specific emotions and specific unusual sexual interests. Pearson correlations and p-values will be calculated between excitation transfer scores and the items and factors from the checklist of unusual sexual interests. The third aim is to assess the association between excitation transfer and normative sexual functioning. This will be done by means of a repeated measures analyses of covariance (RM ANCOVA) with the excitation transfer scores as within-subject variables and sexual outlet and sexual response in the neutral state as covariates. The final aim is to explore the association between excitation transfer and baseline sympathetic arousal. This will be done by means of a RM ANCOVA with the excitation transfer scores as within-subject variables and baseline heart rate variability as covariate.

## Discussion

Sexual deviance is an important risk factor for sexual (re)offenses. This study aims to add knowledge about the possible development of unusual sexual interests and sexual deviance via excitation transfer. We aim to show that arousal in response to emotional films that are initially nonsexual in nature, can enhance sexual arousal. These findings may have potential implications for the treatment of sexual deviance in people who have committed sexual offenses. If our hypotheses are supported, this would emphasize the importance of emotion regulation and sympathetic arousal regulation (stress reduction) in the treatment of unwanted deviant sexual interests.

It is a strength that the methodology described in this study protocol was first carefully tested in a pilot study (Schippers et al., 2022). Improvements from the pilot are incorporated in the current procedures, including Virtual Reality (VR) to present stronger stimuli, as well as the consecutive rather than simultaneous presentation of emotional and sexual stimuli. It may be a limitation that no subgroups of specific sexually unusual backgrounds are contrasted. Rather, we aim for a heterogeneous group of people with diverse sexual backgrounds, to be able to deliver a proof of principle. Future efforts may contrast various subgroups, such as people with interest in BDSM, specific fetishes or pedophilia.

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**Ethics Approval**

Approval for this study was obtained from the medical research ethics committee METC azM/UM, NL80036.068.21 / METC21-087.

**Declaration of Competing Interest**

The authors declare that they have no competing interests.



# Chapter 5

## **Exploratory Factor Analysis of Unusual Sexual Interests**

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## Abstract

**Background:** Unusual sexual interests are largely intercorrelated, yet not much is known about underlying patterns of clusters between various sexual interests.

**Aim:** We aimed to identify underlying clusters of unusual sexual interests using exploratory factor analysis.

**Methods:** We conducted exploratory factor analysis with self-reported interest in a wide variety of unusual sexual acts for an online, international sample ( $N = 669$ ; 61% female), and for women and men separately. Factor regression weights were correlated to self-reported sex life satisfaction, sexual outlet, and psychiatric symptoms.

**Outcomes:** Participants rated the attractiveness of 50 unusual sexual activities, and reported on their sex life satisfaction (Arizona Sexual Experiences Scale), sexual outlet, and symptoms regarding ADHD (Adult ADHD Self-Report Screening Scale for DSM-5), depression, anxiety, and stress (Depression, Anxiety and Stress Scale).

**Results:** We identified five factors of unusual sexual interests that were largely comparable for women and men: submission/masochism, forbidden sexual activities, dominance/sadism, mysophilia (attraction to dirtiness or soiled things), and fetishism. For women, unusual sexual interests related to more psychiatric symptoms and higher sexual outlet, whereas this relation was less explicit for men.

**Clinical Implications:** Different factors of unusual sexual interests may serve different underlying functions or motivations, for instance related to sexual and emotional regulation. A better understanding of the nature of unusual sexual interests is important to be able to influence sexual interests that are unwanted or cause damage to others.

**Strengths & Limitations:** Strength of this study include its anonymity, the avoidance of sexual orientation effects, and the possibility to indicate only a slight endorsement towards sexual items. Limitations include the sample's generalizability and the truthfulness of online responding.

**Conclusion:** Unusual sexual interests could be clustered into five factors that were largely comparable for women and men: submission/masochism, forbidden sexual activities, dominance/sadism, mysophilia, and fetishism.

**Keywords:** sexual interests, paraphilia, exploratory factor analysis, submission, masochism, dominance, sexual outlet

## Exploratory Factor Analysis of Unusual Sexual Interests

The estimated prevalence of having any unusual sexual interest varies widely as a result of varying assessment methods, ranging from 15% to 62% in nonclinical, nonforensic populations (Mundy & Cioe, 2019). Studies agree that men show more variety and greater interest in unusual sexual activities, but women certainly have a substantive part in this as well (Bártová et al., 2020; Bouchard et al., 2017; Dawson et al., 2016; Joyal et al., 2015; Noorishad et al., 2019). In general women favor submissive fantasies, whereas men favor dominant fantasies, albeit both genders endorse both (Castellini et al., 2018; Joyal et al., 2015; Joyal & Carpentier, 2017; Mundy & Cioe, 2019; Noorishad et al., 2019). Available research in various samples shows that unusual sexual interests, overall, are largely intercorrelated: people who have one unusual sexual interest are more likely to have another (Bártová et al., 2020; Brown et al., 2020; Dawson et al., 2016; Joyal & Carpentier, 2017; Wilpert, 2018). Rarer sexual interests generally show lower intercorrelations, such as scatophilia (feces) with zoophilia (animals), while more common paraphilias show higher intercorrelations, such as masochism with sadism, and voyeurism with exhibitionism (Baur et al., 2016; Dawson et al., 2016; Joyal & Carpentier, 2017; Wilpert, 2018).

Some efforts have been made so far to explore these intercorrelations in breadth, i.e., with a wide variety of sexual interests, or in depth, i.e., with the aim of finding underlying patterns or clusters. In the Wilson Sex Fantasy Questionnaire (WSFQ), 40 different sexual fantasies were analytically grouped into four clusters: exploratory (e.g., group sex), intimate (e.g., oral sex), impersonal (e.g., sex with strangers) and sadomasochistic (e.g., being forced to have sex) (Wilson, 1988, p. 49). Although still regularly used, the WSFQ items are somewhat outdated, present an exclusively heterosexual point of view (e.g., "intercourse"), are nonspecific of gender or age (e.g., "seducing an innocent"), or refer to nonsexual behaviors (e.g., "being sought after by the opposite sex") (Joyal et al., 2015; Noorishad et al., 2019; O'Donohue et al., 1997). More recently, Dawson et al. (2016) assessed the extent of attraction to 32 specific sexual acts among 1,015 Canadian students (70% female) (Dawson et al., 2016). These acts were clustered into 14 higher order paraphilic interests on theoretical grounds and at face value, without using empirical or statistical means to support these clusters. Joyal (2015) asked a community sample of 1,501 adults (53% female) in an online questionnaire to rate the intensity with which they experienced 51 different "normophilic" and "paraphilic" sexual fantasies (Joyal, 2015). Subsequently, Joyal clustered the participants into subgroups, based on intensity scores and gender, thus clustering the participants rather than the nature of the

sexual fantasies. Finally, Hald & Štulhofer (2016) asked 2,337 participants (57% female), subdivided into four groups based on gender and sexual orientation, to rate the frequency of their use of 27 pornography topics. Factor analysis revealed three commonly themed pornography clusters across subgroups (group sex, nonheterosexual, and paraphilic), however, these clusters did not all contain the same items in each subgroup. What most of these studies have in common is that they include a broad variety of relatively common, “vanilla” (Hald & Štulhofer, 2016) or “normophilic” (Joyal, 2015) sexual interests. This seems to cause all unusual interests to fall into one single undifferentiated paraphilic cluster. Furthermore, the sexual orientation of participants seems to have a considerable effect if the questions are not tailored to this (e.g., asking both straight and gay men and women for their “interest in performing fellatio”). The emerging clusters in the Joyal (2015) and Hald & Štulhofer (2016) studies seem to be characterized more by sexual orientation than by any other variable. It is therefore relevant to update these efforts using a variety of unusual sexual interests, while controlling for sexual orientation and gender effects.

Various unusual or paraphilic behaviors and interests have been related to higher sexual outlet, “hypersexuality,” “sex drive,” etc., in student and community samples (Bouchard et al., 2017; Castellini et al., 2018; Dawson et al., 2016; Gerwin et al., 2018; V. Klein et al., 2015) and, less frequently, in clinical samples (Engel et al., 2018; Kafka & Hennen, 2003). Lower sex life satisfaction has been related to illegal sexual topics (Mundy & Cioe, 2019). There are some indications that people practicing BDSM have increased sex life satisfaction (Botta et al., 2019), however, a recent systematic review found no clear relation (Brown et al., 2020). Paraphilic sexual interests and behaviors have also often been associated with depression, anxiety, and ADHD in forensic, clinical, and general population samples (Dawson et al., 2016; Gerwin et al., 2018; Kafka, 2012; Kafka & Hennen, 2002; W.L. Marshall, 2007; M. Renaud, 2019). All these studies correlate the presence of psychiatric diagnoses with the presence of *any* paraphilic interest, so direct connections between psychiatric symptoms and specific (clusters of) paraphilic interests have to our knowledge not yet been tested.

### **The Current Study**

The current study aimed to explore underlying clusters, or factors, regarding the nature of unusual sexual interests. We conducted an exploratory factor analysis with the online self-reported interest in a wide variety of unusual sexual acts, among both men and women. Based on previous findings, we expected to find a substantial correlation between dominant and submissive acts, as well as between voyeuristic and exhibitionistic acts (Dawson et al., 2016; Joyal et al., 2015). Since the questions were adequately tailored to gender and sexual orientation, there was no reason

to expect vastly different underlying factor structures in unusual sexual interests between men and women. The secondary aim of the current study was to explore if and how any emerging factors of unusual sexual interests were associated with self-reported sexual outlet, sex life satisfaction, and several psychiatric symptoms (depression, anxiety, stress, and ADHD).

## Methods

### Procedure

An online survey was created on Qualtrics ([www.qualtrics.com](http://www.qualtrics.com)). Recruitment advertisements with a link to the anonymous survey were distributed by means of snowball sampling along social media channels, such as Facebook groups related to sexual themes. We were not aiming for a representative sample, nor were we specifically looking for people with high levels of unusual sexual interests, however, we sought people with a willingness to answer sexual questions. Data collection ran between April 14 and May 19, 2020. The procedure of this study was in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Institutional Review Board of the Amsterdam University Medical Centers (location VUmc, Amsterdam, the Netherlands) approved the study. Only participants older than 18 were recruited. Each participant signed an online informed consent form before beginning the questionnaire. All data were collected anonymously, we did not record participants' Internet Protocol (IP) addresses or any other identifying information. Only one cookie was used in order to prevent ballot box stuffing. We provided three versions of the questionnaire from which participants could choose their preferred language: English, Dutch, and German. The measures were translated in an iterative process by bilingual, native-speaking colleagues. Participants completed questions regarding demographic information, which included age, most applicable gender, relationship status, country where one had lived the longest, highest completed education level, and most applicable sexual orientation. Participants then completed measures of unusual sexual interests, sexual functioning, and psychiatric symptoms (all specified below). After finishing the questionnaires, participants were asked to indicate whether or not they had provided truthful answers. Independent of this, participants could participate in a random drawing for a €50 gift card. An additional survey link was embedded in the questionnaire which allowed participants to provide their email address for the drawing, without it being connected to their prior responses. Six gift cards were distributed for the total sample. Participants were provided with a debriefing form

and encouraged to contact the main researcher with any questions or concerns. The median duration of the questionnaire was 11.6 minutes.

## Sample

A total of 843 people opened the questionnaire. Two people were discarded because they reported to be younger than 18, one person was discarded because they reported to have provided untruthful answers. A total of 171 people dropped out before filling in the critical questions regarding sexual interests. The final total sample for analysis thus consisted of  $N = 669$  participants, aged 18 to 85 years old ( $M = 30.8$ ,  $SD = 9.7$ ), 61% female. The majority of the respondents were from the Netherlands (39%,  $n = 263$ ) and the U.S.A. (34%,  $n = 229$ ), other countries included the U.K. ( $n = 44$ ), Germany ( $n = 25$ ), Canada ( $n = 19$ ), Belgium ( $n = 7$ ), and Australia ( $n = 7$ ). The relationship status of 36% of the respondents was single, 21% were in a relationship shorter than two years, and 43% were in a relationship longer than two years. Compared to population rates of sexual orientation (Kuyper, 2016; Newport, 2018; Rahman et al., 2020), our sample included much less heterosexual orientation (53% in the current sample versus 90% in the population), somewhat more homosexual orientation (9% vs. 2-7%), and much more bisexual orientation (36% vs. 5-7%). Additionally, 2% reported an asexual orientation; these participants were included as research has found a large overlap between sexual fantasies from asexual and sexual participants (Yule et al., 2017). Also, our sample seemed to have received a relatively high level of education compared to population rates (Rahman et al., 2020), with 67% completing university or higher education, 22% some college or vocational education, and 11% high school.

## Measures

### ***Unusual Sexual Interests***

Unusual sexual interests were assessed with a checklist of 56 items, based on sexual behaviors included in previous studies (Dawson et al., 2016; Joyal et al., 2015; Seto et al., 2012). Additional items were included that represent rather common themes in pornography but were not included in the mentioned studies, such as having sex with a family member (Mazières et al., 2014). Lastly, the option was included to list and rate any sexual interest not on the list, to check if important sexual interests were missed. The checklist included both interests generally found to be less rare in the population, such as BDSM, as well as interests generally found to be more rare in the population, such as coprophilia and necrophilia. As our focus was to find factors of *unusual* sexual interests, we excluded relatively common sexual acts between partners, such as oral sex or anal sex. A single item describing “sex with an intimate partner” was included as a reference point. All questions were

tailored to the reported sexual orientation for each respondent, e.g., heterosexual men were not presented with an item implying sexual activity with a man. This resulted in 50 items that were answered by every participant and were used in the current study, see Appendix A for the full list of items. All items were presented in a different, randomized order for each participant. Participants rated each item on a 7-point Likert scale ranging from 1, *very unappealing*, to 7, *very appealing*. We explicitly specified that responses did not have to reflect actual sexual activities, but simply the level to which participants considered the described activities appealing or unappealing.

### **Sexual Functioning**

Sex life satisfaction in the last month was assessed with the item “Over the past month, how satisfying was your sex life?”, which was based on the Arizona Sexual Experiences Scale (ASEX) (McGahuey et al., 2000). This item was rated on a 6-point scale (range 1-6) where lower scores indicated less and higher scores indicated more satisfaction. The other items of the ASEX were included in the survey but are not reported upon in this paper. Additionally, we investigated sexual outlet (Kafka & Hennen, 2003; V. Klein et al., 2015) with the following questions, rated on a 6-point scale: “How many orgasms did you have each week?” (response options: <1, 1-3, 4-6, 7-9, 10-12, or >13), “How many hours did you invest in sexual activity each week?” (<1, 1-3, 4-6, 7-9, 10-12, or >13), and “How long were you involved in sexual activity before you reached orgasm?” (<5 min, 5-30 min, 30min-1hr, 1-2 hrs, >2 hrs, never reached orgasm).

### **Psychiatric Symptoms**

Psychiatric symptoms regarding depression, anxiety, stress, and ADHD in the past month were assessed with the 21-item Depression, Anxiety and Stress Scale (DASS-21) (Lovibond & Lovibond, 1995) and the 6-item Adult ADHD Self-Report Screening Scale for DSM-5 (ASRS-5) respectively (Kessler et al., 2005; Ustun et al., 2017), which both showed good internal consistency in the current sample (DASS-21 Cronbach's  $\alpha = .93$ , ASRS-5  $\alpha = .75$ ). Previous Dutch translations of these questionnaires differ substantially from the English versions. We wanted the English, Dutch and German versions of our questions to be aligned as closely as possible, therefore, we created new translations (as described in Procedure). All psychiatric symptom items were presented in a different randomized order for every participant and rated on a 5-point scale, ranging from 1, *never*, to 5, (*almost*) *always*. Also, participants were asked to indicate “Have you ever been diagnosed with a psychiatric disorder, and if so, which one(s)?” Lastly, due to the exceptional situation at the time the study was conducted (April-May 2020), we asked participants to indicate how distressed

they were by the coronavirus pandemic, on a scale from 1, *not at all*, to 5, *extremely distressed*. We calculated mean scale scores for depression, anxiety, stress and ADHD.

### Statistical Analyses

To identify the optimal number of factors that could explain the variance in the 50 sexual items, we performed an exploratory factor analysis (EFA) with the principal axis factoring extraction method and, due to the expected interrelations between factors, oblique rotation (oblimin in SPSS version 25). All assumptions for exploratory factor analysis were met: The Kaiser-Meyer-Olkin measure (.889) indicated excellent sample size (Hutcheson & Sofroniou, 1999) and Bartlett's test of sphericity ( $p < .001$ ) indicated sufficient relation between the variables (Field, 2009). The number of retained factors was based on the scree plot (Cattell, 1966) and Kaiser's criterion, i.e., eigenvalues being higher than 1 (Kaiser, 1960). If scree plot and eigenvalues led to different conclusions, the researchers decided upon the number of factors. Factor loadings above .40 were considered for the interpretation of the factors (Stevens, 2002). The EFA was first performed for the total sample with 50 sexual items and then for women and men separately. Regression weights were saved for each retained factor. Regression weights are standardized composite variables that "predict the location of each individual on the factor" (DiStefano et al., 2009, p. 4). These regression weights were used to calculate Spearman's correlations (because of ordinal measurement level) between the factors and the following variables: sex life satisfaction, number of orgasms per week, time invested in sexual activities per week, time invested in sex before orgasm, ADHD symptoms (ASRS-5), stress, anxiety, and depression symptoms (DASS-21 subscales), and corona distress. The effects were interpreted with a Bonferroni correction for 9 variables, i.e., at  $\alpha = .006$ . Cohen's  $d$  is reported as effect size, where  $d = .20$  is considered a small effect size,  $d = .50$  a medium effect size, and  $d = .80$  a large effect size (J. Cohen, 1992).

## Results

The total mean score for unusual sexual interest in our sample was moderately lower for women ( $M = 2.82$ ,  $SD = 0.77$ ) than for men ( $M = 3.17$ ,  $SD = 0.82$ ;  $d = 0.44$ , 95%  $CI$  of  $d$  [.38;.50]). Sexual activity in a long-term, committed relationship received the highest overall score ( $M = 6.39$ ,  $SD = 1.09$ ). (It must be noted that the option to write and rate sexual interests not mentioned in the list received a higher score,  $M = 6.45$ ,  $SD = 1.17$ , however, inspecting these answers, we could not form a larger category to be included as a separate sexual interest.) Appendix A displays the mean scores and percentage endorsement for each item for the total sample and for women and men

separately. In this nonrepresentative sample, the 5% highest scoring unusual sexual interests for men were: blindfolding someone, tying someone, spanking someone, public place, and being tied ( $5.16 < M < 5.67$ ). For women these were: being tied, blindfolding someone, being spanked, tying someone, and completely surrendering ( $5.05 < M < 5.60$ ). The 5% lowest unusual sexual interests for men and women were the same, although with a slightly different ranking: defecating on someone, being defecated on, corpse, age 8-12, and age under 8 ( $1.03 < M < 1.30$ ). To illustrate, 21 participants (3%) rated sexual activity with a child under 8 with a score of 2 or higher (i.e., the slightest possible endorsement, as 1 was the lowest possible score), 29 participants (4%) did so for sexual activity with a corpse. The option to list an extra sexual interest was used by 104 participants. Some of these added interests were reformulations of items already on the list (e.g., referring to domination). None of the added interests were mentioned by more than seven participants, most were mentioned once. Appendix B displays themes that emerged from these extra sexual interests.

### Exploratory Factor Analysis (EFA)

The EFA with the total sample identified 5 factors that explained 47.36% of the variance. The resulting pattern matrix with factor loadings is presented in Table 1. The first factor (eigenvalue 11.67) explained 23.35% of the variance and contained items regarding masochistic or submissive acts (e.g., being tied, surrendering your will), hence, this factor was labeled “submission/masochism.” The second factor (eigenvalue 4.65) explained 9.30% of the variance and contained items regarding forbidden or (in many countries) illegal acts, including the DSM-5 paraphilic disorders voyeurism, exhibitionism, frotteurism, and pedophilia, but also sex with a family member. This factor was labeled “forbidden sexual activities.” The third factor (eigenvalue 2.86) explained 5.72% of the variance and included items from a dominant sexual perspective and in which pain or humiliation was exerted (e.g., spanking someone, having someone at your mercy). This factor was labeled “dominance” (emphasis on power) and “sadism” (emphasis on pain). The fourth factor (eigenvalue 2.29) explained 4.59% of variance and included mainly items regarding urination and defecation. This factor was labeled “mysophilia,” which means sexual arousal to dirtiness, or soiled, decaying things. The fifth factor (eigenvalue 2.20) explained 4.40% of variance and included items regarding nonpersonal objects, attributes or characteristics, such as plush, feet, and dwarfism. This factor was labeled “fetishism.” Factors 3 (dominance/sadism), 4 (mysophilia) and 5 (fetishism) were negative, therefore the factor loadings and regression weights were multiplied by -1. All factors correlated positively with each other, see Table 2. Fetishism showed the highest correlations with all other factors, mysophilia the lowest.



## Gender

Figure 1 shows the mean scores for the items with factor loadings  $>.40$  on each factor for women and men. The order of the highest to the lowest rated factors was very similar for men and women. Submission/masochism and dominance/sadism were rated most appealing, forbidden sexual activities the least. The ratings of women and men differed significantly on each factor with medium effect sizes (see Appendix C for means, standard deviations and effect sizes).

**Table 1**

*Factor Loadings from EFA With Total Sample*

Items (Sexual Activities While/With...)	Submission/Masochism	Forbidden	Dominance/Sadism	Mysophilia	Fetishism
1. Being tied	.77	-.02	-.04	-.17	.05
2. Surrendering your will	.77	.03	-.07	-.14	.05
3. Having breathing restricted	.74	.03	.10	-.00	-.13
4. Being made to gag	.73	-.02	-.01	.11	-.04
5. Being tortured	.66	-.01	.01	.34	-.06
6. Being spanked	.65	-.03	.06	-.05	-.00
7. Wax dripped on you	.64	-.08	.03	-.00	.18
8. Being humiliated	.64	.02	.04	.24	.02
9. Filming sex	.30	.16	.23	-.14	.16
10. Age 8-12	-.01	.71	-.11	.06	.05
11. Age 13-16	-.11	.70	.05	.05	-.00
12. Under 8	-.01	.66	-.14	.06	.04
13. Family member	-.02	.64	-.02	.04	.14
14. Touching someone in public	.00	.59	.03	-.07	.01
15. Animal	.07	.59	-.22	.01	.22
16. Forcing someone	.02	.54	.32	.18	-.21
17. Exposing genitals	.13	.51	-.04	-.17	.05
18. Spying on someone	-.13	.49	.20	-.02	-.02
19. Asleep, drugged, unconscious	-.01	.48	.24	.17	-.03
20. Corpse	.03	.37	-.02	.19	.01
21. Public place	.18	.26	.24	-.26	.04
22. Someone at your mercy	-.12	.02	.76	-.03	.12
23. Tying someone	.06	-.01	.75	-.17	.07
24. Spanking someone	.00	-.06	.70	-.00	.11
25. Restricting someone's breathing	.23	.01	.63	.10	-.07
26. Blindfolding someone	.11	-.02	.63	-.25	.05
27. Humiliating someone	.04	.00	.59	.29	.08
28. Making someone gag	.11	.03	.58	.23	-.01

**Table 1***Continued*

Items (Sexual Activities While/With...)	Submission/ Masochism	Forbidden	Dominance/ Sadism	Mysophilia	Fetishism
29. Dripping wax on someone	.16	-.12	.52	.05	.24
30. Virgin	-.15	.22	.32	-.02	.07
31. Orgy	.26	.11	.28	-.08	.23
32. Defecating on someone	-.01	.20	.03	.48	.11
33. Torturing someone	.14	.10	.46	.47	-.08
34. Urinating on someone	-.04	.04	.25	.47	.30
35. Being urinated on	.22	.06	.01	.46	.31
36. Being defecated on	.07	.21	-.08	.45	.14
37. Enema	.20	-.03	.05	.38	.16
38. Blood	.28	.01	.07	.34	.20
39. Committed relationship	.11	-.03	.09	-.21	.07
40. Someone dressed plush animal	-.12	.04	-.00	.05	.72
41. Being dressed as plush animal	-.04	.06	-.09	.01	.68
42. Dwarfism	-.07	.05	.06	-.01	.56
43. Blow-up doll	.00	.16	.03	-.02	.54
44. Someone overweight	.06	.01	-.03	.05	.53
45. Dressing up as opposite sex	.05	-.06	.05	.01	.53
46. Feet	-.01	-.04	.13	.15	.41
47. Rubber, latex, leather	.23	-.06	.21	-.05	.41
48. Prostitute	.09	.11	.21	-.04	.38
49. Someone as old as parent	.16	.12	.01	-.05	.25
50. Watch partner w/ someone else	.18	.15	.13	.07	.24

NB. Loadings >.40 are shaded dark.

**Table 2***Factor Correlation Matrix*

Factor	Submission / Masochism	Forbidden	Dominance/ Sadism	Mysophilia
Forbidden	.08*			
Dominance/ Sadism	.39**	.28**		
Mysophilia	.11**	.25**	.12**	
Fetishism	.42**	.42**	.42**	.21**

NB. Pearson correlations. \*  $p < .05$ , \*\*  $p < .01$

**Figure 1***Mean Item Scores on the Sexual Factors*

The EFA was now repeated for women and men separately (see Appendix D for all items and their factor loadings). For women, four factors were retained (41.96% of variance explained) which were in nature comparable to the factors from the total sample, however, the factor fetishism was dissolved and most of its items now loaded highest on the factor dominance/sadism. Other notable differences were that the items “restricting someone’s breathing” and “making someone gag” now loaded highest on the factor submission/masochism rather than on dominance/sadism. For men, five factors were retained (47.24% of variance explained) which were similar to the total sample. Notable differences were that the items “being urinated on,” “enema,” and “dressing up as opposite sex” now loaded highest on the factor submission/masochism.

### **Sexual Functioning and Psychiatric Symptoms**

Table 3 and 4 display correlations between the factors, the total mean score for unusual sexual interests, sexual functioning, and psychiatric symptoms for women and men respectively. Women scored significantly higher on all psychiatric symptoms than men ( $d = .61, p < .001$ ). As a control measure, we included distress by the current coronavirus pandemic. Corona distress had effects similar to the other psychiatric symptoms, which indicates that the same results could be expected outside of pandemic circumstances.

**Table 3***Spearman Correlations between Factors, Sexual Functioning, and Psychiatric Symptoms for Women*

Women (n=407)	Total Unusual Sexual Interest		Submission/Masochism		Forbidden		Dominance/Sadism		Mysophilia	
	<i>rho</i>	<i>p</i>	<i>rho</i>	<i>p</i>	<i>rho</i>	<i>p</i>	<i>rho</i>	<i>p</i>	<i>rho</i>	<i>p</i>
Sex Life Satisfaction	.04	.456	.06	.200	.04	.463	.01	.914	-.07	.136
Orgasms p/Week	<b>.32</b>	<b>&lt;.001</b>	<b>.31</b>	<b>&lt;.001</b>	<b>.20</b>	<b>&lt;.001</b>	<b>.20</b>	<b>&lt;.001</b>	.06	.258
Time Invested in Sex	<b>.27</b>	<b>&lt;.001</b>	<b>.27</b>	<b>&lt;.001</b>	<b>.17</b>	<b>.001</b>	<b>.15</b>	<b>.003</b>	.09	.064
Time Before Orgasm	-.01	.835	-.03	.520	-.01	.831	-.02	.630	.02	.625
ADHD (ASRS-5)	<b>.19</b>	<b>&lt;.001</b>	<b>.18</b>	<b>&lt;.001</b>	.10	.048	<b>.15</b>	<b>.003</b>	.01	.857
Depression (DASS-21)	<b>.19</b>	<b>&lt;.001</b>	<b>.21</b>	<b>&lt;.001</b>	.07	.189	<b>.14</b>	<b>.005</b>	.03	.572
Anxiety (DASS-21)	<b>.19</b>	<b>&lt;.001</b>	<b>.16</b>	<b>.002</b>	.09	.077	<b>.20</b>	<b>&lt;.001</b>	-.04	.442
Stress (DASS-21)	<b>.22</b>	<b>&lt;.001</b>	<b>.25</b>	<b>&lt;.001</b>	.08	.099	.13	.011	.01	.919
Corona Distress	<b>.16</b>	<b>.002</b>	<b>.14</b>	<b>.005</b>	-.02	.751	<b>.17</b>	<b>.001</b>	.06	.247

NB. **Bolded** effects indicate statistical significant relation at  $\alpha = .006$  (Bonferroni correction for all comparisons).

**Table 4***Spearman Correlations between Factors, Sexual Functioning, and Psychiatric Symptoms for Men*

Men (n=252)	Tot.Unusual Sex.Interest		Submis / Maso		Forbidden		Dom / Sadism		Myso- philia		Fetish	
	<i>rho</i>	<i>p</i>	<i>rho</i>	<i>p</i>	<i>rho</i>	<i>p</i>	<i>rho</i>	<i>p</i>	<i>rho</i>	<i>p</i>	<i>rho</i>	<i>p</i>
Sex Life Satisfaction	-.08	.197	-.07	.240	-.10	.112	-.03	.665	.03	.666	-.07	.269
Orgasms p/Week	.13	.042	-.07	.291	.09	.166	<b>.24</b>	<b>&lt;.001</b>	.01	.918	.16	.013
Time Invested in Sex	<b>.22</b>	<b>&lt;.001</b>	.12	.064	.07	.269	<b>.25</b>	<b>&lt;.001</b>	.07	.302	<b>.18</b>	<b>.003</b>
Time Before Orgasm	.07	.295	.06	.322	-.14	.030	.10	.110	.08	.200	.03	.639
ADHD (ASRS-5)	.11	.103	.06	.338	.03	.631	.02	.802	-.01	.932	<b>.21</b>	<b>.001</b>
Depression (DASS-21)	.16	.011	.10	.118	.03	.588	.05	.479	.04	.564	<b>.31</b>	<b>&lt;.001</b>
Anxiety (DASS-21)	.13	.039	.12	.060	.06	.338	.02	.756	-.07	.300	<b>.25</b>	<b>&lt;.001</b>
Stress (DASS-21)	.15	.017	.16	.011	.05	.440	.00	.984	.00	.976	.16	.010
Corona Distress	.07	.304	.10	.118	-.05	.481	.02	.813	-.01	.953	.13	.046

NB. **Bolded** effects indicate statistical significant relation at  $\alpha = .006$  (Bonferroni correction for all comparisons).

## Discussion

The current study aimed to explore meaningful clusters, or factors, in a wide variety of unusual sexual interests using exploratory factor analysis. Five factors of unusual sexual interests could be identified. These represented: 1) submission and masochism, 2) forbidden sexual activities, 3) dominance and sadism, 4) mysophilia, i.e., sexual activities including dirtiness or soiled things, and 5) fetishism. Conform our hypotheses, the factors of unusual sexual interests were very similar for women and men, mainly differing in strength of endorsement of the sexual interests. This similarity was likely due to the adjustment of the items to the participant's sexual orientation.

Although our sample was self-selected and nonrepresentative, results show that, in line with prior research (Botta et al., 2019; Bouchard et al., 2017; Herbenick et al., 2020; Labrecque et al., 2020), the submission/masochism factor received the highest rating from women, whereas the dominance/sadism factor received the highest rating from men. The subdivision into two correlated but clearly separate factors for submissive/masochistic and dominant/sadistic sexual acts may have resulted from presenting a wider variety of BDSM-related items in our questionnaire than in most other studies (Dawson et al., 2016; Joyal et al., 2015). It is notable that submission/masochism and dominance/sadism did not show their highest correlations with each other, but with fetishism.

### **Sexual Outlet/Sex Drive as a Common Denominator?**

All factors were positively intercorrelated, though to various extents, suggesting the possibility of a (partly) common underlying denominator. Scholars have suggested "sex drive" (sexual outlet) as such an underlying denominator (Bouchard et al., 2017; V. Klein et al., 2015). Sex drive could be a cause for more unusual sexual interests: People who spend more time on sexual activities are more likely to get acquainted with various unusual sexual stimuli (Smid & Wever, 2019) or "habituate more readily to a particular sexual target and activity, motivating them to pursue novel targets and activities" (Dawson et al., 2016, p.35). Logically, sex drive could also be the *result* of more interest in unusual sexual activities. Once you find what gives you gratification, you are likely to devote more time to it, comparable to discovering a new hobby. Although the current study shows some relation between unusual sexual interest and sexual outlet, it does not seem to apply to all types of unusual interests. Furthermore, we found that sexual outlet was more explicitly related to unusual sexual interest in women than in men. This seems to contradict the sex drive hypothesis, as men usually are the ones with more diverse sexual interests and more

sex drive (Bouchard et al., 2017; Dawson et al., 2016). The women in our sample did not have a higher sexual outlet than the men, and both our women and men even scored somewhat lower on sexual outlet compared to other, more representative community samples (Engel et al., 2019; Kingston et al., 2020; V. Klein et al., 2015).

### **Psychiatric Symptoms and Emotional and Sexual Regulation**

A possible explanation for women's closer association between unusual sexual interests and sexual outlet lies in women's higher level of psychiatric symptoms. In the current study, psychiatric symptoms regarding depression, anxiety, stress, and ADHD showed a stronger relation to unusual sexual interests for women than for men. A triangular relation might exist between unusual sexual interests, sexual outlet, and psychiatric symptoms. Even though psychiatric symptoms are generally associated with reduced sexual activity, it has been found that certain psychiatric symptoms might be accompanied by a higher frequency of "risky sex" (Montejo et al., 2018).

The five different factors of unusual sexual interests may serve different purposes or have different motivations. In an incentive-motivational approach, sexual arousal is seen as an emotion (Smid & Wever, 2019; Toates, 2014; Toates et al., 2017). As emotions are known to influence each other back and forth (Wang & Lang, 2012; Zillmann, 1971), sex can be used to regulate emotional states (i.e. "sexual coping"), and emotions can be used to regulate sexual states (e.g., "angry sex"). With respect to sexual coping, for example, the experience of emotional and physical pain in BDSM can create "altered states of consciousness that may be similar to what occurs during mindfulness meditation" as well as feelings of pleasure (Dunkley et al., 2020; Labrecque et al., 2020). This might, consciously or unconsciously, be sought for when experiencing depressive symptoms. Likewise, sexual submission is often used as a means to escape daily life stress (Hébert & Weaver, 2015; Labrecque et al., 2020; D.J. Williams et al., 2017). Feeling in control during sex, for instance in a dominant role, may counteract anxiety symptoms (Fiske et al., 1996). With respect to the emotional regulation of sexual states, it is found that certain emotions indeed seem to be able to enhance sexual arousal (Barlow et al., 1983; Hoon et al., 1977; Malamuth et al., 1986; Meston & Frohlich, 2003; Schippers et al., 2022; Wolchik et al., 1980). It is possible that women are more successful (Haron et al., 2010; Nolen-Hoeksema, 2012), or, at least different (Barańczuk, 2019), in this emotional and sexual self-regulation than men. Further research could seek to validate if certain emotions are associated with the factors of unusual sexual interests. Additionally, studies to the sex life of psychiatric patients tend to focus on their sex life in general (Montejo, 2019; Montejo et al., 2018), yet the current results indicate it might be relevant to specifically include unusual sexual interests, as these might behave differently than general sex life.

### **Strengths and Limitations**

Strengths of this study include its sample, which, though self-selected and nonrepresentative, was international and had a mean age of 31 years, whereas most available studies are based on college students. An online survey accounts for larger participant numbers and its anonymity grants less socially desirable responding than offline interviews or questionnaires (Gnambs & Kaspar, 2014). We avoided sexual orientation effects by adjusting the items to the participants' characteristics. Furthermore, in line with Dawson et al., (2016), our response options ranged from *unappealing* to *appealing*. The possibility to indicate only a slight endorsement (i.e., less repulsion) towards certain items was an advantage, because it resulted in more response variation.

Limitations include the sample's generalizability to the general population, for instance regarding their more diverse (nonheterosexual) sexual orientation and higher educational level. A volunteer bias is known to exist in sex research, causing more sexually open-minded people to participate (Dawson et al., 2019). Also, the characteristics of online samples can not easily be controlled nor can the truthfulness of their responses be checked. This study did not consider the influence of ethnic background, although prior research provides us with little reason to assume that cultural differences affect unusual sexual interests (Labrecque et al., 2020; Långström & Seto, 2006; Tripodi et al., 2015). The literature regarding cultural differences in sexual interests is sparse altogether and future research should include this. Furthermore, our measures were not translated and back-translated by professional translators but were translated by native, bilingual speakers, which must be kept in mind when interpreting the results. In spite of that, we hope to have provided a start for more in-depth research to the patterns underlying various sexual interests. Even though having certain sexual interests does not mean one will pursue this in their behavior (Bártová et al., 2020), researching sexual interests does help us gain insight in such behaviors that usually remain largely undisclosed.

## Conclusion

By means of exploratory factor analysis, we identified five factors of unusual sexual interests that were largely comparable for women and men, representing: submission/masochism, forbidden sexual activities, dominance/sadism, mysophilia, and fetishism. These factors of unusual sexual interests could be related to different underlying functions or motivations, for instance related to sex drive or to emotional regulation and sexual regulation. A better understanding of the nature of unusual sexual interests is important, for example to be able to influence sexual interests that are egodystonic or cause damage to others, but also because consensual and legal forms of sexuality could serve as a coping mechanism to improve emotion regulation or sexual experience. By looking more in depth at patterns of unusual sexual interests based on their nature, this study provides a valuable starting point for further research.



## Appendix A

**Table A1**

*List of Unusual Sexual Items in the Online Survey With Mean Scores, Standard Deviation, and Percentage Endorsement*

[Introduction:] We will now present items regarding various sexual interests. Please rate how appealing or unappealing each category is to you. Your responses do not have to reflect your actual sexual activities, just the level to which you consider the described activities appealing or unappealing. Please respond truthfully. There are no right or wrong answers. Recall that your responses are stored anonymously.

	1) Very unappealing	2) Quite unappealing	3) Slightly unappealing	4) Neutral	5) Slightly appealing	6) Quite appealing	7) Very appealing				
	<b>Total (N=669)</b>		<b>Endorsement<sup>A</sup></b>		<b>Women (n=411)</b>		<b>Men (n=258)</b>				
	<i>M</i>	<i>SD</i>	<i>%</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
1. [Optional] If you have a specific sexual interest that was not included in the list, you may write it here. Please rate this interest. <sup>B</sup>	6.45	1.16	99.60	6.34	1.38	6.60	0.78				
2. Sexual activity in a long-term committed relationship	6.39	1.09	99.00	6.45	1.09	6.28	1.08				
3. Blindfolding someone during sexual activity	5.56	1.40	97.30	5.48	1.44	5.67	1.31				
4. Being tied, chained, or handcuffed during sexual activity	5.43	1.77	93.90	5.60	1.70	5.16	1.85				
5. Tying, chaining, or handcuffing someone during sexual activity	5.21	1.67	95.70	5.05	1.72	5.45	1.57				
6. Being spanked by someone during sexual activity	5.12	1.91	92.80	5.45	1.80	4.59	1.97				
7. Sexual activity with someone in a public place	5.04	1.58	94.50	4.94	1.62	5.18	1.51				
8. Completely surrendering your will to someone during sexual activity	4.90	1.99	90.10	5.05	1.89	4.67	2.12				
9. Spanking someone during sexual activity	4.82	1.87	90.90	4.58	1.94	5.22	1.67				
10. Sexual activity with more than three people (of any gender)	4.70	1.96	88.80	4.42	2.05	5.14	1.72				
11. Having someone completely at your mercy during sexual activity	4.46	1.95	87.40	4.10	1.92	5.03	1.87				
12. Having sex while filming it	4.34	1.91	86.80	4.27	1.98	4.46	1.81				
13. Having hot wax dripped on you during sexual activity	4.07	2.09	80.90	4.23	2.11	3.82	2.04				
14. Sexual activities involving touching rubber, latex, or leather	4.04	1.77	87.60	3.80	1.74	4.41	1.76				
15. Having your breathing restricted during sexual activity	3.98	2.29	73.80	4.32	2.32	3.43	2.14				
16. Dripping hot wax on someone during sexual activity	3.94	1.98	81.20	3.85	1.97	4.09	1.98				
17. Having sex with a virgin	3.90	1.47	90.70	3.64	1.41	4.32	1.45				
18. Restricting someone's breathing during sexual activity	3.71	2.10	74.60	3.54	2.07	3.98	2.11				
19. Having sex with someone who is old enough to be your parent (MILF/DILF)	3.66	1.92	79.40	3.49	1.84	3.93	2.01				
20. Being verbally humiliated during sexual activity	3.26	2.19	66.40	3.26	2.23	3.26	2.13				
21. Having sex with a prostitute (sex worker)	3.17	1.75	73.70	2.86	1.69	3.67	1.74				
22. Being made to gag during sexual activity	3.16	2.15	62.80	3.35	2.24	2.85	1.96				
23. Making someone gag during sexual activity	3.11	2.08	64.00	2.61	1.94	3.92	2.06				
24. Watching your partner have sex with someone else ("cuckolding")	3.08	2.08	60.80	2.86	2.04	3.42	2.11				
25. Sexual activities involving touching feet	3.01	1.75	72.60	2.68	1.63	3.53	1.83				
26. Spying on an unsuspecting person while they undress or engage in sexual activity	2.93	1.99	60.40	2.45	1.80	3.69	2.05				
27. Verbally humiliating someone during sexual activity	2.93	1.98	63.70	2.58	1.87	3.48	2.04				
28. Dressing up as someone of the opposite sex during sexual activity	2.87	1.83	63.50	2.79	1.72	2.99	2.00				

**Table A1***Continued*

	Total (N=669)		Endorse- ment <sup>A</sup>	Women (n=411)		Men (n=258)	
	M	SD	%	M	SD	M	SD
29. Having sex with a person with dwarfism ("small person")	2.53	1.44	61.70	2.45	1.36	2.64	1.56
30. Being seriously hurt or tortured by someone during sexual activity	2.46	2.01	45.00	2.51	2.04	2.39	1.96
31. Having sex with a blow-up doll/sex doll/robot	2.32	1.57	53.80	2.07	1.44	2.71	1.70
32. Having sex with someone who is severely overweight	2.28	1.43	57.20	2.25	1.33	2.34	1.58
33. Urinating on someone during sexual activity ("golden showers")	2.28	1.82	42.20	1.90	1.59	2.88	2.01
34. Being urinated on by someone during sexual activity ("golden showers")	2.25	1.91	39.60	1.91	1.67	2.80	2.13
35. Seriously hurting or torturing someone during sexual activity	2.12	1.75	39.00	1.89	1.58	2.48	1.94
36. Sexual activities involving blood, wounds, or bleeding	1.94	1.61	34.80	1.97	1.64	1.90	1.54
37. Sexual activity involving enema (liquid injected into the rectum, typically to expel its contents)	1.93	1.61	35.00	1.61	1.32	2.45	1.87
38. Sexual activity with someone dressed as a plush animal	1.87	1.34	36.90	1.63	1.10	2.26	1.57
39. Sexual activity with someone who is asleep, drugged, or unconscious	1.78	1.51	27.20	1.45	1.15	2.29	1.84
40. Sexual activity while being dressed as a plush animal	1.76	1.25	39.80	1.61	1.11	2.01	1.41
41. Exposing your genitals or breasts to an unsuspecting person	1.76	1.36	33.30	1.83	1.41	1.64	1.27
42. Forcing someone into sexual activity against their will	1.70	1.47	25.00	1.42	1.08	2.16	1.85
43. Sexual touching or rubbing against an unsuspecting person in public	1.64	1.37	25.10	1.46	1.18	1.91	1.59
44. Having sex with a family member (e.g., siblings, grandparents, step-siblings, step-parents, cousins, nephews, etc.)	1.52	1.23	20.60	1.30	0.95	1.86	1.53
45. Sexual activity involving someone between the ages of 13-16	1.36	1.07	15.20	1.13	0.57	1.73	1.50
46. Sexual activity involving an animal	1.26	0.93	10.30	1.17	0.75	1.40	1.13
47. Defecating on someone during sexual activity ("scat")	1.17	0.69	9.30	1.10	0.43	1.29	0.96
48. Being defecated on by someone during sexual activity ("scat")	1.17	0.75	7.00	1.08	0.46	1.30	1.05
49. Sexual activity involving someone between the ages of 8-12	1.13	0.69	4.90	1.04	0.39	1.26	0.98
50. Sexual activity involving a corpse/dead body	1.10	0.57	4.30	1.05	0.39	1.17	0.76
51. Sexual activity involving someone under the age of 8	1.06	0.42	3.10	1.03	0.25	1.11	0.60
[Not used in the current paper:]							
52. [hetero M/ homo W] Sexual activity involving the sniffing of women's underwear							
53. [hetero M] Being penetrated by a woman with a strap-on dildo ("pegging")							
54. [hetero W] Penetrating a man with a strap-on dildo ("pegging")							
55. [hetero M/ homo W] Having sex with a highly pregnant woman							
56. [homo M/ hetero W] "Gang bang": consecutively having sex with a group of men (submissive role)							
57. [only M] "Gang bang": participating with a group of men consecutively having sex with the same woman or man (dominant role)							

<sup>A</sup> Percentage of respondents rating 2 or higher, i.e., slightest possible endorsement on the 1-7 scale, or, anything higher than "very unappealing".

<sup>B</sup> Total  $N = 104$ , women  $n = 59$ , men  $n = 45$



## Appendix D

**Table D1**

*Factor Loadings from Exploratory Factor Analysis With Women*

	<b>Sub/ Mas</b>	<b>Forbid</b>	<b>Dom/ Sad</b>	<b>Myso</b>
1. Having your breathing restricted during sexual activity	.80	.01	-.08	.03
2. Being made to gag during sexual activity	.74	-.01	-.16	.19
3. Being tied, chained, or handcuffed during sexual activity	.74	.00	-.01	-.06
4. Completely surrendering your will to someone during sexual activity	.72	.03	-.05	.01
5. Being spanked by someone during sexual activity	.68	.00	.08	-.07
6. Being verbally humiliated during sexual activity	.63	.00	-.05	.35
7. Being seriously hurt or tortured by someone during sexual activity	.62	.06	-.20	.42
8. Having hot wax dripped on you during sexual activity	.58	.04	.10	.18
9. Restricting someone's breathing during sexual activity	.49	-.02	.36	-.05
10. Having sex while filming it	.49	.10	.20	.00
11. Sexual activity with more than three people (of any gender)	.48	.05	.27	.07
12. Making someone gag during sexual activity	.41	-.01	.29	.09
13. Sexual activity with someone in a public place	.35	.16	.16	-.14
14. Watching your partner have sex with someone else ("cuckolding")	.23	.13	.23	.14
15. Having sex with someone old enough to be your parent (MILF/DILF)	.18	.15	.17	.05
16. Sexual activity in a long-term committed relationship	.15	.02	.06	-.09
17. Sexual activity involving someone between the ages of 8-12	.00	.84	-.15	-.12
18. Sexual activity involving someone between the ages of 13-16	-.06	.79	-.05	-.06
19. Sexual activity involving someone under the age of 8	-.01	.77	-.13	-.16
20. Sexual activity involving an animal	-.08	.70	-.02	.12
21. Having sex with a family member (e.g., siblings, grandparents, step-siblings, step-parents, cousins, nephews, etc.)	-.04	.64	.00	.09
22. Sexual touching or rubbing against an unsuspecting person in public	.02	.50	.05	-.07
23. Exposing your genitals or breasts to an unsuspecting person	.07	.44	.07	-.04
24. Sexual activity involving a corpse/dead body	-.02	.42	-.02	.11
25. Sexual activity with someone who is asleep, drugged, or unconscious	.12	.42	-.01	.21
26. Forcing someone into sexual activity against their will	.20	.41	.00	.04
27. Spying on an unsuspecting person while they undress or engage in sexual activity	-.03	.39	.09	-.04

**Table D1**  
*Continued*

	<b>Sub/ Mas</b>	<b>Forbid</b>	<b>Dom/ Sad</b>	<b>Myso</b>
28. Having someone completely at your mercy during sexual activity	.14	-.05	.68	-.12
29. Tying, chaining, or handcuffing someone during sexual activity	.31	-.02	.66	-.31
30. Spanking someone during sexual activity	.26	-.05	.61	-.13
31. Dressing up as someone of the opposite sex during sexual activity	-.07	-.04	.59	.06
32. Dripping hot wax on someone during sexual activity	.28	.04	.54	.05
33. Blindfolding someone during sexual activity	.35	-.01	.52	-.34
34. Having sex with a person with dwarfism ("small person")	-.12	.01	.48	.21
35. Verbally humiliating someone during sexual activity	.22	-.03	.42	.24
36. Having sex with someone who is severely overweight	-.01	.01	.42	.24
37. Having sex with a blow-up doll/sex doll/robot	-.04	.21	.41	.25
38. Having sex with a prostitute (sex worker)	.15	.06	.41	.17
39. Sexual activities involving touching rubber, latex, or leather	.29	.04	.40	.06
40. Sexual activity with someone dressed as a plush animal	-.14	.16	.39	.32
41. Sexual activities involving touching feet	-.01	.03	.33	.26
42. Sexual activity while being dressed as a plush animal	-.07	.12	.31	.26
43. Having sex with a virgin	-.05	.11	.29	-.06
44. Being urinated on by someone during sexual activity ("golden showers")	.21	-.04	.08	.66
45. Urinating on someone during sexual activity ("golden showers")	.06	-.07	.27	.58
46. Sexual activities involving blood, wounds, or bleeding	.23	.04	.15	.46
47. Sexual activity involving enema	.27	-.02	-.08	.35
48. Seriously hurting or torturing someone during sexual activity	.29	.05	.18	.31
49. Defecating on someone during sexual activity ("scat")	-.01	.10	.07	.26
50. Being defecated on by someone during sexual activity ("scat")	.05	.18	.00	.26

NB. Loadings >.40 are shaded dark.

**Table D2**  
*Factor Loadings from Exploratory Factor Analysis With Men*

	<b>SubMas</b>	<b>Forbid</b>	<b>DomSad</b>	<b>Myso</b>	<b>Fetish</b>
1. Completely surrendering your will to someone during sexual activity	.85	.04	-.14	-.27	.01
2. Being tied chained or handcuffed during sexual activity	.79	-.06	-.08	-.23	.04
3. Being verbally humiliated during sexual activity	.76	.10	.01	.08	-.17
4. Having hot wax dripped on you during sexual activity	.65	-.14	.10	-.05	.10
5. Being seriously hurt or tortured by someone during sexual activity	.64	-.09	.14	.22	-.09
6. Being spanked by someone during sexual activity	.62	-.04	.08	.03	.01
7. Being made to gag during sexual activity	.56	-.19	.11	.12	.13
8. Being urinated on by someone during sexual activity ("golden showers")	.53	.26	-.06	.25	.05
9. Sexual activity involving enema	.46	.04	.06	.20	-.05
10. Having your breathing restricted during sexual activity	.44	-.14	.20	.06	.18
11. Dressing up as someone of the opposite sex during sexual activity	.42	.07	-.14	.03	.34
12. Sexual activities involving touching rubber latex or leather	.39	-.10	.19	-.06	.26
13. Watching your partner have sex with someone else ("cuckolding")	.30	.23	.02	.02	.16
14. Sexual activities involving touching feet	.25	-.02	.09	.05	.25
15. Sexual touching or rubbing against an unsuspecting person in public	.01	.66	-.08	-.02	.02
16. Forcing someone into sexual activity against their will	.09	.65	.26	.13	-.29
17. Sexual activity involving someone between the ages of 13-16	-.09	.65	.03	.11	.02
18. Spying on an unsuspecting person while they undress or engage in sexual activity	-.01	.62	.05	-.10	-.09
19. Exposing your genitals or breasts to an unsuspecting person	.01	.62	-.05	-.06	.12
20. Having sex with a family member (e.g., siblings, grandparents, step-siblings, step-parents, cousins, nephews, etc.)	-.03	.57	-.01	.09	.25
21. Sexual activity involving someone between the ages of 8-12	-.08	.55	-.07	.23	.20
22. Sexual activity involving someone under the age of 8	-.09	.50	-.09	.29	.19
23. Sexual activity involving an animal	.09	.49	-.25	.09	.27
24. Sexual activity with someone who is asleep drugged or unconscious	-.02	.48	.28	.08	.02
25. Having sex with a virgin	-.04	.33	.28	-.05	-.01
26. Sexual activity with someone in a public place	-.02	.31	.25	-.29	.12
27. Having sex with a prostitute (sex worker)	.22	.27	.14	-.17	.18

**Table D2**  
Continued

	SubMas	Forbid	DomSad	Myso	Fetish
28 Having someone completely at your mercy during sexual activity	-.04	.20	.73	-.12	-.02
29 Spanking someone during sexual activity	-.04	-.04	.72	.01	.09
30 Restricting someone's breathing during sexual activity	.01	-.12	.71	.16	.14
31 Tying, chaining, or handcuffing someone during sexual activity	.12	.08	.70	-.20	.01
32 Making someone gag during sexual activity	.01	-.07	.69	.23	.01
33 Blindfolding someone during sexual activity	.06	.04	.65	-.29	.03
34 Verbally humiliating someone during sexual activity	.17	.16	.60	.08	-.11
35 Dripping hot wax on someone during sexual activity	.19	-.12	.60	.02	.11
36 Seriously hurting or torturing someone during sexual activity	.17	.15	.52	.40	-.10
37 Being defecated on by someone during sexual activity ("scat")	.15	.11	-.00	.61	.14
38 Defecating on someone during sexual activity ("scat")	.08	.17	.12	.60	.08
39 Sexual activities involving blood wounds or bleeding	.14	-.04	.23	.45	.18
40 Sexual activity involving a corpse/dead body	-.01	.19	.04	.37	.10
41 Sexual activity in a long-term committed relationship	.08	.02	.17	-.33	.05
42 Urinating on someone during sexual activity ("golden showers")	.18	.26	.23	.27	.08
43 Sexual activity with someone dressed as a plush animal	-.05	-.09	.08	.05	.78
44 Sexual activity while being dressed as a plush animal	.03	-.01	-.02	.05	.74
45 Having sex with a person with dwarfism ("small person")	-.09	.10	.18	.09	.53
46 Having sex with someone who is severely overweight	.09	.04	-.02	.16	.49
47 Having sex with a blow-up doll/sex doll/robot	.17	.18	-.08	-.10	.47
48 Having sex while filming it	-.01	.14	.24	-.11	.35
49 Sexual activity with more than three people (of any gender)	.03	.17	.24	-.15	.29
50 Having sex with someone old enough to be your parent (MILF/DILF)	.14	.07	-.04	-.01	.28

NB. Loadings >.40 are shaded dark. For men, factor 3, 4 and 5 were negative, therefore the factor loadings and regression weights were multiplied by -1.







# Chapter 6

## **Factor Analysis With Unusual Sexual Interests: A Replication Study in a Representative Population Sample**

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## Abstract

A previous study found a variety of unusual sexual interests to cluster in a five-factor structure, namely submission/masochism, forbidden sexual activities, dominance/sadism, mysophilia, and fetishism (Schippers et al., 2021). The current study was an empirical replication to examine whether these findings generalized to a representative population sample. An online, anonymous sample ( $N = 256$ ) representative of the Dutch adult male population rated 32 unusual sexual interests on a scale from 1 (very unappealing) to 7 (very appealing). An exploratory factor analysis assessed whether similar factors would emerge as in the original study. A subsequent confirmatory factor analysis served to confirm the factor structure. Four slightly different factors of sexual interest were found: extreme, illegal and mysophilic sexual activities; light BDSM without real pain or suffering; heavy BDSM that may include pain or suffering; and illegal but lower-sentenced and fetishistic sexual activities. The model fit was acceptable. The representative replication sample was more sexually conservative and showed less sexual engagement than the original convenience sample. On a fundamental level, sexual interest in light BDSM activities and extreme, forbidden, and mysophilic activities seem to be relatively separate constructs.

**Keywords:** sexual interests, replication, confirmatory factor analysis, submission, masochism, sexual outlet

## Factor Analysis With Unusual Sexual Interests: A Replication Study in a Representative Population Sample

Unusual sexual interests, such as sexual interest in dominance, fetishistic items, or illegal activities, are highly intercorrelated. Having one unusual sexual interest often coincides with having another (Bártová et al., 2021; Dawson et al., 2016; Joyal & Carpentier, 2017; Wilpert, 2018). Despite being intercorrelated, not much is known about patterns among these correlations (Schippers et al., 2021). Do some interests consistently co-occur more often with specific others? In a previous study with a convenience sample of 669 adults, we aimed to explore whether a broad variety of unusual sexual interests could be clustered in a meaningful way using exploratory factor analysis (Schippers et al., 2021). Five clusters were found of unusual sexual interests that often co-occurred: submission/masochism, forbidden sexual activities, dominance/sadism, mysophilia (attraction to dirtiness or soiled things), and fetishism. It is necessary to examine whether these findings generalize to samples that are not convenience samples. The current study aimed to explore if similar factors would emerge in a different sample representative of the general population.

### Clusters of Unusual Interests

Prior research has not yet led to a conclusive theoretical foundation about how and why certain unusual sexual interests cluster together (Schippers et al., 2021). One reason is that previous studies have mainly been characterized by sexual orientation rather than the nature of sexual interest (Hald & Štulhofer, 2016; Joyal, 2015; Wilson, 1988). For instance, hetero- and homosexual men may respond differently to a question regarding “performing fellatio”, causing artificial differences based on sexual orientation. Likewise, the heteronormative word “intercourse” may not be relevant for couples that do not perform penetrative sex. Another reason is that previous studies have included a large number of common, normative sexual interests, causing unusual interest to cluster into one undifferentiated factor (Hald & Štulhofer, 2016; Joyal, 2015; Wilson, 1988).

In the original study, we performed an exploratory factor analysis with a broad variety of unusual sexual interests in an online convenience sample of 258 men and 411 women (Schippers et al., 2021). We included a large variety of unusual sexual interests and tailored the questions to the self-reported sexual orientation of the participants, meaning that questions were phrased in a nonheteronormative manner and – for instance – heterosexual men were not presented with questions regarding sex with a man. The original sample rated 50 unusual sexual activities on a 7-point

scale ranging from *unappealing* to *appealing*, meaning that actual experience with these sexual acts was not necessary to respond. Five clusters were found. First, submission/masochism, which included items regarding being tied and surrendering your will during sexual activities. Second, forbidden sexual activities, which included items that are forbidden or illegal in most countries, such as voyeurism, frotteurism, pedophilia, and sex with a family member. Third, dominance/sadism, which included items regarding dominance and power, or pain and humiliation during sexual activities. Fourth, mysophilia (attraction to dirtiness or soiled things), which included items regarding sexual interest in urination and defecation. Fifth, fetishism, which included items regarding sexual interest in nonpersonal objects, attributes or characteristics such as plush or feet.

These five clusters of unusual sexual interests may differ because they serve different purposes or have different motivations. It was hypothesized that this clustering of unusual sexual interests may be related to emotion regulation (Schippers et al., 2021). The conceptual rationale of both the prior study and the current replication is based on an incentive motivational model of sexual deviance (Smid & Wever, 2019). It is based on the notion that various emotions can be used (consciously or unconsciously) to regulate sexual arousal, and sexual arousal can be used to regulate other emotions. A personal preference for certain interactions between emotions and sexual arousal would then result in various clusters of unusual sexual interests, based on a similar emotional load. Sexual submission, for example, can be used to escape stress (Hébert & Weaver, 2015; Labrecque et al., 2020; D.J. Williams et al., 2017), whereas dominance or control may sooth anxiety symptoms (Fiske et al., 1996). However, this hypothesis remains speculation for now and is to be researched in later stages after the factor structure has been replicated.

## Replication

Replication is important to build confidence in (or falsify) a certain finding or theory (Earp & Trafimow, 2015; R.M. Walker et al., 2017). *Conceptual* replications are used to test a particular theory or idea in the same population, yet with different measurements and analyses, whereas *direct* replications are used to recreate a particular finding (Earp & Trafimow, 2015). Various types of replication research are suggested, depending on whether the same or different dataset, population, or measures and analysis are used (see Table 1; Tsang & Kwan, 1999; R.M. Walker et al., 2017).

**Table 1**  
*Types of Replications*

	<b>Same Measurement and Analysis</b>	<b>Different Measurement and Analysis</b>
<b>Same Dataset</b>	Checking of analysis	Re-analysis of data
<b>Same Population</b>	Exact replication	Conceptual replication
<b>Different Population</b>	Empirical generalization	Generalization and extension

Note. Adapted from Tsang and Kwan (1999) and R.M. Walker et al. (2017).

Empirical generalization is one of these types of replications, using a similar research design and analysis in a different population to examine whether the original findings remain meaningful. Empirical generalization is also referred to as generalizability replication (Valentine et al., 2011) or replication regarding external validity (Fabrigar et al., 2020; Valentine et al., 2011). In this type of replication, the focus lies on “the degree to which the relation between the psychological constructs of interest generalizes rather than the specific operationalizations of these constructs used in the original study” (Fabrigar et al., 2020, p.323).

The current replication study aimed for an empirical generalization, meaning that we tried to replicate the results from the previous study (the content of the five factors) with the same measures and analysis (online questionnaire of unusual sexual interests and factor analysis) in a different population (representative population sample rather than the original convenience sample). Though an exploratory factor analysis was used to assess whether the proposed concept of the clustering of unusual sexual interests would also apply to a representative population sample, this is formally not a conceptual replication. Because the same measurement (although somewhat modified) and the same analyses were used, the current study is best qualified as an empirical generalization. To advance theory building, it is useful to first gain insights into the fundamentals of clustering of sexual interests. Future steps could include exact replications to operationalize the constructs and optimize a questionnaire. Replication aimed at empirical generalization includes the change of a possible relevant moderator to achieve external validity (Fabrigar et al., 2020). In our case this is the supposed level of sexual diversity pertaining to the nature of the sample, which will be discussed below. Including variables that cause heterogeneity can be useful for readjusting theoretical foundations (McShane et al., 2019).

### **Characterization Original Sample**

The original convenience sample was international, mainly from the Netherlands and United States. The sample was recruited via snowball sampling on social media,

meaning that the researchers distributed a link to “a study regarding sexual interests” in their social networks and asked people to participate and share the link. The link was additionally posted on various social media platforms dedicated to sexuality. The sampling method made it likely that people who responded were open-minded towards sexuality. Furthermore, the original sample reported a much lower heterosexual orientation rate (53%) than overall population rates (90%), as well as a much higher bisexual orientation rate (36% vs. 5-7%; Kuyper, 2016; Newport, 2018; Rahman et al., 2020). Moreover, the participants’ educational level was relatively high (Rahman et al., 2020). Higher educational level has been related to having a BDSM<sup>1</sup> identity (Labrecque et al., 2020; Mundy & Cioe, 2019; A.M. Walker & Kuperberg, 2022) and more engagement in online sexual activities (Wéry & Billieux, 2016). It thus can be hypothesized that the original sample was more sexually diverse than a population sample. This could have influenced the results, as a sexually diverse sample might respond more sexually diverse to various sexual interests. Furthermore, it was unsure if possible cultural differences between the Netherlands and United States (Weaver et al., 2005) may have influenced the results. To rule out possible effects of selection bias in the convenience sample, it is important to replicate findings in a representative sample. Replicated clusters would indicate that some unusual sexual interests share a similar function or origin in the general population.

### **Current Study**

The aim of the current study was to conceptually and empirically replicate the original study, meaning that we used exploratory factor analysis to examine whether similar factors would emerge in a sample representative of the Dutch adult male population. The larger, meta-aim of both the current and original study was to explore underlying clusters regarding the nature of unusual sexual interests (Schippers et al., 2021). A better understanding of the nature of sexual interests is relevant in understanding, diagnosing, and potentially treating unwanted sexual interests.

The exploratory factor analysis served to explore the factor structure and parameters and was followed up by a confirmatory factor analysis to confirm this factor structure (Widaman, 2012; Worthington & Whittaker, 2006). The original study conducted exploratory factor analysis on the total sample as well as women and men separately. This replication solely focused on men and was compared to the original results from the male subsample. The reason for limiting the focus to men is that research findings regarding unusual sexual interests are closely related to sexual deviance. Sexual deviance is a risk factor for sexual offending in men (Brankley et al., 2021; Etzler et al., 2020; Hanson et al., 2007; Helmus et al., 2021), but knowledge about risk factors

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<sup>1</sup> Bondage and Discipline (BD), Dominance and Submission (DS) and Sadism and Masochism (SM)

for sexual offending in women is limited (E. Marshall et al., 2021). The vast majority of sexual offenses are committed by men (Cortoni et al., 2017). Furthermore, men show somewhat more variety and greater interest in unusual sexual activities compared to women (Bártová et al., 2021; Bouchard et al., 2017; Dawson et al., 2016; Joyal et al., 2015; Noorishad et al., 2019). Because of these possible differences between men and women, it is relevant to consider the genders separately and finetune the methodology specifically to men.

Several adaptations were made to the questionnaire relative to the prior study, to retain only the statistically relevant items per factor (i.e., items with factor loadings above .40). Some of the original items were also combined because they reflected similar acts and correlated strongly ( $r > .75$ ). For further adaptations, see the Methods section. Questions about general sexual functioning were included in the current study to compare and characterize both samples, where it was expected that the original sample would show more sexual engagement than the replication sample.

## Methods

### Sample

Qualtrics was hired to recruit a representative population sample from the Netherlands ([www.qualtrics.com](http://www.qualtrics.com)). Qualtrics is an experience management company which has access to samples from traditional, actively managed, double-opt-in market research panels, occasionally supplemented by social media recruitment, and partners with a network of online sample providers (Qualtrics, 2019). Based on known demographic characteristics, they can stratify samples according to *a priori* participant targets. We requested that the sample would represent the Dutch adult (18+) male population based on the parameters of region, sexual orientation, age, and educational level. The aim was to recruit a number of participants similar to the subsample of men ( $n = 258$ ) from the original study, which showed good power in the factor analysis (Kaiser-Meyer-Olkin measure = 0.889; Hutcheson & Sofroniou, 1999). After data collection, two extreme outliers were removed from all sampled participants. These men reported spending more than 80 hours per week on sex, and inspection of their responses raised suspicion about honest answering. The final, overall sample comprised 256 participants.

Participants were on average 43.80 years old ( $SD = 15.75$ , range 18-80). Most of the sample (95.7%,  $n = 245$ ) reported heterosexual orientation, 1.2% ( $n = 3$ ) bisexual orientation, and 3.10% ( $n = 8$ ) homosexual orientation, which – as a priori requested



– was comparable to the Dutch population (van Beusekom & Kuyper, 2018). The majority (64.5%,  $n = 165$ ) of the participants reported being in a relationship longer than two years, 30.1% ( $n = 77$ ) reported being single, and 5.5% ( $n = 14$ ) reported being in a relationship for less than two years. Regarding educational level, 27.3% ( $n = 70$ ) had reached university or higher education entrance level, 58.6% ( $n = 150$ ) some college or vocational education, 13.3% ( $n = 34$ ) high school, and 0.8% ( $n = 2$ ) elementary school level.

## Procedure

Data collection ran from October 26, 2021 to November 15, 2021. All participants clicked a consent button on an informed consent form. Only completed surveys were included. Participants received a reimbursement of €2.39 based on the survey length. The procedure of this study was in accordance with the ethical standards of the institutional and national research committee and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. According to Dutch and European law, explicit approval from an institutional review board is not necessary with noninvasive, nonmedical research. The survey started with questions regarding the participants' age, current marital status, highest education ever commenced, and most applicable sexual orientation. This was followed by questions regarding unusual sexual interests and questions about sexual functioning (see Measures). The median duration of the questionnaire completion was 4 minutes and 46 seconds.

## Measures

### ***Unusual Sexual Interests***

A checklist of 32 unusual sexual interests was adapted from the checklist developed for the original study (Schippers et al., 2021) (see Table 2 for all current items; see original checklist in Schippers et al., 2021). The original checklist included 50 items, as well as the option to add any sexual interest not listed above. A previous exploratory factor analysis (EFA) found five factors in the original checklist: submission/masochism, forbidden sexual activities, dominance/sadism, mysophilia, and fetishism (Schippers et al., 2021). The internal consistency of these factors was acceptable to good (Cronbach's  $\alpha = .78-.89$ ). Adaptations were made respective to the original EFA factor loadings for *men* to retain only the statistically relevant items per factor. A total of 21 items were removed. Three sets of the original items were combined because they correlated strongly ( $r > .75$ ) and thus reflected similar acts, namely: (a) being defecated on and (b) defecating on someone, (a) being dressed as a plush animal and (b) with someone dressed as a plush animal, and (a) someone between the ages 8-12 and (b) under the age of 8 (reduction of three items). The item of seriously hurting or torturing someone was excluded because it loaded on both the factors dominance/

sadism and mysophilia (reduction of one item). Furthermore, items were retained when they had a factor loading of .40 or higher in the original study, with a maximum of seven items per factor (reduction of 17 items). The original factors mysophilia and fetish were left with few items, respectively three and four. A total of four items were added: three items with mysophilic content (corpse/dead body, dirty underwear, vomit) and one item with fetishistic content (medical examinations). The corpse/dead body item was added because it had a factor loading just below the threshold (.37). The medical examination item was a relatively frequently given response to the open answering option in the original study. Increasing the number of items means that fewer participants are needed to recover a factor (Widaman, 2012). Moreover, this enabled us to theoretically test whether we captured the meaning of the factor correctly: if adding a clearly mysophilic item such as vomit fit the factor, this means that the factor may indeed represent mysophilia. The item “sexual activity in a long-term committed relationship” remained included in the questionnaire as a reference point for respondents, but was not included in the analyses reported in this paper as it did not load on any of the original factors. Each item was rated on a seven-point Likert scale ranging from 1 (very unappealing) to 7 (very appealing). Participants were instructed that their responses did not have to reflect their actual experience with the sexual acts. The item order was randomized for each participant.

### **General Sexual Functioning**

Conforming with the original study, sexual outlet (Kafka & Hennen, 2003; V. Klein et al., 2015) and general sexual functioning were assessed with the following questions reflecting on the past month: (1) How many orgasms did you have each week (<1 per week, 1-3, 4-6, 7-9, 10-12, 13+); (2) How many hours did you invest in sexual activity each week (<1 per week, 1-3, 4-6, 7-9, 10-12, 13+); (3) How long were you involved in sexual activity before you reached orgasm (never reached orgasm, <5 minutes, 5-30 minutes, 30 minutes-1 hour, 1-2 hours, >2 hours); and (4) How satisfying was your sex life (extremely unsatisfying, very unsatisfying, unsatisfying, satisfying, very satisfying, extremely satisfying). The following questions reflected on their general sex life: (1) When you feel more stressed or unhappy than usual, are you... (more, equally, less likely to masturbate/have sex); (2) Compared to most people, do you think that your actual sex life is... (boring, normal, somewhat adventurous, very adventurous/kinky); (3) How often do you watch porn (never, once a month or less, once a month to once a week, more than once a week but less than daily, daily); and (4) Watching pornography primarily helps you to... (get aroused, stay aroused, achieve orgasm).

## Statistical Analyses

To explore the underlying factor structure, exploratory factor analysis (EFA) was performed with Pearson correlations using IBM SPSS (version 27; NY, USA). The principal axis factoring extraction method was applied with oblique rotation (oblimin in SPSS). Assumptions for EFA were met, meaning that the Kaiser-Meyer-Olkin measure (.935) indicated excellent sample size (Hutcheson & Sofroniou, 1999) and Bartlett's test of sphericity ( $p < .001$ ) indicated a sufficient relation between the variables (Field, 2009). The number of factors was primarily fixed at five, following the findings from the original study, although this could be released in case of unacceptable factor fit. The number of retained factors was based on the scree plot (Cattell, 1966) and Kaiser's criterion (eigenvalues  $> 1$ ; Kaiser, 1960). Only factor loadings of .40 and higher were interpreted (Field, 2009; Stevens, 2002).

To confirm the factor structure from the EFA, confirmatory factor analysis (CFA) was subsequently performed using IBM SPSS Amos (version 27; NY, USA). Conducting both EFA and CFA on the same dataset is just confirming how robust the model is. To conduct a CFA on the same sample as the EFA, one would normally split the sample in two random halves. However, splitting the sample would result in two relatively small samples with too little power for our purposes. We therefore conducted both EFA and CFA on the same participants. Model fit was assessed using fit indices where the following values were preferable: Chi<sup>2</sup> probability  $p > .05$ , comparative fit index (CFI)  $> .90$ , Tucker-Lewis fit index (TLI)  $> .90$ , and the root mean square error of approximation (RMSEA)  $< .06$  (Hu & Bentler, 1999; Marsh et al., 2004). Because of the resulting unacceptable fit, post-hoc modifications to the CFA were necessary. Following Jackson et al. (2009) and Schreiber et al. (2006), we took note that the modifications were theoretically acceptable and minor. Modifications were made by deleting variables with low standardized loadings and inspecting and deleting observed variables with the highest standardized residual covariances (Maydeu-Olivares & Shi, 2017) and covariate error variances within the same factor that had high modification indices (Shek & Yu, 2014).

Finally, the responses to the general sexual functioning questions were compared between the replication sample and the men from the original sample (Schippers et al., 2021). Odds ratios (OR) and 95% confidence intervals were calculated, where a confidence interval *not* including 1 indicated a statistically significant difference ( $p < .05$ ) between the two samples.

## Results

### Exploratory Factor Analysis

The EFA with five fixed factors explained 67.77% of the variance, where factor 1 explained 45.66% of the variance (eigenvalue 14.15), factor 2 explained 10.99% (eigenvalue 3.41), factor 3 explained 4.69% (eigenvalue 1.46), factor 4 explained 3.39% (eigenvalue 3.39), and factor 5 explained 3.03% (eigenvalue 0.94). The fourth and fifth factors added very little extra explained variance and the fifth factor had an eigenvalue below 1. The fourth factor contained only one item with a factor loading above .40, and the fifth factor contained only two. It was therefore decided that a five-factor structure was not the best fit for the data.

A new EFA without fixed factors showed an optimal factor structure of four factors. The pattern matrix is displayed in Table 2 and the factor Pearson correlation matrix in Table 3. Factor 1 contained items related to extreme, illegal sexual activities (child, force) and mysophilic sexual activities (defecation, vomit). This factor was named “forbidden-extreme”. Factor 2 contained items with a moderate or “light” BDSM-related nature, more “vanilla” or “garden variety” in nature without real pain or suffering, such as tying up, blindfolding, and spanking. It was named “BDSM-light”. Factor 3 contained more severe or “heavy” BDSM items, including gagging, and blood. The items of being seriously hurt during sexual activities and verbal humiliation loaded highest on this factor, albeit the factor loading of the first was just below the .40 threshold and the second belonged to two factors (third and fourth). This factor was named “BDSM-heavy”. Factor 4 contained items referring to sexual activities that are illegal in most countries, but usually receive a lower judicial sentence and can in some way be considered less intrusive<sup>2</sup>, such as frotteurism, voyeurism, and exhibitionism. Factor 4 also contained items regarding fetishistic sexual acts (dwarfism, plush animal, blow-up doll). It was named “fetish-forbidden”.

The tested model included four related latent constructs and is displayed in Table 2 with the factor loadings of the tested predictors bolded. The data showed no good fit with the proposed model,  $\chi^2 = 1121.97$ ,  $df = 318$ ,  $p < .001$ ; CFI = .845; TLI = .829; RMSEA = .100 (95% CI [.093; .106];  $p < .001$ ). Correlations between the factors ranged between .57 and .84.

<sup>2</sup> Naturally, the choice of words is not intended to diminish the seriousness of potential damage for victims.

**Table 2***Pattern Matrix with EFA Factor Loadings*

Item (Sexual Activities Involving...)	Original Factor	Forbidden-Extreme	BDSM-Light	BDSM-Heavy	Fetish-Forbidden
Someone aged < 12	Forbid	<b>.90</b>	-.01	.01	.05
Feces	Myso	<b>.88</b>	.06	-.02	-.07
Forcing someone against will	Forbid	<b>.78</b>	.12	-.15	.08
Corpse	Myso	<b>.65</b>	-.11	.22	.17
Dirty underwear	Supposed Myso	<b>.64</b>	-.03	.06	.24
Vomit	Supposed Myso	<b>.64</b>	-.09	.20	.17
Someone aged 13-16	Forbid	<b>.62</b>	-.01	-.05	.25
Being tied	SubMas	.07	<b>.88</b>	.03	-.09
Tying someone	DomSad	-.05	<b>.86</b>	-.13	.15
Blindfolding someone	DomSad	-.04	<b>.81</b>	-.01	.04
Surrendering your will	SubMas	.12	<b>.71</b>	-.01	-.09
Someone at your mercy	DomSad	-.06	<b>.64</b>	-.10	.26
Spanking someone	DomSad	-.13	<b>.63</b>	.30	.13
Being spanked	SubMas	.02	<b>.63</b>	.36	-.05
Hot wax dripped on you	SubMas	.27	.38	.21	.04
Gagging someone	DomSad	.05	.18	<b>.52</b>	.27
Being made to gag	SubMas	.28	.20	<b>.50</b>	-.02
Blood	Myso	<b>.41</b>	-.02	<b>.41</b>	.14
Being seriously hurt	SubMas	.27	.16	.39	.19
Restricting someone's breath	DomSad	.28	.23	.33	.13
Being verbally humiliated	SubMas	.31	.17	.33	.21
Someone with dwarfism	Fetish	.04	-.06	.05	<b>.69</b>
Dressed as plush animal	Fetish	-.03	.08	-.00	<b>.68</b>
Spying unsuspecting person	Forbid	.08	.24	-.22	<b>.62</b>
Rubbing unsuspecting person	Forbid	.10	.05	-.02	<b>.59</b>
Family member	Forbid	.19	-.03	-.00	<b>.58</b>
Medical examinations	Supposed Fetish	.10	.09	.02	<b>.57</b>
Verbally humiliating someone	DomSad	-.07	.09	<b>.44</b>	<b>.51</b>
Exposing your genitals	Forbid	.21	-.06	.12	<b>.51</b>
Blow-up doll	Fetish	.19	.09	.03	<b>.45</b>
Someone with obesity	Fetish	.07	-.02	.14	<b>.45</b>

Note. Factor loadings >.40 are **bolded**. A 32<sup>nd</sup> item regarded sex in a romantic relation and was not included in the analyses. Forbid = Forbidden, Myso = Mysophilia, SubMas = Submission/Masochism, DomSad = Dominance/Sadism.

**Table 3***EFA Factor Pearson Correlation Matrix*

<b>Factor</b>	<b>BDSM-Light</b>	<b>BDSM-Heavy</b>	<b>Fetish-Forbidden</b>
Forbidden-Extreme	.29	.42	.72
BDSM-Light		.32	.47
BDSM-Heavy			.37

Note. All *rs* at  $p < .05$ 

### Confirmatory Factor Analysis

In terms of post-hoc modifications, the items concerning sexual activities with blood and verbal humiliation were deleted as they showed high standardized residual covariances with several other variables and both loaded on two different factors in the EFA. The item of being seriously hurt was added to the BDSM-heavy factor, as its factor loading on the EFA was borderline acceptable (.39) and it theoretically suited the factor. Subsequently, covariation was added between the error variances within the same factor with the highest modification indices (MI). This happened for the error variances of the items regarding plush and medical (MI = 22.729) in the factor fetish-forbidden, and the following items from the factor BDSM-light: surrender active and tie passive (MI = 23.523), spank passive and tie active (MI = 32.701), and spank passive and spank active (MI = 54.076). The modifications improved the model fit to acceptable but not very good fit,  $\chi^2 = 755.87$ ,  $df = 289$ ,  $p < .001$ ; CFI = .904; TLI = .892; RMSEA = .080 (95% CI [.073; .087]);  $p < .001$ . The final model and standardized regression weights are displayed in Table 4, and the CFA factor correlations in Table 5. The internal consistency of these factors was good to excellent, forbidden-extreme Cronbach's  $\alpha = .94$ , BDSM-light  $\alpha = .92$ , BDSM-heavy  $\alpha = .82$ , fetish-forbidden  $\alpha = .88$ .

### Comparing Sexual Functioning Between Samples

The mean endorsement scores for the replication sample and the men from the original sample are displayed in the Online Supplement. The most "popular" item for the replication sample – blindfolding someone – only received a score of 3.38, which translated to "a little unappealing"/"neutral". On average, the replication sample thus showed no positive rating for any item, while the men from the original sample rated several items positively. Table 6 compares general sexual functioning between the replication samples and the men from the original sample. In sum, the replication sample reported having fewer orgasms, less time invested in sex, less time watching porn, and considered themselves less kinky than the men from the original sample.

**Table 4***CFA Standardized Regression Weights*

<b>Factor</b>	<b>Item</b>	<b>Estimate</b>
Forbidden-Extreme	Someone aged < 12	.94
	Dirty underwear	.86
	Corpse	.85
	Feces	.82
	Vomit	.82
	Someone aged 13-16	.80
	Forcing against will	.79
BDSM-Light	Being tied	.91
	Tying someone	.90
	Blindfolding someone	.77
	Someone at your mercy	.76
	Spanking someone	.73
	Being spanked	.72
	Surrendering your will	.69
BDSM-Heavy	Gagging someone	.78
	Being seriously hurt	.78
	Being made to gag	.75
Fetish-Forbidden	Family member	.72
	Exposing your genitals	.72
	Someone with dwarfism	.69
	Rubbing unsuspecting person	.69
	Spying unsuspecting person	.67
	Medical examinations	.67
	Blow-up doll	.66
	Dressed as plush animal	.65
	Someone with obesity	.56

**Table 5***CFA Factor Correlation Matrix*

<b>Factor</b>	<b>BDSM-Light</b>	<b>BDSM-Heavy</b>	<b>Fetish-Forbidden</b>
Forbidden-Extreme	.36	.76	.84
BDSM-Light		.61	.54
BDSM-Heavy			.78

Note. All  $r$ s at  $p < .05$

**Table 6***General Sexual Functioning in Replication Sample and Men from Original Sample*

Question, Response Options	Replication Sample	Men Original Sample	OR	95% CI
	(Population)	(Population)		
How many orgasms did you have each week?	256	252		
<1 p.w.	40	10	<b>0.22</b>	<b>(0.11, 0.46)</b>
1-3	142	57	<b>0.23</b>	<b>(0.16, 0.34)</b>
4-6	46	68	<b>1.69</b>	<b>(1.10, 2.58)</b>
7-9	17	59	<b>4.30</b>	<b>(2.43, 7.61)</b>
10-12	5	32	<b>7.30</b>	<b>(2.80, 19.07)</b>
13+	6	26	<b>4.79</b>	<b>(1.94, 11.86)</b>
How many hours did you invest in sexual activity each week?	256	251		
<1 p.w.	35	22	0.61	(0.34, 1.07)
1-3	146	80	<b>0.35</b>	<b>(0.25, 0.51)</b>
4-6	44	61	<b>1.55</b>	<b>(1.00, 2.39)</b>
7-9	18	44	<b>2.81</b>	<b>(1.57, 5.02)</b>
10-12	8	29	<b>4.05</b>	<b>(1.81, 9.04)</b>
13+	5	15	<b>3.19</b>	<b>(1.14, 8.92)</b>
How long were you involved in sexual activity before you reached orgasm?	256	251		
<5 min	44	7	<b>0.14</b>	<b>(0.06, 0.31)</b>
5-30 min	144	109	<b>0.60</b>	<b>(0.42, 0.85)</b>
30 min – 1 hr	26	87	<b>4.69</b>	<b>(2.90, 7.60)</b>
1-2 hrs	5	33	<b>7.60</b>	<b>(2.92, 19.81)</b>
2+ hrs	2	9	<b>4.72</b>	<b>(1.01, 22.08)</b>
Never reached orgasm	35	6	<b>0.15</b>	<b>(0.06, 0.37)</b>
How satisfying was your sex life?	256	249		
Extremely unsatisfying	20	19	0.97	(0.51, 1.87)
Very unsatisfying	16	37	<b>2.62</b>	<b>(1.42, 4.84)</b>
Somewhat unsatisfying	44	54	1.33	(0.86, 2.08)
Somewhat satisfying	120	80	<b>0.54</b>	<b>(0.37, 0.77)</b>
Very satisfying	48	39	0.80	(0.51, 1.28)
Extremely satisfying	8	20	<b>2.71</b>	<b>(1.17, 6.27)</b>
When you feel more stressed or unhappy than usual, are you...	256	243		
Less likely to masturbate/have sex	137	58	<b>0.27</b>	<b>(0.19, 0.40)</b>



**Table 6***Continued*

Question, Response Options	Replication Sample (Population)	Men Original Sample	OR	95% CI
	<i>n</i>	<i>n</i>		
Equally likely to masturbate/have sex	75	70	0.98	(0.66, 1.44)
More likely to masturbate/have sex	44	115	<b>4.33</b>	<b>(2.87, 6.53)</b>
Compared to most people, do you think that your actual sex life is...	256	243		
Boring	63	42	<b>0.64</b>	<b>(0.41, 0.99)</b>
Normal/ordinary	135	59	<b>0.29</b>	<b>(0.20, 0.42)</b>
Somewhat adventurous	52	69	<b>1.56</b>	<b>(1.03, 2.35)</b>
Kinky	6	73	<b>17.89</b>	<b>(7.61, 42.07)</b>
How often do you watch porn?	256	243		
Never	104	7	<b>0.04</b>	<b>(0.02, 0.10)</b>
Once a month or less	76	22	<b>0.24</b>	<b>(0.14, 0.39)</b>
More than once a month, less than once a week	42	39	0.97	(0.61, 1.57)
More than once a week, less than daily	29	123	<b>8.02</b>	<b>(5.06, 12.72)</b>
Daily	5	52	<b>13.67</b>	<b>(5.36, 34.88)</b>
Watching pornography primarily helps you to...	152	233		
Get aroused	87	116	0.74	(0.49, 1.12)
Stay aroused	35	32	<b>0.53</b>	<b>(0.31, 0.90)</b>
Achieve orgasm	30	85	<b>2.34</b>	<b>(1.44, 3.78)</b>

Note. OR > 1 means that the original sample scored higher than the replication sample whereas an OR < 1 means that the original sample scored lower than the replication sample. Bolded OR indicates a statistically significant difference between frequencies at  $p < .05$ .

## Discussion

This study aimed to replicate in a representative sample of Dutch adult men a previously found factor structure of unusual sexual interests comprising the factors of submission/masochism, forbidden sexual activities, dominance/sadism, mysophilia, and fetishism (Schippers et al., 2021). This factor structure of the original study could not be replicated in the current sample. In the replication sample, a four-factor solution was the best fit for unusual sexual interests, comprising the factors of “forbidden-extreme”, sexual interest in extreme, illegal (child, force) and mysophilic

sexual activities (defecation, vomit); “BDSM-light”, sexual interest in light BDSM without real pain or suffering; “BDSM-heavy”, including more severe or heavy BDSM items that may cause pain or suffering; and “fetish-forbidden”, interest in illegal but lower-sentenced sexual activities (frotteurism, exhibitionism) and fetishistic sexual acts. Using CFA, this four-factor structure, after modification, showed acceptable fit. The nature of the clusters did not strongly differ from the original findings, aside from the fact that they were organized somewhat differently. BDSM was not split into a submissive and dominant counterpart, but rather into light and heavy activities. The forbidden items were distributed over a more extreme factor including mysophilia, and a less extreme factor including fetish. Looking at the mean endorsement of the items in both samples, the factors that explained most variance were those that were most popular (BDSM-light) as well as least popular (illegal acts).

### **Different Samples**

The differences between the replication and original findings may be explained by the nature of both samples. The representative replication sample was more sexually conservative than the original convenience sample. They had less interest in unusual sexual activities, spent less time on sex activities, watched less porn, and described their sex life as less adventurous than the men from the original sample. In a general population sample, unusual sexual interests will more likely fall into one undifferentiated cluster, comparable to previous studies (Hald & Štulhofer, 2016; Joyal, 2015), whereas sexually diverse samples will endorse a broader variety of sexually diverse interests and more clearly discern these from each other. Brown et al. (2020) concluded that BDSM may constitute a broadening of sexual interests rather than a fixation on a specific interest. In the same vein, increased differentiation of forbidden sexual interests might be expected in samples of people who have sexually offended. These results show that it is not only important to replicate studies but also to carefully tailor study samples to the population to which we want to apply the findings. A slightly different clustering of sexual interests may be found in more sexually diverse samples and population samples. At the same time, the nature of submissive/masochistic, dominant/sadistic, fetishistic, mysophilic and forbidden sexual activities is reflected in both samples to some extent.

### **Function of Clusters**

What both studies have in common is that they found a distinction between sexual interests in “light” BDSM activities and more extreme, unusual sexual activities such as illegal and mysophilic activities. What these forbidden-extreme items share, is their extremity. They may evoke an emotional reaction such as disgust, shock or abhorrence. This is in line with the finding that strong emotions can increase sexual

arousal (Barlow et al., 1983; Malamuth et al., 1986; Schippers et al., 2022). In this way, stimuli that do not initially seem sexually arousing but evoke an emotional reaction – such as force or feces – may become associated with sexual arousal (Critelli & Bivona, 2008; Schippers et al., 2024; Smid & Wever, 2019). In future efforts, it would be relevant to investigate emotional reactions to a variety of unusual sexual interests. It may be that the intensity, direction (positive or negative) or type of emotion differs between samples or clusters of sexual interests. If this is the case, emotion regulation might play a role in the regulation of unusual sexual interests.

### **Strengths and Limitations**

Replication studies are not often published, as only ~1% of the articles in 100 psychology journals with the highest impact factors concerned actual replications (Makel et al., 2012), with most of those being exact replications (Fabrigar et al., 2020). It is therefore a strength that this study provided an empirical generalization; a replication to generalize previous results to another sample. This sample was representative of the Dutch adult male population with no signs of selection bias.

Some limitations could be identified. While the different results are likely to represent a true and meaningful difference between the two samples, we cannot rule out the possibility that methodological limitations have affected the results. While not unprecedented, conducting both the EFA and CFA on the same participants is not preferred, because it carries the risk of overfitting. Results need to be viewed with some reservation and future studies may strive for replication in new samples. Ideally, adjustments to the main measure should not have been made in the same step as the generalization to another sample. These adjustments were, however, based on statistical and theoretical reasons. The fact that data were skewed means that factor analysis with polychoric rather than Pearson correlations may have been more appropriate (Marques, 2021). This was not planned because it was intended to resemble the original analyses as much as possible.

### **Future Research**

Future efforts are needed using sound methodology to refine and improve the questionnaire assessing the clustering of unusual sexual interests. It should for instance be tested whether the modified CFA model has an acceptable fit in a convenience sample like the original sample. In this way, the current checklist may be used to compare various samples regarding their unusual sexual interests.

Given the role of sexual deviance in sexual offending (Brankley et al., 2021; Etzler et al., 2020; Hanson et al., 2007; Helmus et al., 2021), it is relevant to replicate this study

in samples of people who have sexually offended. Sexual deviance as a risk factor is interpreted in a broad manner as interest in stimuli that are “illegal, inappropriate, or highly unusual” (Fernandez et al., 2014). Distinct clusters of light BDSM interests and illegal interests could feed the hypothesis that not every type of sexual deviance may be an equally strong risk factor for committing sexual offenses. As knowledge about risk factors for sexual offending in women is limited (E. Marshall et al., 2021), it is recommended that female samples, either offending or nonoffending, receive specific attention.

## Conclusion

When investigating unusual sexual interest, it seems that there are some differences between population samples and sexually diverse samples, which mainly lie in the level of differentiation of these interests. At a fundamental level, interest in light BDSM activities and extreme, forbidden activities seem to be relatively separate constructs. We emphasize *relatively*, as they hold the lowest intercorrelations of all factors, but these remain substantial. Other studies have also found that masochism correlated most strongly with sadism, and that voyeurism, exhibitionism, and frotteurism correlated most strongly with each other (Baur et al., 2016; Dawson et al., 2016; Paquette & Brouillette-Alarie, 2020). In general, someone with light BDSM-related interests is likely to have other light BDSM-related interests, and someone with interests in more extreme, mysophilic, fetishistic, or forbidden sexual acts is likely to have more of such sexual interests. A hypothetical implication could be that light BDSM interests are not an equally strong risk factor for sexual offending as extreme, forbidden sexual interests. It is hypothesized that light BDSM and extreme, forbidden sexual acts might fulfill different emotional needs. Future steps include a more precise operationalization of the conceptual ideas laid out in these two studies, and testing the fit of the modified CFA model in different samples, including people who have sexually offended and women.



# Chapter 7

## **Pedophilia is Associated with Lower Sexual Interest in Adults: Meta-Analyses and a Systematic Review with Men who had Sexually Offended Against Children**

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## Abstract

Sexual interest in children is an important factor contributing to sexual (re)offending against children. The current state of research makes it difficult to conclude if people with pedophilia are overly interested in children, or have lower interest in adults, or both. This is relevant knowledge in treatment for preventing sexual (re)offenses against children. This study aimed to systematically analyze sexual interest in both children and adults in samples of men with pedophilia and comparison groups. A total of 55 studies ( $N = 8,465$ ) were included in four meta-analyses and a systematic review. Most included studies considered people who had sexually offended against children (PSOC;  $n^{\text{PSOC}} = 5,213$ ). Results indicated that PSOC with pedophilia did not have a clear sexual preference for either children or adults. Compared to comparison groups, they had more absolute sexual interest in children and lower sexual interest in adults. We conclude that the lack of sexual interest in adults may be a relevant factor in PSOC with pedophilia. More studies are needed to disentangle sexual interest in children from sexual interest in adults, while using carefully matched comparison groups and appropriate research designs.

**Keywords:** pedophilia, sexual offenses against children, sexual preference, sexual interest, meta-analysis, systematic review

## **Pedophilia is Associated with Lower Sexual Interest in Adults: Meta-Analyses and a Systematic Review with Men who had Sexually Offended Against Children**

Global prevalence estimates indicate that up to 31% of girls and 17% of boys have experienced some form of sexual abuse before their eighteenth birthday (Barth et al., 2013; Stoltenborgh et al., 2011). Sexual interest in children is, together with impulsive and antisocial traits, arguably the most important factor contributing to sexual offending against children (Brouillette-Alarie & Proulx, 2019; Seto, 2019; Smid & Wever, 2019). More than half of the people who have sexually offended against children (PSOC) have a diagnosis of pedophilia (Eher et al., 2019; Seto, 2018) compared to ~1% in the general population (Bártová et al., 2021; Joyal & Carpentier, 2017). Sexual interest in children is therefore frequently researched in PSOC and is an important topic in treatment of PSOC with pedophilia in order to reduce sexual recidivism.

The current state of research and treatment makes it difficult to conclude if people with pedophilia are overly interested in children, or have lowered interest in adults, or both. This is due to the fact that instruments and research designs do not always differentiate between sexual interest in and sexual preference for children. Sexual *interest* is the presence of any absolute sexual response to child stimuli. Sexual *preference* is a relatively stronger sexual response to child stimuli than to adult stimuli (A.F. Schmidt et al., 2014). Furthermore, most studies into sexual interest in children include undifferentiated, heterogeneous samples of men who have sexually offended against children, rather than men or women (offending or nonoffending) with a diagnosis of pedophilia (Gerwinn et al., 2018).

The most frequently used measures of sexual interest (Laws & O'Donohue, 2008; Thornton et al., 2018) in general render it impossible to compare the absolute sexual interest in children to the absolute sexual interest in adults. Existing questionnaires either assess a general concept of sexual functioning or desire without specifying the age of the object (e.g., Arizona Sexual Experience Scale [McGahuey et al., 2000], International Index of Erectile Functioning [Rosen et al., 1997]), or only ask for sexual interest in children and not in adults (e.g., Screening Scale for Pedophilic Interests [Seto et al., 2017]). In the Implicit Associations Test (IAT) sexual and nonsexual words have to be sorted in child and adult categories. A stronger association between child and “sexy” could also mean a stronger association between adult and “nonsexy” (Babchishin et al., 2013). Although the designs of viewing time measures and penile plethysmography (PPG) would allow for the assessment of absolute sexual interest



in children, often a difference score is calculated in which response to adults is subtracted from response to children, as these difference scores have shown more discriminative value between PSOC and non-PSOC groups (McPhail et al., 2019; A.F. Schmidt et al., 2017).

In the existing body of literature, most studies compare sexual interest in or preference for children between undifferentiated samples of PSOC and comparison groups. Recent meta-analyses concluded that PSOC had both greater sexual *interest* in children (McPhail et al., 2019) and greater sexual *preference* for children (Babchishin et al., 2013; Pedneault et al., 2021; A.F. Schmidt et al., 2017) than comparison groups consisting of nonoffenders (large effect sizes), people who committed nonsexual offenses (moderate to large effect sizes), and people who sexually offended against adults (moderate effect sizes). Only one of these meta-analyses included the degree of pedophilia, based on various risk factors, in the PSOC group as a moderator (Pedneault et al., 2021). Regarding indirect measures of sexual interest in children, they found no difference between PSOC who were more and less pedophilic.

Some studies enable conclusions about the sexual interest in *adults* in PSOC versus comparison groups. Such studies show that PSOC score higher on sexual interest in children, but also lower on sexual interest in adults than comparison groups (Babchishin et al., 2014; L.S. Grossman et al., 1992; Miner et al., 1995; P. Renaud et al., 2014). In several studies, the lack of sexual interest in adults even emerges as the larger effect (Becker et al., 1992; Blanchard et al., 2002; Howard et al., 1994; Poepl et al., 2011; P. Renaud et al., 2014; Rice et al., 2012). To our knowledge, this has only once been systematically researched in a sub-analysis of a meta-analysis of PPG studies (McPhail et al., 2019). General PSOC samples (pedophilia not specified) showed lower sexual interest in adults than nonoffenders ( $d = -0.860$ , 95% *CI* [-1.141; -0.579]), people who committed nonsexual offenses ( $d = -0.101$ , 95% *CI* [-0.475; 0.272]), and people who sexually offended against adults ( $d = -0.052$ , 95% *CI* [-0.192; 0.089]). In comparison, their interest in children was larger in all equations (respectively,  $d = .917$ ,  $d = .360$ , and  $d = .497$ ). While sexual preference for children is the righteous focus of assessment of PSOC, it remains unclear whether for people *with pedophilia*, their preference for children is driven by a great interest in children, by little interest in adults, or both. The current study aims to explore this.

It is relevant to study the role of sexual interest in children versus adults in sexual preference for children, as it might contribute to its etiology and has potential consequences for treatment. A lack of rewarding sexual behavior with adult partners might contribute to persistence in sexual offending behavior against children,

because there is no satisfactory sexual alternative to children (Smid & Wever, 2019). Furthermore, treatment that targets a lack of sexual interest in adults is different from treatment that targets an excess of sexual interest in children. When aiming at increasing sexual interest in adults, possible interventions include improving social and intimate skills, and sexual exposure to and practice with adult sexual stimuli (Frühauf et al., 2013). This in contrast to decreasing sexual interest in children by, for instance, reducing sexual arousal with or without medication and avoiding sexual contexts or behaviors (Beech & Harkins, 2012). As such, treatment focusing on sexual interest in adults may concern a strengthening of a simmering interest that already might be present. A focus on improving sexuality with adults adds to positive and responsive treatment, a better quality of life, and may be easier to maintain for an individual (Bonta & Andrews, 2017; Willis et al., 2013). This contributes to the ultimate goal of preventing sexual offenses against children.

### **The Current Study**

The current study aimed to systematically analyze sexual interest in both children and adults in men with pedophilia and comparison groups by means of meta-analyses and a systematic review. By including only studies that assessed both child and adult stimuli, as well as both pedophilic and comparison groups, we were able to directly compare the two interests in the two groups. The following five research questions were answered by means of meta-analyses and meta-regression:

1. Do men with pedophilia have more sexual interest in children than in adults (i.e., a sexual preference for children)?
2. Do comparison groups have more sexual interest in adults than in children (i.e., a sexual preference for adults)? (NB. This is a control check with assumed positive result.)
3. Do men with pedophilia have more sexual interest in children than comparison groups?
4. Do men with pedophilia have less sexual interest in adults than comparison groups?
5. Is a sexual preference for children associated with excessive sexual interest in children, a lack of sexual interest in adults, or both?

Based on our a priori literature review, we expected that many candidate studies for our meta-analyses would not report sufficient data to answer our research questions. In addition, many studies would be too old to be able to retrieve the raw data from the authors. To be as comprehensive as possible, we chose to follow-up on the meta-analyses with a systematic review. This systematic review included studies from which variance or exact mean scores could not be retrieved from the article

or authors, but from which we could retrieve mean scores from text or derive mean scores from figures. The aim of this systematic review was not to estimate precise effects, but to provide an indication of the mutual relationships between sexual interest in children and adults in addition to the meta-analytic findings.

## Methods

### Information Sources and Search Strategy

The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines were followed while drafting this manuscript (Page et al., 2021). We conducted a systematic search of the databases PubMed, Embase, APA PsycInfo (EBSCO), Criminal Justice Abstracts (EBSCO), Web of Science (Clarivate), and the Cochrane Central Register of Controlled Trials (CENTRAL; Wiley). The search included the following terms (including textual variations and synonyms) to describe the pedophilic groups: pedophile, hebephile, ephebophile, pedosexual, child molester, child sexual abuser, child sexual offender, child pornography, sexual interest in children. These were combined with the following terms regarding the most common measures for sexual interest as summarized in the literature (Laws & O'Donohue, 2008; Thornton et al., 2018): penile plethysmography, sexual arousal, viewing time, reaction time, implicit association test, card sort, skin conductance, heart rate, pupillometry, visual presentation tasks, dot-probe tasks, eye tracking, go/no go task, Stroop task. Only articles in English, Dutch or German were included. There were no a priori search restrictions to year of publication. The final inclusion date was October 15, 2021. For an outline of the searches see the Online Supplement.

### Selection of Studies

Studies were included in the meta-analyses when they included: 1) a measure of sexual interest in children, 2) a measure of sexual interest in adults, 3) a pedophilic or PSOC group, and 4) a nonpedophilic comparison group. The a priori inclusion criteria encompassed offending and nonoffending people with pedophilia, as well as PSOC without information regarding pedophilia diagnosis, as it was expected that most eligible samples would consist of the latter. Studies were excluded when they concerned animal samples or female samples, when they compared two groups of PSOC, or when no full text was available.

Studies were included in the meta-analyses when they reported mean scores, variance, and number of participants for the primary outcomes, or when these could be obtained after contacting the authors. Studies were included in the systematic

review if the abovementioned data could not be obtained, but mean scores (but no variance or number of participants) were given in the text or could be derived from figures.

### Data Collection and Data Items

Study coding was based on a coding protocol (see Online Supplement) that was a priori calibrated by one author and a research assistant based on 11 studies. For the meta-analyses, mean scores, standard deviations and number of participants were extracted for the primary outcomes sexual interest in children and sexual interest in adults. For the systematic review, means were retrieved from the text or derived from figures. Additionally, we extracted information for several possible moderating variables in the meta-analyses:

- type of pedophilic or PSOC group (nonoffending, contact offenses, child sexual exploitation material offenses),
- type of comparison group (community control, students, people who have sexually offended against adults, people who committed nonsexual offenses),
- age of pedophilic/PSOC group and comparison group,
- type of instrument (“explicit”, i.e., rating scales or questionnaires; “implicit”, where the aim of the instrument was obscured, e.g., viewing time tasks; or “physical”, where a physical reaction was measured, e.g., penile plethysmography),
- type of stimulus (picture, audio, video, text),
- and type of outcome measure (“absolute”, i.e., raw scores; or “transformed”, e.g., ipsative z-scores or difference scores).

Furthermore, to estimate the extent of pedophilia in undifferentiated PSOC samples, information was extracted regarding DSM or ICD diagnosis of pedophilia or SSPI scores (Helmus et al., 2015; Seto et al., 2017) as reported in the papers. For papers that did not include that information, the following SSPI items were applied to the PSOC sample: any boy victim, more than one child victim, any child victim younger than 12, any extrafamilial victim. Each SSPI item was scored a 1 if it was present in the majority of the PSOC sample. For example, if 63% of PSOC had offended against extrafamilial victims and 37% against intrafamilial victims, the item “extrafamilial victim” was scored a 1. Adding the SSPI items resulted in a rough approximation of a SSPI score for the PSOC sample as a whole, ranging from 0 to 4.

Finally, study quality was assessed using the QUADAS-2 tool (Whiting et al., 2011). For each primary study, the risk of bias and applicability concerns regarding the current research aims were coded “low”, “high”, or “unclear” on three domains: participant

selection, instruments, and flow and timing (e.g., whether all participants were included in the final analyses). Based on these three domains, an overall judgment of “at risk of bias” was made when there was a high risk on at least one domain.

In studies where multiple outcome options were available, a single outcome was chosen to maintain independence of effects (Babchishin et al., 2013). For instance, when both female and male child stimuli were used, we chose results considering the preferred gender of the sample. If a study used multiple instruments to assess sexual interests, the outcomes were averaged in the overall analyses, assuming dependence and thus using a conservative correlation of 1.0 between the measures (Babchishin et al., 2013; Borenstein et al., 2009, 2015).

All included studies were coded by one author. A research assistant independently coded a random 13.5% ( $k = 5$ ) of the studies. Interrater reliability analyses showed Kappa's between  $\kappa = .84$  and  $\kappa = .92$ , which is interpreted as “almost perfect” agreement (Landis & Koch, 1977). Any differences were subsequently resolved by consensus.

### **Effect Measures and Synthesis Methods**

Four separate meta-analyses were performed. In meta-analysis 1, sexual interest in children was compared to sexual interest in adults in pedophilic groups (i.e. was there a sexual preference for children in pedophilic groups). In meta-analysis 2, sexual interest in children was compared to sexual interest in adults in comparison groups (i.e., was there a sexual preference for adults in comparison groups). In meta-analysis 3, sexual interest in children was compared between pedophilic groups and comparison groups. In meta-analysis 4, sexual interest in adults was compared between pedophilic groups and comparison groups. The final research question “Is a sexual preference for children associated with excessive sexual interest in children, a lack of sexual interest in adults, or both?” was answered as follows. A meta-regression was done to predict if a sexual preference for children (meta-analysis 1) was related to sexual interest in children (meta-analysis 3) and sexual interest in adults (meta-analysis 4). For this, we used the effect sizes (Hedges'  $g$ ) from meta-analysis 3 and 4 as predictor variables in meta-analysis 1.

All analyses were done using Comprehensive Meta-Analysis software version 3 (Borenstein et al., 2013). We calculated the pooled effect size Hedges'  $g$  for each meta-analysis as follows. The means were subtracted from each other and divided by the weighted standard deviation,  $d = (M_1 - M_2) / \sqrt{((n_1 - 1)S_1^2 + (n_2 - 1)S_2^2)/(n_1 + n_2 - 2)}$ , after which  $d$  was multiplied by Hedges' correction factor  $J = 1 - (3 / (4df - 1))$ , such

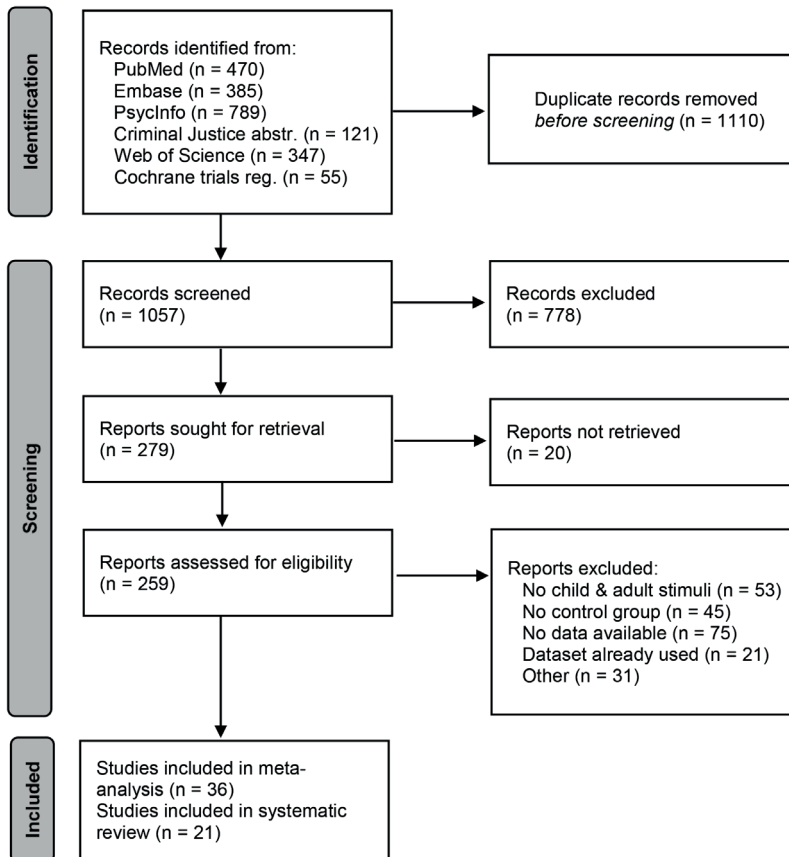
that Hedges'  $g = J * d$ . The use of Hedges'  $g$  is recommended for small sample sizes (Cuijpers, 2016). Meta-regression effects ( $R^2$ ) represented the proportion of explained variance relative to the total variance, which was calculated as  $R^2 = 1 - (T^2_{\text{residual}} / T^2_{\text{total}})$ . An effect size of  $g = .20$  is considered a small,  $g = .50$  medium, and  $g = .80$  a large effect; for  $R^2$  (meta-regression) this is .02, .13, and .26, respectively (J. Cohen, 1988). Effects were tested at an alpha level of  $\alpha = .05$ . A random effects model was applied, assuming systematic variance between studies (heterogeneity), as is recommended for psychological studies (Hedges & Vevea, 1998). Significant  $Q$ -statistics indicated the presence of heterogeneity. An  $I^2$  of 25% represents low, 50% moderate, and 75% high heterogeneity (J.P. Higgins et al., 2003). In case of heterogeneity, we conducted moderator analyses to explore sources of variance using the moderators specified above. Publication bias was assessed using Egger's test, the funnel plot, and Duval and Tweedie's trim and fill procedure (Cuijpers, 2016; Duval & Tweedie, 2000; Egger et al., 1997).

Not all primary studies specified whether or not pedophilia diagnoses were present in their sample. Therefore, all analyses were done twice: first with all studies and then only including studies with presumed pedophilic participants (i.e., sensitivity analyses). Pedophilia was presumed when the majority of a sample had a diagnosis of pedophilia, or a SSPI score (as originally reported or our approximation) of 3 or 4, indicating a high probability of a pedophilic sample.

## Results

The systematic search resulted in 1,057 unique records. See Figure 1 for the PRISMA flow diagram of the study selection procedure (Page et al., 2021). A total of 136 records met the inclusion criteria. For 119 studies not enough data was available; the authors were contacted whenever possible. We received additional data from 11 studies. A total of 36 studies were included in the meta-analyses. An extra 21 were included in the systematic review. Two studies (Dombert et al., 2013; Mokros et al., 2013) were included in both the meta-analyses and the systematic review because sufficient information was available for one instrument (in both cases rating scales) and not for another instrument (both reaction time tasks).

**Figure 1**  
PRISMA Flow Diagram of Study Selection Procedure



### Meta-Analyses: Study Characteristics

No studies with nonoffending pedophilic samples could be included in the meta-analyses. All studies included people who committed contact sexual offenses or mixed types of sexual offenses. Table 1 shows the characteristics of the included studies ( $k = 36$ ,  $N^{\text{total}} = 7,382$ ,  $n^{\text{PSOC}} = 4,744$ ). The years of publication ranged from 1980 to 2021. Seventeen studies used multiple instruments that could be included, yielding a total of 60 entries. Fifteen studies (41.7%) included a sample that was presumed to be pedophilic. All studies knew some problems with study quality in regard to our research aims (see Appendix 1). This was often because pedophilia was not or not accurately assessed in the PSOC samples. Furthermore, in 48% of the cases, groups were not properly comparable on the outcome measure. Often PSOC groups were considerably older than the comparison group, while reaction time increases and erectile functioning decreases with age; and the research design

did not control for these possible effects. Another example for concerns regarding study quality was the exclusion of low responding participants for analysis. Lack of variation – *all* studies were “at risk” – rendered the overall study quality score useless as a moderator. Therefore, the item “were scores on the outcome measure comparable for the groups” was included in the analyses instead. All means and standard deviations per study are reported in the Online Supplement.



**Table 1***Meta-Analyses: Study Characteristics*

Study	Setting	PSOC			Comparison		
		N	Age (M)	Presumed Pedophilia	Group	N	Age (M)
Abel et al., 2004	Other	1170	15.2	Unclear	PSOA	534	15.2
Babchishin et al., 2014	Prison	35	50.2	Unclear	PNSO	21	39.7
Babchishin et al., 2017	Other	865	38.4	Unclear	Other	195	36.5
Banse et al., 2010	Prison	14	47.2	Yes	CC	38	41.8
Bartels et al., 2018	Clinical	29	47.0	Yes	Students	26	20.0
Blanchard et al., 2012	Other	29	36.6	Yes	PSOA	115	37.3
Cazala et al., 2019	Outpatient	25	42.2	Yes	CC	24	37.8
Ciardha & Gormley, 2012	Prison	14	50.1	Unclear	CC	24	42.3
Clift et al., 2009	Outpatient	26	16.5	Unclear	PSOA	17	16.5
Dombert et al., 2017	Prison	77	46.0	Yes	PSOA	47	40.8
Dombert et al., 2013	Prison	47	41.2	Unclear	CC	59	41.2
Fontelle et al., 2019	Outpatient	15	42.0	Yes	CC	15	41.2
Gray et al., 2015a	Outpatient	124	38.6	Unclear	PSOA	160	38.6
Gray et al., 2015b	Outpatient	98	39.6	Unclear	PSOA	239	39.6
Gress, 2005	Outpatient	19	36.0	Unclear	PSOA	7	36.0
L.S. Grossman et al., 1992	Outpatient	31	40.1	Unclear	CC	21	40.1
Habets et al., 2021	Other	29	45.6	Yes	PNSO	25	37.9
Hall et al., 2015	Prison	13	43.5	Unclear	CC	13	40.7
G.T. Harris et al., 1992	Other	36	35.6	Unclear	CC	22	28.5
	Clinical	21	30.9	Unclear	Other	15	27.3
Haywood et al., 1990	Outpatient	24	38.0	Yes	CC	23	38.0
Hinton et al., 1980	Clinical	9	NA	Unclear	CC	9	NA
Jordan et al., 2016	Clinical	22	42.1	Yes	CC	52	25.3
Looman & Marshall, 2001	Clinical	49	37.8	Unclear	PSOA	141	35.9
Marschall-Lévesque et al., 2018	Other	15	47.5	Unclear	CC	15	48
Miner et al., 1995	Clinical	38	NA	Unclear	PSOA	38	NA
Mokros et al., 2010	Clinical	21	42.9	Yes	PNSO	21	32.3
Mokros et al., 2013	Clinical	42	42.7	Yes	CC	95	35.6
Pezzoli et al., 2021	Outpatient	16	43.2	Yes	CC	16	43.4

## Measures

Instrument	Type	Outcome	Groups Comparable
Reaction time	Implicit	Transformed	Yes
Questionnaire	Explicit	Raw	Yes
Reaction time	Implicit	Raw	No
Rating	Explicit	Raw	Yes
PPG	Physical	Raw	Yes
Questionnaire	Explicit	Transformed	No
Questionnaire	Explicit	Raw	Yes
Reaction time	Implicit	Raw	No
Reaction time	Implicit	Raw	No
PPG	Physical	Raw	No
Rating	Explicit	Raw	No
PPG	Physical	Transformed	Yes
Reaction time	Implicit	Transformed	No
PPG	Physical	Raw	Yes
Reaction time	Implicit	Raw	Yes
Rating	Explicit	Raw	No
Rating	Explicit	Raw	No
PPG	Physical	Transformed	Yes
Reaction time	Implicit	Raw	Unclear
Rating	Explicit	Raw	Yes
Reaction time	Implicit	Raw	Unclear
Rating	Explicit	Raw	Yes
Reaction time	Implicit	Raw	No
PPG	Physical	Transformed	Yes
Reaction time	Implicit	Raw	Yes
Eye tracking	Implicit	Transformed	Yes
PPG	Physical	Raw	No
PPG	Physical	Raw	No
Other	Implicit	Raw	No
PPG	Physical	Transformed	No
Reaction time	Implicit	Raw	No
Reaction time	Implicit	Raw	No
Rating	Explicit	Raw	No
PPG	Physical	Transformed	Yes
PPG	Physical	Transformed	Yes
PPG	Physical	Transformed	No
Reaction time	Implicit	Raw	Yes
Rating	Explicit	Transformed	No
Reaction time	Implicit	Raw	Yes
Reaction time	Implicit	Raw	Yes

**Table 1***Continued*

Study	Setting	PSOC			Comparison		
		N	Age (M)	Presumed Pedophilia	Group	N	Age (M)
Poepl et al., 2011	Clinical	9	45.0	Yes	PNSO	11	29.0
Rosburg et al., 2021	Outpatient	21	35.5	Yes	CC	21	30.8
Stephens et al., 2017	Clinical	1833	39.1	Unclear	PSOA	405	39.1
Stinson & Becker, 2008	Clinical	49	51.0	Yes	PSOA	11	51.0
Turner et al., 2018	Other	63	41.1	Unclear	Students	63	27.0
Vásquez Amézquita et al., 2019	Prison	18	44.5	Unclear	CC	19	40.4
Welsch et al., 2021	Other	51	42.6	Unclear	CC	55	24.9
Wormith, 1986	Prison	12	30.2	Unclear	Other	24	30.2

NB. PSOC = people who have sexually offended against children; PSOA = people who have sexually offended against adults; PNSO = people who have committed nonsexual offenses; CC = community controls; PPG = penile plethysmography

## Measures

Instrument	Type	Outcome	Groups Comparable
Reaction time	Implicit	Transformed	Yes
Other	Implicit	Raw	Yes
Reaction time	Implicit	Raw	Yes
Rating	Explicit	Raw	No
Reaction time	Implicit	Raw	Yes
PPG	Physical	Transformed	Unclear
Rating	Explicit	Raw	Yes
PPG	Physical	Transformed	Unclear
Reaction time	Implicit	Transformed	No
Rating	Explicit	Transformed	Yes
Other	Explicit	Transformed	Yes
Rating	Explicit	Raw	No
Reaction time	Implicit	Raw	No
Eye tracking	Implicit	Raw	Yes
Rating	Explicit	Raw	No
Rating	Explicit	Raw	No
Reaction time	Implicit	Raw	No
Questionnaire	Implicit	Raw	No
PPG	Physical	Transformed	Yes
Rating	Explicit	Transformed	Yes

## Meta-Analysis 1: Do PSOC Have More Sexual Interest in Children Than in Adults?

Overall, PSOC's sexual interest in children did not statistically differ from their sexual interest in adults, indicating no sexual preference for children in PSOC ( $g = -0.323$ , 95%  $CI [-0.684; 0.037]$ ,  $p = .079$ ,  $k = 36$ , a small-medium effect; see forest plot in Appendix 2). There was a significant and high amount of heterogeneity present ( $Q(35) = 1547.78$ ,  $p < .001$ ,  $I^2 = 97.74$ ). Therefore, moderator analyses were performed with age of PSOC, type of instrument, and instrument outcome (see Table 2). Combined instruments (either combination of implicit, explicit, or physical instruments) better distinguished sexual interest in children from sexual interest in adults than single instruments. Raw outcomes better distinguished sexual interest in children from sexual interest in adults than transformed outcomes.

Egger's test indicated the presence of publication bias ( $t(34) = 3.22$ ,  $p = .003$ ), see funnel plot in Appendix 2. The imputed effect size increased to  $g = -.477$  (95%  $CI [-.801; -0.152]$ ) in Duval and Tweedie's trim and fill procedure. This indicated that if missing publications were included, PSOC would show significantly less sexual interest in children than in adults, i.e., a sexual preference for adults.

**Table 2**

*Moderators Meta-Analysis 1: PSOC's Sexual Interest in Children Versus Adults*

Moderator	$g$	95% CI of $g$	$p^{within}$	$Q (df)$	$p^{between}$	$n^{PSOC}$	$k$
Age PSOC	-0.001	-0.53; 0.053		0.00 (1)	.999	4484	33
Type of Instrument				10.99 (3)	.012		36
Combined	-0.833	-1.227; -0.440	<.001			2982	15
Explicit	-0.191	-1.250; 0.867	.723			89	2
Implicit	-0.036	-0.503; 0.431	.879			1421	11
Physical	0.160	-0.384; 0.705	.564			252	8
Instrument Outcome				7.65 (2)	.022		32
Raw	-0.400	-0.701; -0.099	.009			771	20
Transformed	0.004	-0.392; 0.401	.983			1477	12
<b>Sensitivity Analyses: PSOC With Presumed Pedophilia</b>							
Age PSOC	-0.037	-0.092; 0.018		1.74 (1)	.187	418	15
Type of Instrument				6.39 (3)	.094		15
Combined	-0.214	-0.548; 0.121	.211			144	6
Explicit	0.750	0.036; 1.464	.039			42	1
Implicit	0.074	-0.225; 0.374	.627			205	7
Physical	0.263	-0.497; 1.023	.497			29	1
Instrument Outcome				1.08 (2)	.583		13
Raw	-0.016	-0.318; 0.285	.916			281	10
Transformed	-0.005	-0.558; 0.548	.986			100	3

### Sensitivity Analyses

The analyses were repeated only including studies with PSOC with presumed pedophilia (see Table 1; 45.0% of the entries in the meta-analyses). For PSOC with presumed pedophilia, sexual interest in children did not statistically differ from their sexual interest in adults ( $g = 0.035$ , 95% CI [-0.203; 0.274],  $p = .771$ ,  $k = 15$ , a small effect; see forest plot in Appendix 2). Heterogeneity among the studies was reduced to a significant, moderate-high level ( $Q(14) = 40.30$ ,  $p < .001$ ,  $I^2 = 65.26$ ). Moderator analyses with instrument type and instrument outcome could not significantly reduce the amount of heterogeneity (see Table 2).

### Meta-Analysis 2: Do Comparison Groups Have More Sexual Interest in Adults Than in Children?

Overall, comparison groups showed more sexual interest in adults than in children, indicating a sexual preference for adults ( $g = 1.377$ , 95% CI [1.029; 1.724],  $p < .001$ ,  $k = 36$ , a large effect; see forest plot in Appendix 2). There was a significant and high amount of heterogeneity present ( $Q(35) = 921.20$ ,  $p < .001$ ,  $I^2 = 96.20$ ). Therefore, moderator analyses were performed with type of comparison group, age of comparison group, type of instrument, and instrument outcome (see Table 3). Using either combination of implicit, explicit or physical instruments better distinguished sexual interest in children from sexual interest in adults than single instruments. Egger's test indicated no publication bias ( $t(34) = 0.95$ ,  $p = .175$ ).

**Table 3**

*Moderators Meta-Analysis 2: Control Group's Sexual Interest in Children Versus Adults*

Moderator	$g$	95% CI of $g$	$p^{within}$	$Q (df)$	$p^{between}$	$n^{comp}$	$k$
Type of Comp.Group				1.65 (5)	.895		
Community	1.623	1.061; 2.185	<.001			490	16
PNSO	1.074	-0.054; 2.201	.062			78	4
PSOA	1.182	0.522; 1.841	<.001			1780	11
Students	1.608	0.059; 3.157	.042			88	2
Other	1.197	-0.341; 2.734	.127			185	2
Age Comp.Group	0.032	-0.016; 0.081		1.72 (1)	.189	2573	34
Type of Instrument				12.87 (3)	.005		36
Combined	2.044	1.544; 2.545	<.001			1287	14
Explicit	1.367	0.291; 2.443	.013			165	3
Implicit	0.705	0.134; 1.277	.016			746	11
Physical	1.084	0.413; 1.754	.002			440	8
Instrument Outcome				12.26 (2)	.002		32
Raw	1.379	1.005; 1.752	<.001			1031	20
Transformed	0.910	0.424; 1.397	<.001			1003	12

NB. PNSO = people who have committed nonsexual offenses; PSOA = people who have sexually offended against adults

### Meta-Analysis 3: Do PSOC Have More Sexual Interest in Children Than Comparison Groups?

Overall, PSOC showed more sexual interest in children than comparison groups ( $g=0.517$ , 95% CI [0.384; 0.650],  $p < .001$ ,  $k = 36$ , a medium-large effect; see forest plot in Appendix 2). There was a significant and high amount of heterogeneity present ( $Q(35) = 148.49$ ,  $p < .001$ ,  $I^2 = 76.43$ ). Moderator analyses were performed with the age difference between PSOC and comparison groups, type of comparison group, type of instrument, instrument outcome, and comparability of the groups on the instrument (see Table 4). The difference with PSOC was largest when compared to community comparison groups, relative to other types of comparison groups. Egger's test indicated no publication bias ( $t(34) = 2.03$ ,  $p = .050$ )<sup>1</sup>.

#### Sensitivity Analyses

The analyses were repeated only including studies with PSOC with presumed pedophilia (see Table 1). This analysis showed a slightly larger effect, where PSOC with presumed pedophilia had more sexual interest in children than comparison groups ( $g = 0.705$ , 95% CI [0.431; 0.979],  $p < .001$ ,  $k = 15$ , a medium-large effect; see forest plot in Appendix 2). Heterogeneity was reduced but still high, ( $Q(14) = 50.11$ ,  $p < .001$ ,  $I^2 = 72.06$ ). Moderator analyses were performed with instrument outcome and comparability of the groups on the instrument (see Table 4). Noncomparable groups differed more from each other on sexual interest in children than comparable groups.

**Table 4**

*Moderators Meta-Analysis 3: PSOC Versus Control Group's Sexual Interest in Children*

Moderator	<i>g</i>	95% CI of <i>g</i>	<i>p</i> <sup>within</sup>	<i>Q</i> ( <i>df</i> )	<i>p</i> <sup>between</sup>	<i>n</i> <sup>PSOC</sup> / <i>n</i> <sup>comp</sup>	<i>k</i>
Age PSOC-Comparison	-0.005	-0.036; 0.025		0.12 (1)	.731	2255/1632	24
Type of Comp.Group				16.77 (5)	.005		35
Community	0.719	0.533; 0.905	<.001			357/490	16
PNSO	0.330	-0.044; 0.705	.084			92/78	4
PSOA	0.431	0.263; 0.600	<.001			3533/1780	11
Students	0.756	0.130; 0.998	.011			92/88	2
Other	-0.132	-0.537; 0.273	.523			642/185	2
Type of Instrument				4.09 (3)	.252		36
Combined	0.567	0.352; 0.782	<.001			2982/1298	15
Explicit	0.764	0.216; 1.312	.006			89/154	2
Implicit	0.305	0.037; 0.572	.025			1421/746	11
Physical	0.648	0.338; 0.957	<.001			252/440	8
Instrument Outcome				0.29 (2)	.866		32
Raw	0.538	0.355; 0.721	<.001			771/1031	20

<sup>1</sup>  $p = .050$  is borderline significant/nonsignificant, but the funnel plot and Duval and Tweedie's trim and fill procedure indicated no missing studies.

**Table 4***Continued*

Moderator	<i>g</i>	95% CI of <i>g</i>	<i>p</i> <sup>within</sup>	<i>Q</i> ( <i>df</i> )	<i>p</i> <sup>between</sup>	<i>n</i> <sup>PSOC</sup> / <i>n</i> <sup>comp</sup>	<i>k</i>
Transformed	0.467	0.221; 0.712	<.001			1477/1003	12
Groups Comparable				3.43 (2)	.180		35
No	0.660	0.433; 0.887	<.001			397/574	13
Yes	0.349	0.110; 0.588	.004			1494/951	12
<b>Sensitivity Analyses: PSOC With Presumed Pedophilia</b>							
Age PSOC-Comparison	-0.022	-0.061; 0.017		1.22 (1)	.270	369/525	14
Type of Comp.Group				6.82 (3)	.078		15
Community	1.019	0.663; 1.374	<.001			177/282	8
PNSO	0.205	-0.385; 0.795	.496			59/57	3
PSOA	0.500	-0.033; 1.032	.066			155/173	3
Students	0.361	-0.592; 1.313	.458			29/25	1
Type of Instrument				7.70 (3)	.053		15
Combined	1.123	0.704; 1.543	<.001			144/159	6
Explicit	0.851	-0.015; 1.717	.054			42/95	1
Implicit	0.341	-0.028; 0.709	.070			205/168	7
Physical	0.738	-0.145; 1.621	.101			29/115	1
Instrument Outcome				11.95 (2)	.003		13
Raw	0.552	0.287; 0.817	<.001			281/381	10
Transformed	0.595	0.091; 1.100	.021			100/117	3
Groups Comparable				10.33 (2)	.006		10
No	0.762	0.401; 1.123	<.001			145/308	5
Yes	0.221	-0.168; 0.611	.266			152/120	5

NB. PNSO = people who have committed NonSexual Offenses; PSOA = people who have Sexually Offended against Adults

### Meta-Analysis 4: Do PSOC Have Less Sexual Interest in Adults Than Comparison Groups?

Overall, PSOC showed less sexual interest in adults than comparison groups ( $g = 0.264$ , 95% CI [0.121; 0.407],  $p < .001$ ,  $k = 36$ , a small effect; see forest plot in Appendix 2). There was a significant and high amount of heterogeneity present ( $Q(35) = 181.75$ ,  $p < .001$ ,  $I^2 = 80.74$ ). Moderator analyses were performed with the age difference between PSOC and comparison groups, type of comparison group, type of instrument, instrument outcome, and comparability of the groups on the instrument (see Table 5). None of these variables significantly moderated the effect.

Egger's test indicated the presence of publication bias ( $t(34) = 2.82$ ,  $p = .008$ ); see funnel plot in Appendix 2. The imputed effect size decreased to  $g = 0.116$  (95% CI [-0.019; 0.251]) in Duval and Tweedie's trim and fill procedure. This indicated that if missing publications were included, there would be no more difference between PSOC and comparison groups on sexual interest in adults.



### Sensitivity Analyses

The analyses were repeated only including studies with presumed pedophilic PSOC (see Table 1). This analysis showed a larger effect, where pedophilic PSOC had less sexual interest in adults than comparison groups ( $g = 0.350$ , 95%  $CI [0.172; 0.528]$ ,  $p < .001$ ,  $k = 15$ , a small-medium effect; see forest plot in Appendix 2). Heterogeneity among the studies was reduced to a nonsignificant level ( $Q(14) = 22.28$ ,  $p = .073$ ,  $I^2 = 37.17$ ), therefore moderator analyses were not performed.

**Table 5**

*Moderators Meta-Analysis 4: PSOC Versus Control's Sexual Interest in Adults*

Moderator	$g$	95% CI of $g$	$p^{within}$	$Q (df)$	$p^{between}$	$n^{PSOC}/n^{comp}$	$k$
Age PSOC-Comparison	-0.004	-0.031; 0.023		0.09 (1)	.761	2255/1632	24
Type of Comp.Group				4.69 (5)	.455		35
Community	0.446	0.217; 0.675	<.001			357/490	16
PNSO	0.189	-0.276; 0.655	.425			92/78	4
PSOA	0.086	-0.153; 0.325	.482			3533/1780	11
Students	0.304	-0.275; 0.882	.304			92/88	2
Other	0.241	-0.334; 0.815	.412			642/185	2
Type of Instrument				2.54 (3)	.467		36
Combined	0.202	0.001; 0.404	.049			2934/1287	14
Explicit	0.269	-0.168; 0.705	.228			138/165	3
Implicit	0.179	-0.071; 0.430	.161			1421/746	11
Physical	0.459	0.171; 0.747	.002			251/440	8
Instrument Outcome				2.78 (2)	.250		32
Raw	0.157	-0.034; 0.348	.106			770/1031	20
Transformed	0.416	0.159; 0.673	.002			1477/1003	12
Groups Comparable				2.34 (2)	.311		36
No	0.388	0.170; 0.606	<.001			397/574	13
Yes	0.158	-0.066; 0.381	.166			1542/962	13

*NB.* PNSO = people who have committed nonsexual offenses; PSOA = people who have sexually offended against adults

### Is a Sexual Preference for Children Associated with Excessive Sexual Interest in Children, a Lack of Sexual Interest in Adults, or Both?

Using meta-regression, the result from meta-analysis 1, PSOC's sexual preference for children, showed small, nonsignificant relations to their absolute sexual interest in children (meta-analysis 3) and absolute sexual interest in adults (meta-analysis 4) (Table 6,  $R^2 = .05$ ). The analyses were repeated only including studies with presumed pedophilic PSOC. The result from meta-analysis 1, PSOC's sexual preference for children, showed a moderate-large, nonsignificant relation to their absolute sexual

interest in children (meta-analysis 3) and a small-moderate, nonsignificant relation to their absolute sexual interest in adults (meta-analysis 4) (Table 6,  $R^2 = .23$ ). The fact that no sexual preference was established in meta-analysis 1 the first place, minimizes the relevance of these results.

**Table 6**

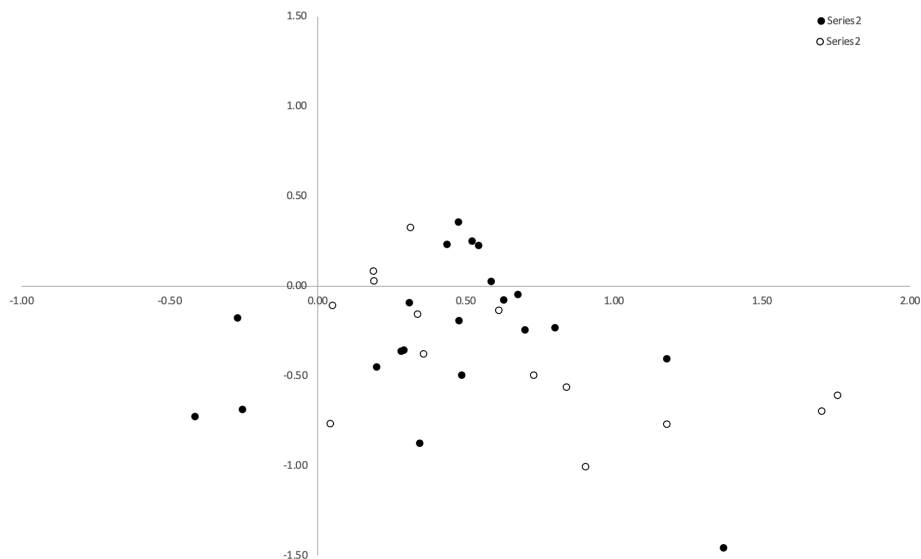
*The Relation Between Sexual Preference (Meta 1) and Sexual Interests (Meta 3 and 4)*

Variable	<i>g</i>	95% CI of <i>g</i>	$p^{\text{within}}$	<i>Q</i> ( <i>df</i> )	$p^{\text{between}}$	<i>k</i>
Meta-Regression				0.48 (2)	.785	31
PSOC Child Interest (Meta 3)	0.248	-0.767; 1.263	.632			
PSOC Adult Interest (Meta 4)	0.200	-0.633; 1.033	.638			
<b>Sensitivity Analyses: PSOC With Presumed Pedophilia</b>						
Meta-Regression				2.77 (2)	.250	11
PSOC Child Interest (Meta 3)	-0.621	-1.502; 0.260	.167			
PSOC Adult Interest (Meta 4)	0.429	-0.192; 1.050	.175			

To visualize the relation between sexual interest in adults and children, the results of meta-analyses 3 and 4 were plotted together (see Figure 2). This concerns the Hedges *g* scores for PSOC relative to comparison groups. For example, a data point of (0.5; -1.0) indicates that in this study, for sexual interest in children PSOC scored  $g = 0.5$  compared to comparison groups, and for sexual interest in adults PSOC scored  $g = -1.0$  compared to comparison groups, meaning that lack of sexual interest in adults of PSOC was larger than their sexual interest in children. From this figure we can see that most PSOC samples with presumed pedophilia had both more sexual interest in children (positive scores on the horizontal axis) and less sexual interest in adults (negative scores on vertical axis) than comparison groups.

**Figure 2**

*PSOC Sexual Interest in Children and Adults (With Comparison Groups as Frame of Reference)*



NB. Data points represent Hedges  $g$  from meta-analysis 3 and 4, indicating sexual interest in children and sexual interest in adults. Each datapoint is PSOC score relative to comparison group.

## Systematic Review

A total of 21 studies were included in the systematic review ( $N^{\text{total}} = 1,083$ ,  $n^{\text{PSOC}} = 469$ ). Three studies had multiple instruments that could be included, yielding a total of 25 entries. The characteristics of these studies are described in Table 6. The years of publication ranged from 1975 to 2018. All but three studies concerned undifferentiated PSOC samples that had committed offenses against children; one study had a sample of nonoffending participants with pedophilia (Ponseti et al., 2012); one study had a mixed sample of nonoffending and offending participants with pedophilia (Weidacker et al., 2018); and one study had participants “seeking evaluation and/or treatment of their patterns of sexual arousal” (p.26) with a diagnosis of pedophilia (DSM-III), but their specific sexual behaviors and/or offense status was unclear (Abel et al., 1981). Twelve of the studies (57.1%) included a sample with presumed pedophilia.

The following results were found in answer to the research questions. First, PSOC showed more sexual interest in children than in adults in 52.0% of the studies, indicating a sexual preference for children. In the presumed pedophilic samples, this percentage increased to 58.33%. Second, comparison groups showed more

sexual interest in adults than in children in 88.0% of the studies, indicating a sexual preference for adults. Third, in 76.0% of the studies, PSOC showed more sexual interest in children than comparison groups. In the presumed pedophilic samples this increased to 91.67%. Fourth, in 80.0% of the studies, PSOC showed less interest in adults than comparison groups. In the presumed pedophilic samples this decreased to 75.00%. Finally, in 40.0% of the studies, the difference between PSOC and comparison groups on sexual interest in adults was larger than the difference on sexual interest in children. In the samples that were presumed pedophilic, this increased to 41.67%. These findings are very much in line with the meta-analytical findings, the only difference being that the PSOC group seemed somewhat less sexually interested in adults.

**Table 6**  
*Systematic Review: Study Characteristics*

Study	PSOC			
	Setting	N	Age (M)	Presumed Pedo
Abel et al., 1981	Other	8	NA	Yes
Barsetti et al., 1998	Other	20	42.4	Yes
Baxter et al., 1984	Prison	15	34.0	Unclear
Becker et al., 1992	Outpatient	39	15.4	Unclear
Canales et al., 2009	Inpatient	37	36.7	Unclear
Chaplin et al., 1995	Other	15	37.9	Unclear
L. J. Cohen et al., 2002	Outpatient	7	38.0	Yes
Dombert et al., 2013	Prison	47	41.2	Unclear
Fromberger et al., 2012	Inpatient	22	42.1	Yes
G.T. Harris et al., 1996	Outpatient	26	41.3	Unclear
Hempel et al., 2013 *	Other	46	49.1	Unclear
Howard et al., 1994	Inpatient	19	39.2	Unclear
W.L. Marshall et al., 1988	Outpatient	21	32.9	Unclear
Mokros et al., 2013	Inpatient	42	42.7	Yes
Ponseti et al., 2012	Outpatient	13	33.5	Yes
Quinsey & Chaplin, 1988	Other	25	30.9	Unclear
Quinsey et al., 1975	Other	20	27.5	Yes
P. Renaud et al., 2010 *	Outpatient	10	42	Unclear
Schiffer, Krueger, et al., 2008	Inpatient	11	37.0	Yes
Schiffer, Paul, et al., 2008	Inpatient	8	38.4	Yes
Weidacker et al., 2018	Other	18	36.2	Yes

NB. \* lower scores indicate more sexual interest. PSOC = people who have sexually offended against children; PSOA = people who have sexually offended against adults; CC = community controls; PPG = penile plethysmography; IAT = implicit associations test; EEG = electroencephalogram; AAT = approach-avoidance task

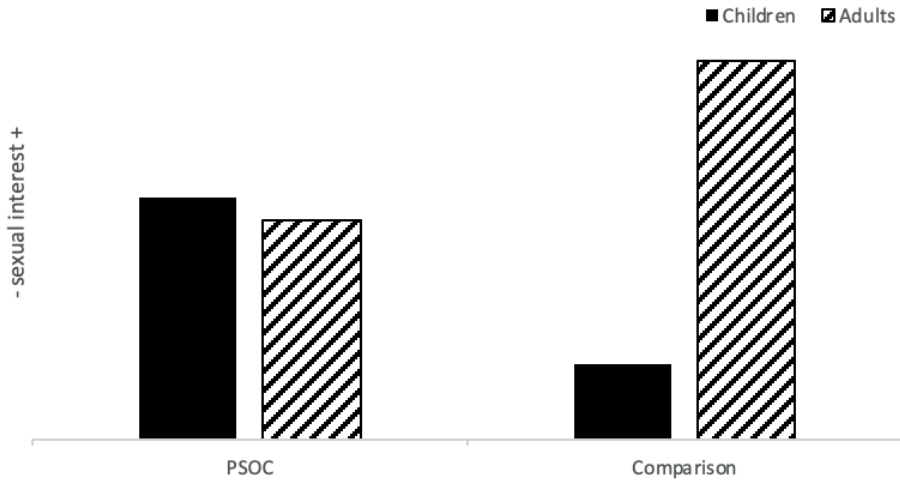
Comparison				PSOC Child	Comp. Child	PSOC Adult	Comp. Adult
Type	N	Age (M)	Instrument	Stimuli (M)	Stimuli (M)	Stimuli (M)	Stimuli (M)
PSOA	8	NA	PPG	25.00	28.00	37.00	39.00
CC	18	29.4	PPG	2.10	1.50	2.20	5.60
PSOA	75	27.8	PPG	37.00	11.00	35.00	39.00
PSOA	28	15.4	PPG	90.00	52.00	73.00	83.00
PSOA	45	36.7	PPG	20.00	13.00	26.00	27.00
CC	15	31.2	PPG	11.50	3.50	9.00	7.75
CC	7	38.0	PPG	1440.00	60.00	60.00	40.00
			Rating	21.00	13.00	22.00	13.00
CC	59	41.2	Reaction time	4950.00	5400.00	5310.00	5890.00
CC	52	25.3	Eye tracking	25.00	16.00	29.00	46.00
			Rating	2.00	1.00	4.00	6.00
CC	25	36.2	Reaction time	2.00	3.20	2.20	5.25
			PPG	3.75	1.75	2.80	5.25
			Rating	1.25	3.30	4.30	5.25
CC	40	35.6	IAT	743.00	746.00	756.00	730.00
CC	19	38.1	EEG	7.30	7.20	9.80	13.50
CC	18	29.8	PPG	35.00	9.00	32.00	42.00
CC	95	35.6	Reaction time	0.67	-0.28	0.20	-0.19
CC	18	32.4	Rating	4.90	1.75	1.75	3.80
Other	14	31.0	PPG	4.80	1.50	2.70	3.90
Other	21	25.5	PPG	4.50	2.10	3.60	3.80
CC	22	41.9	Eye tracking	7.90	11.90	10.50	14.20
CC	12	32.0	Rating	6.00	0.40	3.00	3.90
CC	12	36.1	Rating	5.50	1.40	3.60	4.60
CC	11	30.5	AAT	19.00	-5.00	-1.00	61.00

## Discussion

This study, using multiple meta-analyses and a systematic review ( $k = 55$ ,  $N^{total} = 8,465$ ,  $n^{PSOC} = 5,213$ ), explored sexual *preference* for children over adults in people with pedophilia, by contrasting their absolute sexual *interest* in children and in adults. All studies in the meta-analyses and nearly all studies in the systematic review included people who had sexually offended against children (PSOC) and no nonoffending people with pedophilia. We therefore limit our conclusions to PSOC and PSOC with presumed pedophilia, the latter referring to 45.0% of the entries in the meta-analyses and 57.1% of the systematic review.

PSOC and PSOC with presumed pedophilia did not show a clear sexual preference for either children or adults. Some other meta-analyses have found a sexual preference for children in PSOC (Babchishin et al., 2013; Pedneault et al., 2021; A.F. Schmidt et al., 2017). These prior studies subtracted sexual interest in adults from sexual interest in children and compared those scores between PSOC and comparison groups, in formula:  $(PSOC^{child} - PSOC^{adult}) - (comparison^{child} - comparison^{adult})$ . The current study used a different approach by comparing the absolute sexual interest scores in children to those in adults in PSOC, in formula:  $PSOC^{child} - PSOC^{adult}$ . This way, the relative dependence on comparison groups was circumvented.

Using this approach, we also could determine that PSOC, and particularly those with presumed pedophilia, showed greater sexual interest in children (medium-large effects) and lower sexual interest in adults (small-medium effects) than comparison groups. With comparison group's sexual interest in children being minimal and their sexual interest in adults maximal, PSOC with pedophilia seemed to "slide to the center" and end up somewhere in between (see Figure 3). These findings might have consequences for etiology and treatment. Regarding etiology, the current results indicate that a sexual preference for children is not only driven by an excess of interest in children, but that a lowered interest in adults may be a factor too. Regarding treatment of PSOC with pedophilia, these findings implicate that therapists should not only focus on reducing the impact of sexual interest in children, but additionally try to strengthen the sexual interest in adults. As discussed in the introduction, this requires a different focus, where sexuality with adults is a positive target and avoidance or reduction of sexuality with children a negative target.

**Figure 3***Schematic Representation of Sexual Interests PSOC and Comparison Groups*

Treatment of PSOC is not a one size fits all approach. Part of the PSOC are believed to be driven primarily by antisocial tendencies and less by sexual interests (Brouillette-Alarie et al., 2018; Brouillette-Alarie & Proulx, 2019; Etzler et al., 2020; McPhail et al., 2018). The most extreme *nonpedophilic* PSOC samples in the meta-analyses (Babchishin et al., 2017; Gray et al., 2015; Stephens et al., 2017; Welsch et al., 2021) probably were more antisocial. They included PSOC who did not exclusively offend against children, but could have also had adult victims. For these people, treatment might gain most by focusing on antisocial behavior rather than sexual interests.

### **Deficiency Perspective (“Too Little”) or Drive Perspective (“Too Much”)**

The current results indicate that the lack of sexual interest in adults is a relevant factor in PSOC with presumed pedophilia. It is suggested that sexual interests in children and pedophilia may also be understood from a deficiency perspective (Smid & Wever, 2019). In this deficiency perspective, it is argued that the lack of rewarding sexuality with adults might cause sexual offending to persist. Schippers et al. (2022) also found that men who were sensitive for deviant sexual arousal showed lower penile reactivity to adult sexual stimuli. Such a deficiency perspective does not necessarily exclude a sex drive perspective as posed by Bouchard et al. (2017) and V. Klein et al. (2015), who suggest that people with a generally high “sex drive”, or, a high frequency of sexual behaviors, are more likely to have pedophilic interests. Note that in the referenced studies the age of the sexual partner is not specified when assessing the frequency of sexual acts, so we do not know whether this high “drive”



is towards adults or children. The deficiency and sex drive perspectives can be seen as different sides of the same coin. When rewarding sexuality with adults is lacking, the desire to achieve sexual satisfaction may lead to a stronger focus on possibly effective sexual stimuli and greater time investment in sexual activity. Laier et al. (2013), for instance, found that self-proclaimed “cybersex addicted” subjects reacted to sexual stimuli with less genital sexual arousal, while simultaneously indicating a stronger (explicit) drive to act on their sexual desires.

### **Strengths, Limitations, and Recommendations**

One of the strengths of the current study is that this is the first, to our knowledge, to meta-analyze the crosswise differences in absolute sexual *interest* in children and adults, rather than sexual *preference*, in PSOC with pedophilia and comparison groups. Furthermore, we provide a rather complete picture of the literature by combining meta-analyses and a systematic review, including assessment of study quality and publication bias. The systematic review captured older studies than the meta-analysis, with relatively more studies from the 1980s and 1990s when the field was in its early years. Additional strengths, limitations, and recommendations are discussed below.

#### ***Proper Comparisons***

In half of the included studies, the PSOC and comparison groups were not adequately matched. For instance, PSOC were older than comparison groups, which for instance might increase reaction time and suppress sexual interests in reaction time paradigms. Moreover, several of the included studies compared PSOC in a psychiatric hospital to healthy community comparison groups. Testosterone lowering medication or other medication in psychiatric patients might suppress penile response on PPG. Additionally, self-reported pedophilic interests are likely to be more suppressed in community comparison groups (social desirable responding) than in people already receiving treatment for them, where acknowledging these feelings often is a first goal. Many studies lacked control mechanisms for these discrepancies, which could relatively easily be implemented by adding a task with a neutral stimulus (see for instance Bartels et al., 2018), or striving for a better matching of the comparison groups. We assessed the influence of this possible bias by analyzing subgroups based on whether the groups were comparable or not. We found a tendency for PSOC to differ more from the noncomparable comparison groups. Improper comparisons thus artificially increased the difference between PSOC and comparison groups. Publication bias caused more extreme differences: studies were published more often when PSOC had more sexual interest in children and when comparison groups had more sexual interest in adults.

Additionally, in 33.3% of the studies in the meta-analyses, the outcome measures were transformed into z-scores or difference scores. An average score is then calculated per person over all categories of stimuli (e.g., adult male, adult female, child male, child female) and each category is scored relative to this average. Such procedures are recommended in assessments used to differentiate PSOC from comparison groups based on sexual preference (McPhail et al., 2019; A.F. Schmidt et al., 2017). These difference scores are not informative about absolute sexual interest to either children or adults, because they are now made relative to each other. It must be acknowledged that transforming outcome measures comes at the cost of losing sight of meaningful differences between and within people.

### ***Information Regarding Pedophilia***

Even with broad inclusion criteria regarding publication year, type of instruments, and type of participants, not many primary studies included people with a diagnosis of pedophilia. We therefore estimated the extent of pedophilia based on whether SSPI items (Helmus et al., 2015; Seto et al., 2017) were present for the *majority* of a PSOC sample. Most PSOC samples were heterogenous and also included a nonpedophilic minority for whom SSPI items were not true, which may have suppressed the effects. Often, not enough information was reported to estimate the level of pedophilia. If no DSM or ICD diagnosis can be obtained, we recommend researchers to include the SSPI or comparable assessments, or provide sufficient victim information. Differentiating samples of PSOC is important, as we see once again that PSOC with pedophilia may present different from other PSOC.

### ***Selection of Instruments and Outcomes***

While previous meta-analyses focused on specific types of measures, this meta-analysis incorporated any measure of sexual interest. Combinations of physical, explicit or implicit instruments showed better differentiation between PSOC and comparison groups than either measure alone. PPG, implicit measures such as viewing time procedures, and explicit rating scales thus provided complementary information. Unfortunately, no IAT studies could be included in the meta-analyses, even though many of such studies have been carried out over the past decade. These designs directly oppose child and adult stimuli and provide no independent assessment of either. A suggestion to bypass this is to use two single-category IATs, one with child versus neutral stimuli and one with adult versus neutral stimuli (Hempel et al., 2013). Common practice when using PPG, but also with many reaction time tasks, is to exclude low responders (Merdian & Jones, 2011). We recommend not to exclude low responders without thorough consideration, as a lack of response may be an actual and relevant finding.

## **Conclusion**

PSOC with presumed pedophilia did not show relatively more sexual interest in children than in adults, meaning they were characterized by a lack of sexual preference for either children or adults. Compared to comparison groups, they showed more sexual interest in children and less sexual interest in adults. This means that the strength of their sexual interests ended up somewhere in between the low child interest and the high adult interest of the comparison groups. More studies are needed that disentangle sexual interest in children from sexual interest in adults in people with pedophilia, while using carefully matched comparison groups and appropriate research designs and measures. The lack of sexual interest in adults may be a meaningful factor in the assessment and treatment of PSOC with pedophilia that may open new avenues to help them refrain from offending behavior.

## **Acknowledgements**

We thank Nikita Feringa for her help acquiring the data for this study and Pim Oomen for his help in double coding the studies. Also, we thank the various authors who have send contributions to the meta-analyses.

## **Declaration of Interest Statement**

We have no conflict of interest to disclose.

## **Data Availability Statement**

Data will be made available on request.



# Appendix 1

**Table A1**
*Study Quality as Assessed With the QUADAS-Tool*

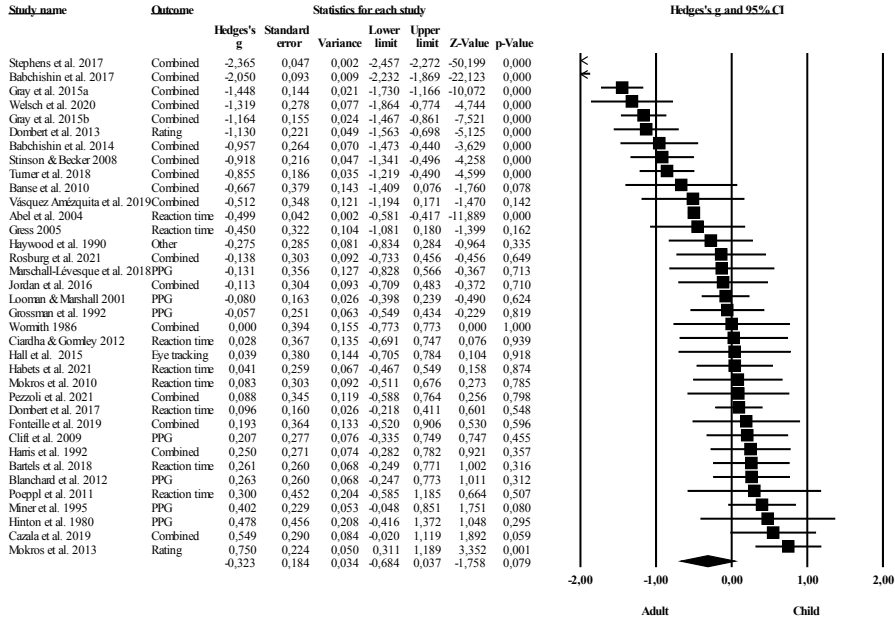
First Author, Year	Instrument	Participant Selection		Instrument		Participant Flow	Summary
		Risk of Bias	Applicability Concerns	Risk of Bias	Applicability Concerns	Risk of Bias	
Abel et al., 2004	Reaction time	High	High	Low	High	Low	At risk
Babchishin et al., 2014	Questionnaire	High	High	Low	Low	High	At risk
	Reaction time Rating	High	High	High	Low	High	At risk
Babchishin et al., 2017	PPG	High	High	Low	Low	High	At risk
	Questionnaire	High	High	Low	Low	High	At risk
Banse et al., 2010	Questionnaire	High	High	Low	Low	Low	At risk
	Reaction time	High	High	High	Low	Low	At risk
Bartels et al., 2018	Reaction time	High	High	High	Low	Low	At risk
Blanchard et al., 2012	PPG	Low	Low	High	Low	High	At risk
Cazala et al., 2019	Rating	High	Low	High	Low	Low	At risk
	PPG	High	Low	Low	Low	High	At risk
Ciardha & Gormley, 2012	Reaction time	High	High	High	High	High	At risk
	PPG	High	High	Low	Low	High	At risk
Dombert et al., 2017	Reaction time	High	High	Low	Low	High	At risk
Dombert et al., 2013	Rating	High	High	Low	Low	Low	At risk
Fontelle et al., 2019	Rating	High	High	Low	Low	Low	At risk
	PPG	High	High	Low	High	High	At risk
Gray et al., 2015a	Reaction time	High	High	Low	Low	Low	At risk
	Rating	High	High	Low	Low	Low	At risk
Gray et al., 2015b	Reaction time	High	High	Low	Low	Low	At risk
	Rating	High	High	Low	Low	Low	At risk
Gress, 2005	Reaction time	High	High	High	Low	Low	At risk
L.S. Grossman et al., 1992	PPG	High	High	Low	Low	Unclear	At risk
Habets et al., 2021	Reaction time	High	Low	Low	Low	Low	At risk
Hall et al., 2015 G.T. Harris et al., 1992	Eye tracking	High	High	Low	Low	Low	At risk
	PPG	High	High	High	High	Low	At risk
	PPG	High	High	High	High	Low	At risk
Haywood et al., 1990	Other	High	High	Low	Low	Low	At risk
Hinton et al., 1980	PPG	High	High	High	High	High	At risk
Jordan et al., 2016	Reaction time	Low	Low	High	High	High	At risk

**Table A1***Continued*

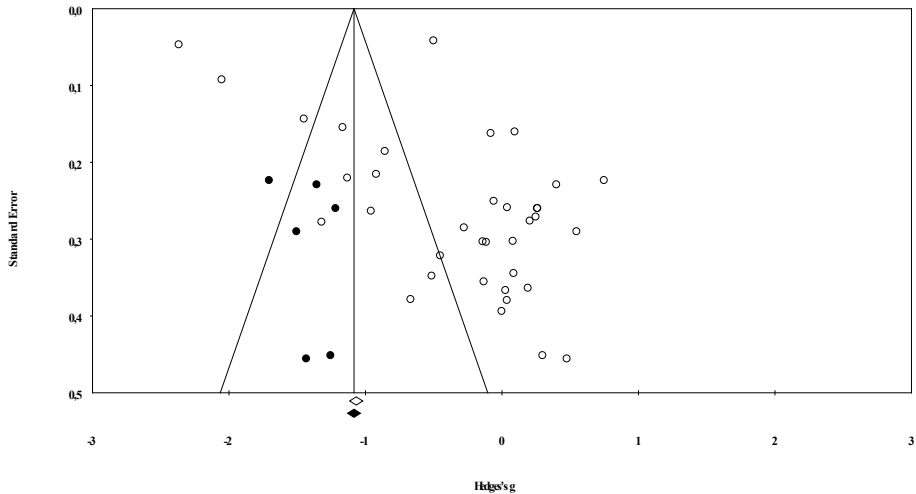
First Author, Year	Instrument	Participant Selection		Instrument		Participant Flow	
		Risk of Bias	Applicability Concerns	Risk of Bias	Applicability Concerns	Risk of Bias	Summary
Looman & Marshall, 2001	Reaction time	Low	Low	High	High	Low	At risk
	Rating	Low	Low	High	High	High	At risk
Marschall- Lévesque et al., 2018	PPG	High	High	Low	High	High	At risk
Miner et al., 1995	PPG	High	High	Low	Low	Low	At risk
Mokros et al., 2010	PPG	High	High	High	Low	Unclear	At risk
Mokros et al., 2013	Reaction time	High	High	Low	Low	Low	At risk
Pezzoli et al., 2021	Rating	High	Low	Low	Low	Low	At risk
Poepl et al., 2011	Reaction time	High	Low	Low	Low	Low	At risk
	Reaction time	High	Low	Low	Low	Low	At risk
Rosburg et al., 2021	Other	High	High	High	Low	Low	At risk
Stephens et al., 2017	Reaction time	High	High	Low	Low	Low	At risk
	Rating	High	High	High	Low	Low	At risk
	Reaction time	High	High	Low	Low	Low	At risk
Stinson & Becker, 2008	PPG	High	High	Unclear	High	High	At risk
	Rating	High	High	Low	Low	High	At risk
Turner et al., 2018	PPG	High	High	High	High	High	At risk
	Reaction time	High	High	High	High	High	At risk
	Rating	High	High	High	High	High	At risk
Vásquez Amézquita et al., 2019	Other	High	High	High	Low	Low	At risk
	Reaction time	High	High	High	Low	Low	At risk
Welsch et al., 2021	Eye tracking	High	High	Low	Low	High	At risk
	Rating	High	High	Low	Low	High	At risk
Wormith, 1986	Rating	High	High	High	High	High	At risk
	Reaction time	High	High	High	High	High	At risk
Total "High"	Questionnaire	High	High	High	High	High	At risk
	PPG	High	High	Low	Low	High	At risk
	Rating	High	High	Low	Low	High	At risk
		56	49	25	18	28	60

# Appendix 2

**Figure A2.1**  
Forest Plot of Meta 1: PSOC's Sexual Interest in Children Versus Adults

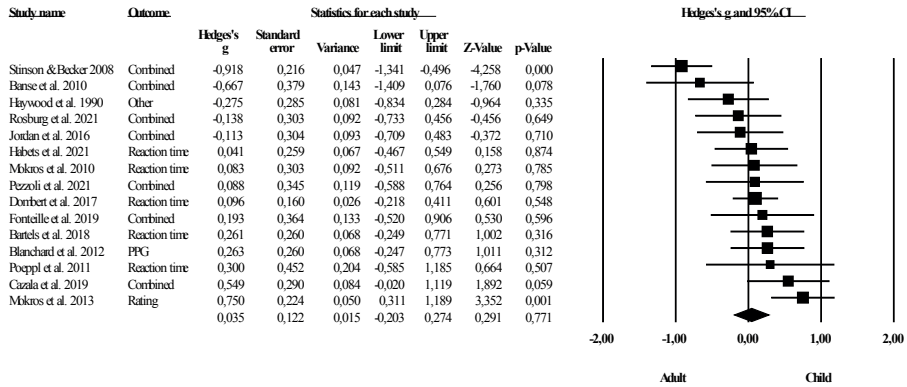


**Figure A2.2**  
Funnel Plot of Publication Bias Meta 1

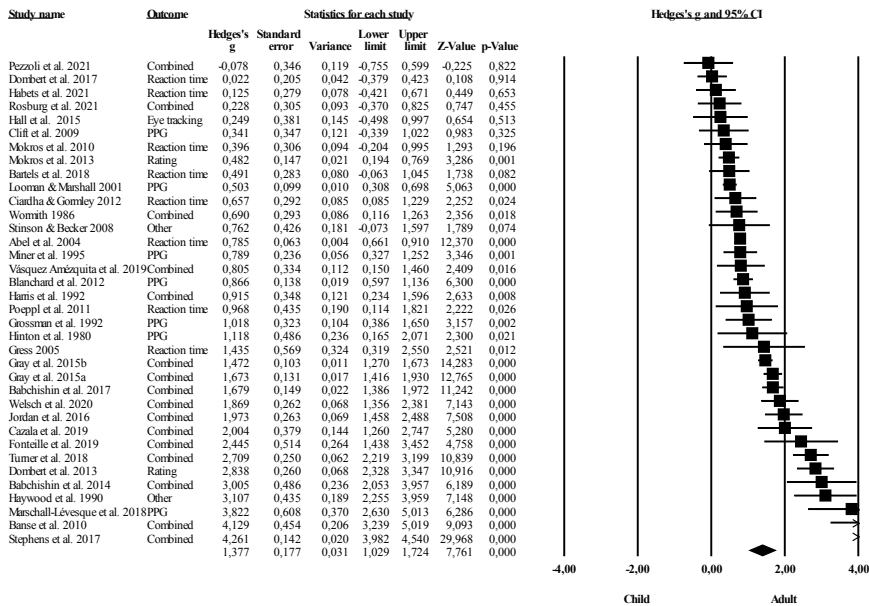


NB. Black dots = imputed publications

**Figure A2.3**  
Forest Plot Sensitivity Analyses Meta 1



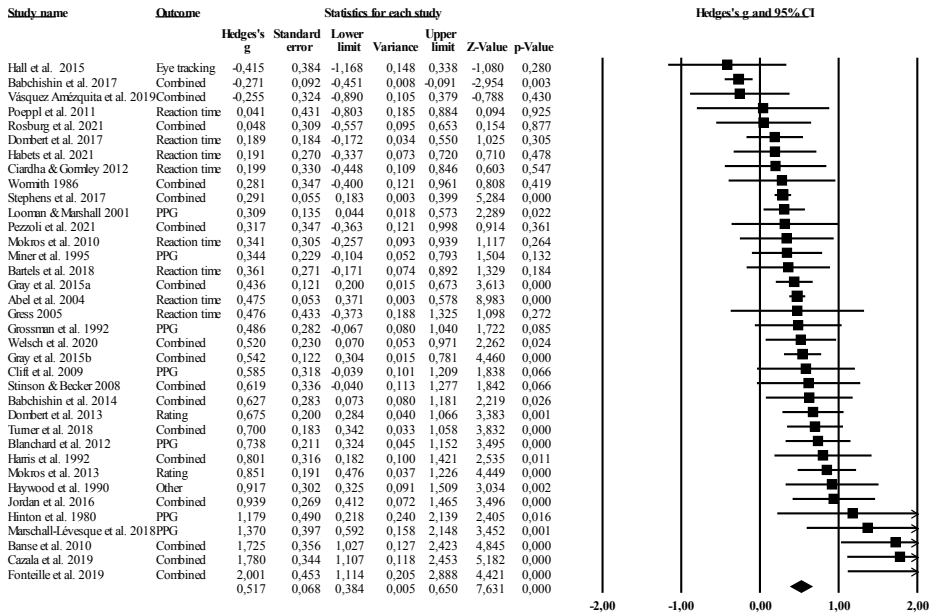
**Figure A2.4**  
Forest Plot of Meta 2: Comparison Groups' Sexual Interest in Children Versus Adults





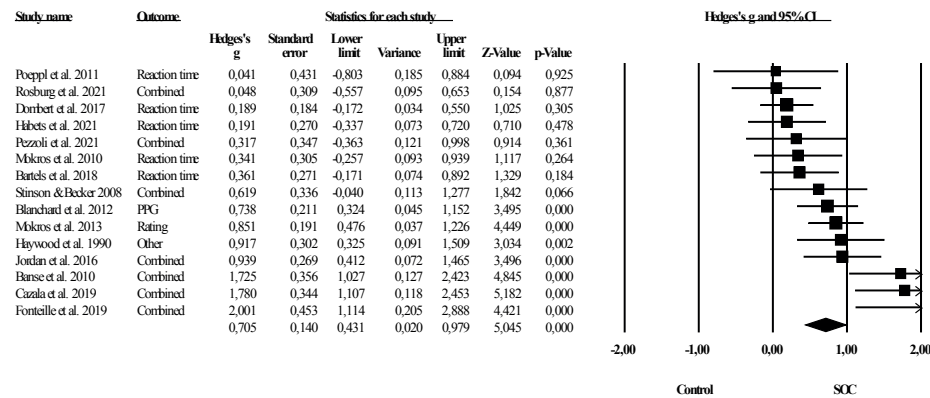
**Figure A2.5**

Forest Plot of Meta 3: PSOC Versus Comparison Groups' Sexual Interest in Children



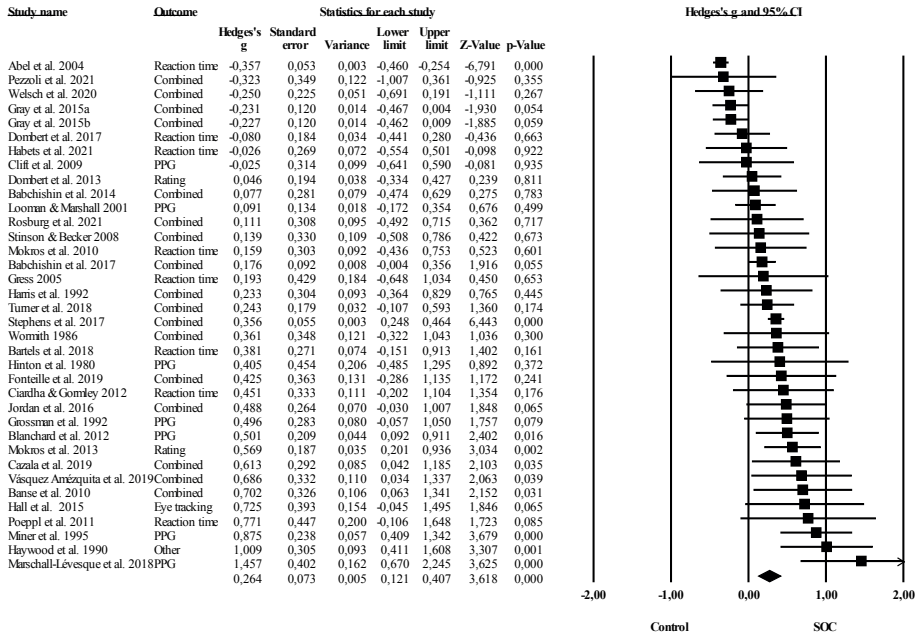
**Figure A2.6**

Forest Plot Sensitivity Analyses Meta 3



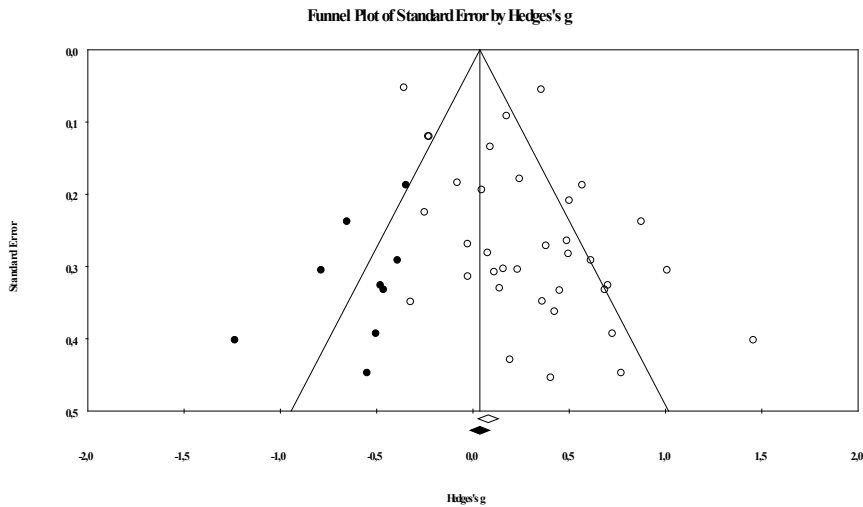
**Figure A2.7**

Forest Plot of Meta 4: PSOC Versus Comparison Groups' Sexual Interest in Adults



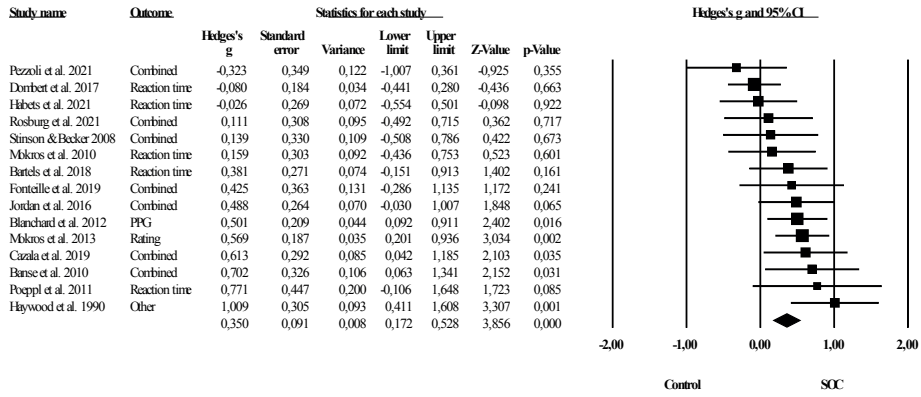
**Figure A2.8**

Funnel Plot of Publication Bias Meta 4



NB. Black dots = imputed publications

**Figure A2.9**  
Forest Plot Sensitivity Analyses Meta 4







# Chapter 8

## **Prevalence and Consideration of Sexual Deviance in Outpatient Treatment of Sexual Offending Behavior**

Schippers, E. E., de Vogel, V., Smid, W. J., & Hoogsteder, L. M. (2023).  
Prevalence and consideration of sexual deviance in outpatient treatment of sexual  
offending behavior.

## Abstract

The current study explored the prevalence and consideration of sexual deviance in outpatient treatment for sexual offending behavior. Sexual deviance was assessed in 198 adult clients with a combination of Stable-2007, DSM-5, or client self-report. Preliminary treatment effects over the first year were assessed using the Stable-2007 in a smaller subsample. Two groups of clients could be discerned with different needs: a sexual deviance group (two-thirds of the clients) with more sexual preoccupation and sexual coping, and a nonsexual deviance group (about one-third) with more impulse control disorders. Treatment content was similar for both groups, meaning treatment did not specifically target the different needs in the different groups. Preliminary positive treatment effects were found for both groups, which seemed mostly driven by improvements in sexual self-regulation. Treatment more specialized towards the needs of the subgroups and including more behavioral techniques might have more pronounced effects.

## Prevalence and Consideration of Sexual Deviance in Outpatient Treatment of Sexual Offending Behavior

In a recent meta-analysis, it was found that within 5 years after conviction, about 4% of convicted persons who have sexually offended (PSO) recidivated with a sexual offense and 26% recidivated with any offense (Helmus et al., 2021). Treatment effectively helps reducing these numbers. Meta-analytic findings indicate that roughly one third of the nontreated recidivating PSO would not be recidivating would they have had treatment (Gannon et al., 2019). In this paper, we explore to what extent sexual deviance is present in PSO in an outpatient setting, what the differences are between clients with and without sexual deviance, and if sexual deviance and general self-regulation are sufficiently addressed by therapists in accordance with a need-oriented PSO-treatment program.

### Effective Treatment Targets

It is well-established that treatment of PSO most effectively reduces any recidivism when it incorporates the risk, need, responsivity principles (Bonta & Andrews, 2017; Olver & Stockdale, 2020). This means that clients with a higher risk of recidivism should receive more intensive treatment, treatment should focus on the individually relevant dynamic risk factors related to recidivism (needs), effective techniques should be used and treatment should be provided in a responsive manner adapted to the learning style of the individual. Two clusters of risk factors, or needs, seem to be most important in sexual offending: one regarding sexual self-regulation and one regarding general self-regulation problems (Brouillette-Alarie & Proulx, 2019; Etzler et al., 2020; Olver et al., 2018; van den Berg et al., 2020). General self-regulation problems are also referred to as disinhibition, externalizing problems, antisocial orientation, or general criminality. In general, PSO with general self-regulation problems have a higher risk of relapse with violent and general (any) offenses and sexual offenses with an adult female victim (Brouillette-Alarie et al., 2018; Hanson & Morton-Bourgon, 2005).

Sexual self-regulation includes sexual deviance, or paraphilias in the DSM-5-TR, which generally refers to sexual interests that are uncommon, unusual, or illegal when acted upon, such as exhibitionism, voyeurism, or pedophilia (American Psychiatric Association, 2022; Fernandez et al., 2014). In a sample of convicted, Canadian PSO on community supervision, sexual deviance was deemed a problem in 21% of the participants (defined as a score 2 on the Stable-2007 item sexual deviance), a slight problem in 44% (score 1), and no problem in 35% (score 0) (Brankley et al., 2017). PSO with sexual self-regulation problems in general have a higher risk of sexual recidivism and sexual offenses with a child victim (Brouillette-Alarie et al., 2018;



Hanson & Morton-Bourgon, 2005). General self-regulation and sexual self-regulation problems thus are important treatment targets if they are present in the individual.

### **What Should Treatment Entail?**

Cognitive-behavioral therapy (CBT) is the recommended and to date most effective treatment modality to reduce recidivism in PSO (Gannon et al., 2019; Schmucker & Lösel, 2017). CBT tries to alter cognitions related to offense behavior and train skills to control behavioral impulses and replace them with prosocial behavior (Helmond et al., 2015; Kim et al., 2016). While recommended, treatment of PSO does not always adhere to CBT. There are indications that therapists tend to overemphasize a cognitive or rational (“talking”) approach, thereby underemphasizing the behavioral techniques (“doing”) that could be relevant for change in this population (Gannon, 2016; L.E. Marshall & Marshall, 2012). To illustrate, in a study with nonsexually violent outpatients, 31% of the therapists had not provided any behavioral exercises as prescribed in the treatment program (Hoogsteder et al., 2016). In addition, behavioral techniques to directly address sexual deviance (behavioral practice, conditioning) are found to be effective (A. Allen et al., 2020; Gannon et al., 2019; McPhail & Olver, 2020), but appear to not be standard practice (Gannon et al., 2019; McGrath et al., 2010).

### **The Current Study**

The current study included a cohort of clients in the largest outpatient forensic treatment facility in the Netherlands. Clients received treatment for sexual offending behavior with the aim to reduce the risk of future sexual and general offending behavior. The treatment concerns a CBT-based program including psychoeducation and insightful and experiential exercises. The treatment program aims to incorporate the risk, need, responsivity principles: it can be tailor-made to the individual’s risk factors that are related to sexual offending behavior. Various modules can be used or skipped, such as impulsivity, emotion regulation, stress reduction, social network, intimacy deficits, and sexual self-regulation.

The aim was to explore the prevalence of sexual deviance in outpatient PSO and characterize clients with and without sexual deviance. It could be expected that clients with sexual deviance show more sexual self-regulation problems and those without sexual deviance show more general self-regulation problems. Treatment incorporating the need-principle should then focus more on sexual self-regulation problems in the clients with sexual deviance and more on general self-regulation problems in the other clients. Additional to the main aim, preliminary treatment effects regarding general self-regulation and sexual self-regulation were assessed over the first year of treatment as part of a standard procedural assessment at the facility.

## Methods

### Sample

The current study included a cohort of clients with sexual offending behavior at an outpatient forensic treatment facility in the Netherlands. It concerned all adult (18+) clients who entered treatment between January 1, 2021, and June 30, 2022. Conform the Dutch forensic mental health system, clients had not necessarily all committed a sexual offense, but could be presumed at risk for it. Roughly half of the clients were referred to the outpatient treatment facility by a judge or parole officer (“mandatory treatment”), the other half by their general practitioner (“voluntary treatment”)<sup>1</sup>.

### Instruments

#### **Static-99R, Stable-2007**

The Static-99R (Phenix et al., 2016) and Stable-2007 (Fernandez et al., 2014) were used to estimate the risk of future offenses. The Static-99R consists of 10 static items, the Stable-2007 consists of 13 dynamic items that apply to people with sexual offending behavior. Stable items need to be scored by a trained professional with a 0 (*not problematic*), 1 (*possibly problematic*), or 2 (*certainly problematic*). A combined Static-Stable risk category indicates a low, low-moderate, moderate-high, high or very high risk of recidivism. The Stable-2007 subdomains represent the sum of the underlying items: (a) significant social influences; (b) intimacy deficits (consisting of the items capacity for relationship stability, emotional identification with children, hostility towards women, general social rejection/loneliness, lack of concern for others); (c) general self-regulation (impulsive acts, poor cognitive problem solving, negative emotionality/hostility); (d) sexual self-regulation (sex drive/ preoccupation, sex as coping, deviant sexual interests), and (e) cooperation with supervision. Psychometric research indicates good predictive validity for both the Static-99R and Stable-2007 (Helmus et al., 2021) and excellent interrater reliability for the English versions (Fernandez & Helmus, 2017).

#### **Forensic Outpatient Risk Assessment, FORE (Version 2)**

The FORE-V2 (van Horn et al., 2016, 2020) is a mandatory instrument to estimate the risk of future offenses in people who receive outpatient forensic treatment in the Netherlands. The FORE-V2 includes six static risk factors and 11 dynamic risk factors that must be rated by a trained professional on a 5-point scale ranging from 0 (*not problematic*), to 4 (*very problematic*). An actuarial sum score is calculated by adding up all item scores, concluding in an overall judgment of a *very low* (scores 0-14), *low* (15-20), *moderate* (21-32), *high* (33-37), or *very high* (38-68) risk of recidivism. The interrater reliability of FORE-V1 (version 1) was moderate to excellent for most

items, convergent validity with several other relevant instruments was good, the FORE-V1 was sensitive to change over time, and had good predictive validity (M.J. Eisenberg et al., 2020). In the current study, the internal consistency of the FORE-V2 was acceptable (Cronbach's  $\alpha = .72$ ,  $n = 114$ ).

### ***Client Self-Reported Sexual Deviance***

Clients rated the item "I have a sexual interest in activities, people or objects that are unusual or illegal" on a 10-point scale, ranging from 1 (*not at all*) to 10 (*very much*). This is an intuitive rating system for clients because it is equal to the Dutch school grading system.

### ***Treatment Elements***

Therapists and clients scored a form at seven months to evaluate which treatment elements were offered during the prior treatment period. The following treatment elements were reported in this manuscript: "general self-regulation", "sexual self-regulation", "use of behavioral exercises", and "motivation for treatment". The forms are available upon request to the corresponding author.

### **Procedure**

Clients were included in the PSO-treatment program if they had shown sexual offense behavior in the past and/or were at risk for future sexual or general (re)offending. The latter was reflected by at least a low-moderate recidivism risk score on the Static-99R + Stable-2007 combination or on the standardly used Dutch risk assessment tool FORE-V2. Clients with an IQ lower than 80 or clients whose sexual offense behavior *solely* concerned child sexual exploitation material received a different treatment program and were excluded from the study. A standard start assessment was completed at admittance, consisting of: Static-99R, Stable-2007, FORE-V2, and client self-reported sexual deviance (see Instruments). The Stable-2007 was repeated after one year of treatment.

The inclusion criteria for the study followed those of the treatment program. Only clients who signed the informed consent form for participation in scientific research were included in this study. According to the Dutch Medical Research Involving Human Subjects Act, retrospective research with case file information does not require approval from an Institutional Review Board, which was confirmed for this particular study by the Institutional Review Board of the Amsterdam University Medical Centers (location VUmc, Amsterdam, the Netherlands) (ref.: 2019.315).

## PSO-Treatment Program

The outpatient PSO-treatment program (Hoogsteder & Schippers, 2019) uses a modular approach that can be tailor-made based on individually relevant risk factors for sexual offending behavior. The intervention uses a cognitive-behavioral approach and includes behavioral exercises, elements of the Good Lives Model (Willis et al., 2013), system-oriented working, and a focus on motivation for behavioral change. It aims to adhere to the risk, need, responsivity principles (Bonta & Andrews, 2017), meaning that the frequency and intensity of treatment are tailored to the client's risk of recidivism. Relevant risk factors from the start assessment determine which modules may be used. The program consists of the following modules: (1) Start Module, focusing on acute safety measures and motivation for treatment; (2) Core Module, focusing on (a) basic needs and positive life plan; (b) social network and intimate relationships; (c) general self-regulation, including impulse control, emotion regulation, problem solving; (d) cognitive distortions; (e) sexual self-regulation; (3) Stress Reduction Module; and (4) Self-Esteem Module. A pilot evaluation of the treatment program was recently conducted with 23 clients and 9 therapists, concluding that program integrity overall was sufficient (Hoogsteder & Schippers, 2019). Two points that needed improvement were "working with behavioral techniques" and "attention for general self-regulation and intimacy". On average, clients were satisfied with the treatment program and rewarded it with an 8.5 out of 10 points.

## Statistical Analyses

Clients were classified in the sexual deviance group if any of the following conditions was met at admittance: (a) a score of 1 or 2 on the Stable-2007 item sexual deviance; or (b) DSM-5 classification of paraphilic disorder<sup>2</sup> by the therapist; or (c) client self-reported sexual deviance score of 6 or higher. Clients without sexual deviance were classified in the nonsexual deviance group (i.e., score 0 on Stable-item sexual deviance, no DSM-5 classification of paraphilic disorder, and self-reported sexual deviance score below 6). Repeated measures analyses of variance (RM ANOVAs) assessed change over time and change between the groups on the Stable-2007 and its theoretical subdomains. Being a first exploration, treatment effects were assessed at a liberal  $\alpha = .02$  (Bonferroni correction for 5 Stable-2007 subdomains  $\alpha = .1/5 = .02$ ). Effect sizes were interpreted as follows: partial  $\eta^2 = .01$  small,  $\eta^2 = .06$  medium, and  $\eta^2 = .14$  a large effect (J. Cohen, 1988). *ORs* further away from 1 mean larger effects; a possible rule of thumb is *OR* = 1.68 small, *OR* = 3.47 medium, and *OR* = 6.71 large effects (H. Chen et al., 2010).

## Results

### Sample

An initial 333 clients were admitted to the treatment program between January 1, 2021 and June 30, 2022. Of these clients, 200 (60%) signed an informed consent for the use of their personal data for scientific purposes (15% registered no consent, 25% was unknown). Two clients were wrongly registered to the treatment program, because they were not at risk for sexual offending behavior but for other delinquent behaviors, resulting in a total sample of 198 clients. Treatment effects were reported for a smaller number of clients, since 14 clients had dropped out of treatment early, also, not every client had available repeated measurements. The number of measurements is reported where relevant.

### Prevalence of Sexual Deviance

Of the total sample ( $N = 198$ ), 127 clients (64.1%) were assigned to the sexual deviance group having either a score of 1 or 2 on the Stable-2007 item sexual deviance, a DSM-5 classification of paraphilic disorder, or a self-reported sexual deviance score of 6 or higher (see Table 1). The other 71 clients (35.9%) were assigned to the nonsexual deviance group.

Notably, 47 clients did not report any deviant sexual interest that was reported by the therapist. This did not differ between mandatory and voluntary clients ( $OR = 1.30$ ,  $95\%CI = 0.46; 3.65$ ). Vice versa, 4 therapists did not report any sexual deviance on the Stable-2007 nor classified a paraphilic disorder according to DSM-5, while clients did report sexual deviance.

Many clients were classified with unspecified paraphilic disorder. Upon closer inspection, most of them had committed child sexual exploitation material-related transgressions, but did not meet the criteria for a specific paraphilic disorder. Clients with unspecified paraphilic disorder more often received voluntary treatment than mandatory ( $OR = 2.78$ ,  $95\%CI = 1.25; 6.15$ ).

**Table 1***Break-Down of Sexual Deviance Group (n = 127)*

	<i>n</i>	% of Total Available Measures
Stable-2007 Item Deviant Sexual Interests	97	
Score 0	20	20.6%
Score 1	53	54.6%
Score 2	24	24.7%
DSM-5 Paraphilic Disorder	127	
No Paraphilic Disorder	29	22.8%
Pedophilic Disorder	32	25.2%
Exhibitionistic Disorder	8	6.3%
Unspecified Paraphilic Disorder	58	45.7%
Client-Reported Deviant Sexual Interests	72	
Score 1 (Absent)	28	38.9%
Score $\geq 6$	25	34.7%

### Characterization of Groups

The sexual deviance group and nonsexual deviance group did not differ in age, educational level or migration background ( $p$ 's  $> .206$ , small effects). Table 2 reports clinical and offense-related characteristics of both groups. Table 3 reports the treatment elements for the smaller subset of cases that had filled out the forms. The sexual deviance group showed more sexual self-regulation problems (sexual preoccupation, sex as coping) and more often had (potential) child victims. The nonsexual deviance group more often had a DSM-5 classification of disruptive, impulse-control and conduct disorders; adult victims; mandatory treatment (via judicial ruling); and a lower risk estimation on the Static + Stable.

**Table 2***Clinical and Offense-Related Characteristics at Start Treatment*

Characteristics	Sexual Deviance ( <i>n</i> = 127)		Nonsexual Deviance ( <i>n</i> = 71)		OR	95%CI OR
	<i>n</i>	%	<i>n</i>	%		
DSM-5						
ADHD	10	7.9%	11	15.5%	0.47	0.19; 1.16
PTSD	3	2.4%	2	2.8%	0.83	0.14; 5.12
Mood Disorder	16	12.6%	6	8.5%	1.56	0.58; 4.19
Autism Spectrum Disorder	15	11.8%	4	5.6%	2.24	0.71; 7.04
Disrupt, Impulse, Conduct	30	23.6%	49	69.0%	<b>0.14</b>	<b>0.07; 0.27</b>
Substance Abuse Disorder	24	18.9%	16	22.5%	0.80	0.39; 1.63
Antisocial Behavior (V71.01)	16	12.6%	16	22.5%	0.50	0.23; 1.06
Stable-2007, Score ≥1						
Sex Drive/Preoccupation	40	41.2%	7	14.6%	<b>4.11</b>	<b>1.67; 10.09</b>
Sex as Coping	49	50.5%	11	22.9%	<b>3.43</b>	<b>1.57; 7.51</b>
Impulsive Acts	45	46.4%	24	50.0%	0.87	0.43; 1.73
(Potential) Victim Age						
Child <12	28	22.0%	6	8.5%	<b>3.06</b>	<b>1.20; 7.81</b>
Adolescent 12-16	42	33.1%	24	33.8%	0.97	0.52; 1.79
Adult 16>	19	15.0%	27	38.0%	<b>0.29</b>	<b>0.14; 0.57</b>
Both Child and Adolescent	10	7.9%	5	7.0%	1.13	0.37; 3.44
All Ages	16	12.6%	5	7.0%	1.90	0.67; 5.43
Unknown	12	9.4%	4	5.6%	1.75	0.54; 5.64
Judicial Framework						
Mandatory	41	32.3%	38	53.5%	<b>0.41</b>	<b>0.23; 0.75</b>
Voluntary	86	67.7%	33	46.5%	<b>2.42</b>	<b>1.33; 4.39</b>
Static+Stable Risk						
Low	45	54.2%	34	75.6%	<b>0.38</b>	<b>0.17; 0.86</b>
Low-Moderate	24	28.9%	7	15.6%	2.21	0.87; 5.63
Moderate-High	8	9.6%	3	6.7%	1.49	0.38; 5.93
High	2	2.4%	1	2.2%	1.09	0.10; 12.32
Very High	4	4.8%	0	0.0%	4.56	0.24; 88.17
FORE-V2 Risk						
Very Low	57	78.1%	34	72.3%	1.36	0.58; 3.17
Low	11	15.1%	8	17.0%	0.86	0.32; 2.34
Moderate	4	5.5%	4	8.5%	0.62	0.15; 2.62
High	1	1.4%	1	2.1%	0.64	0.04; 10.47
Very High	0	0.0%	0	0.0%	NA	

NB. **Bolded** effect sizes indicate significant difference between groups, where OR > 1 means that sexual deviance group scored higher than nonsexual deviance group. ADHD = Attention Deficit Hyperactivity Disorder; PTSD = Post-Traumatic Stress Disorder; Disrupt, Impulse, Conduct = Disruptive, Impulse-Control and Conduct Disorders

**Table 3***Treatment Elements as Reported by Therapist and Client*

Topic	Sexual Deviance		Nonsexual Deviance		OR	95%CI OR
	n	%	n	%		
Sexual Self-Regulation						
Therapist	37	94.9%	18	85.7%	3.08	0.47; 20.12
Client	21	87.5%	7	100.0%	0.50	0.02; 11.25
General Self-Regulation *						
Client	17	70.8%	5	71.4%	0.97	0.15; 6.25
Frequent Behavioral Exercises						
Therapist	14	35.9%	8	38.1%	0.91	0.30; 2.73
Client	13	54.2%	4	57.1%	0.89	0.16; 4.85
Client Motivation for Treatment						
Therapist	35	89.7%	20	95.2%	0.44	0.05; 4.19
Client	22	91.7%	7	100.0%	0.79	0.03; 19.54

NB. **Bolded** effect sizes indicate significant difference between groups, where  $OR > 1$  means that sexual deviance group scored higher than nonsexual deviance group.

\* Only client-report data were available.

### Exploratory Treatment Effects

Repeated Stable-2007 measures at 1 year were available for 46 clients (see Table 4). When controlling for initial risk level (Static + Stable combination), the Stable-2007 total score was significantly reduced over time,  $F(1,43) = 9.77, p = .003$ , partial  $\eta^2 = 0.19$ ,  $\beta = .86$ , a large effect. A statistically significant improvement over time was reported on the domain sexual self-regulation,  $F(1,43) = 7.34, p = .010$ ,  $\eta^2 = .15$ ,  $\beta = .75$ , a large effect. There were no improvements on significant social influences,  $F(1,43) = 0.56, p = .458$ ,  $\eta^2 = .01$ ,  $\beta = .11$ , a small effect; intimacy deficits,  $F(1,43) = 2.86, p = .098$ ,  $\eta^2 = .06$ ,  $\beta = .38$ , a medium effect; general self-regulation,  $F(1,43) = 4.69, p = .036$ ,  $\eta^2 = .10$ ,  $\beta = .56$ , a medium effect; nor cooperation with supervision,  $F(1,43) = 1.84, p = .184$ ,  $\eta^2 = .04$ ,  $\beta = .26$ , a small effect. There was no difference between the groups in change over time on the Stable-2007 total score,  $F(1,43) = 0.09, p = .767$ ,  $\eta^2 = 0.01$ ,  $\beta = .06$ , a small effect; nor on any subdomain ( $p$ 's  $> .102$ ,  $\eta^2 < .05$ , all small effects).



**Table 4***Estimated Marginal Means Stable-2007*

	Sexual Deviance					Nonsexual Deviance				
	Start			1 Year		Start			1 Year	
	<i>n</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>n</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
Stable-2007 Total Score	33	6.72	0.46	4.70	0.39	13	5.86	0.74	3.54	0.62
Significant Social Influences	33	0.32	0.09	0.23	0.07	13	0.50	0.14	0.18	0.12
Intimacy Deficits	33	2.38	0.24	1.75	0.16	13	2.34	0.38	1.40	0.25
General Self-Regulation	33	1.33	0.18	0.99	0.14	13	2.17	0.29	1.25	0.22
Sexual Self-Regulation	33	2.64	0.22	1.70	0.26	13	0.69	0.35	0.62	0.41
Cooperation With Supervision	33	0.06	0.06	0.03	0.04	13	0.15	0.10	0.09	0.06

NB. Means adjusted for initial risk level on Static + Stable

## Discussion

Conform expectations, two-thirds of the sample showed any sexual deviance, as measured by self-report (score 6/10 or higher) or therapist-report (DSM-5 diagnosis of paraphilic disorder or score 1 or 2 on the Stable-2007 item deviant sexual interests). The other one-third of the cohort did not show any signs of sexual deviance according to our measurements. This prevalence is in line with earlier findings (Brankley et al., 2017). Clients and therapists did not always agree: therapists reported sexual deviance more often than clients did. This might be due to several reasons, such as client's inability for introspection, client's social desirability, or other, practical issues (e.g., DSM-5 diagnosis is required for insurance).

The nonsexual deviance group more often had a DSM-5 classification of disruptive, impulse control and conduct disorders. The sexual deviance group was characterized by more sexual preoccupation (in ~40% of the cases) and sexualized coping (~50%) than the nonsexual deviance group (15% and 23% respectively). This is in accordance with previous findings where sexual preoccupation and sexualized coping related more to sexual deviance than to impulsivity (Olver et al., 2018). Yet, some authors have found sexual preoccupation and sexualized coping to form a (sub)cluster of risk factors on their own (Etzler et al., 2020; van den Berg et al., 2020).

### Lower Risk?

The nonsexual deviance group more often scored low risk on the Static + Stable combination than the sexual deviance group, but not on FORE-V2. In a recent, large, field validation study (Helmus et al., 2021), the Static + Stable combination overestimated risk for sexual recidivism. Sexual recidivism is related to sexual self-regulation items, which were more present in the sexual deviance group. The Static + Stable combination thus might have overestimated the risk level for the sexual

deviance group. Furthermore, the nonsexual deviance group received more DSM-5 classifications of impulse control problems than the sexual deviance group, but no higher impulsivity-scores on the Stable-2007. The Stable-2007 item concerns “impulsive behaviour across a number of settings (...). It is not simply represented by the individual's history of sexual offending, but is generally a ‘character trait’” (Fernandez et al., 2014, p.65). In practice, the offense history might often be taken into account for the DSM-5 diagnosis but not the Stable-item. This might be a reason for the lower risk scores on the Stable-2007 in the nonsexual deviance group. Despite their lower Stable-2007 risk, the nonsexual deviance group more often received mandatory treatment (rather than voluntary) than the sexual deviance group. People with impulse control problems may be less likely to seek treatment voluntarily, as general self-regulation problems mostly predict treatment attrition (Olver et al., 2011). Self-identified paraphilias may urge clients to seek voluntary treatment more readily.

### **Preliminary Treatment Effects**

The first year of treatment seemed to have equally positive effects for both groups. The improvements on the Stable-2007 were mainly based on improved sexual self-regulation scores. Intimacy deficits and general self-regulation showed a trend towards positive change as well, with medium effects sizes but low power to detect effects. The focus of treatment was more on sexual self-regulation, given that general self-regulation was a less common treatment topic. Furthermore, behavioral exercises were only being offered in a minority of the cases. It is recommended to better implement the use of behavioral exercises, as they have been found to effectively reduce sexual deviance (A. Allen et al., 2020; Gannon et al., 2019; McPhail & Olver, 2020) and may generally be relevant for change in this population (Gannon, 2016; L. E. Marshall & Marshall, 2012).

The two groups had different dynamic criminogenic needs and in a need-oriented approach should thus receive somewhat different treatment. Need-oriented treatment for the sexual deviance group should focus more on sexual self-regulation, e.g., addressing content (deviance), frequency (preoccupation) or function (coping) of sexuality. Treatment for the nonsexual deviance group should focus more on general self-regulation, addressing impulsivity and behavioral control, and on motivation for treatment. In the current sample, there were no indications that treatment was adjusted to the specific needs of the subgroups. Treatment outcomes may be more pronounced with more attention to relevant dynamic criminogenic needs. The pilot evaluation of the treatment program concluded that more efforts were needed regarding “working with behavioral techniques” and “attention for general self-regulation and intimacy” (Verheij et al., 2022). This remains a point of attention.

### **Strength, Limitations and Recommendations**

This study aimed to include a cohort of all outpatient clients receiving treatment for sexual offense behavior. Unfortunately, many of these clients did not provide informed consent or had missing data points for repeated measures. The sample is, thus, likely not representative of the larger population of outpatient, adult PSO in the Netherlands. It is recommended to motivate both therapists and clients to increase the number of repeated measurements. It is unclear why a quarter of informed consent forms was not filled out (consent unknown). With mistrusting clients, therapists might discard conversations about the use of client treatment data and prioritize building therapeutic alliance. The missing number of data could thus be biased towards unmotivated, noncomplying clients, meaning that true treatment effects in the entire population might be smaller. It is a strength that this study used multiple information sources, i.e., researcher, therapist and client, as it appears they each bring additional information. The used definition of sexual deviance (based on Stable-2007, DSM-5 and self-report) seems to be meticulous and complete. A final strength is that the treatment contents were thoroughly described.

### **Conclusions**

Based on the presence or absence of sexual deviance, different subgroups could be identified in a cohort of adult clients who entered treatment for sexual offending behavior in an outpatient center for forensic treatment in the Netherlands. The sexual deviance group, about two-thirds of the cohort, showed more problems with sexual self-regulation as reflected by higher sexual preoccupation and more sexual coping. The nonsexual deviance group, about one-third of the cohort, showed more general self-regulation problems such as impulse control problems. Treatment did not emphasize sexual self-regulation in the sexual deviance group, nor general self-regulation in the nonsexual deviance group. Rather, sexual self-regulation was a treatment topic for most clients and general self-regulation was a less common topic. Behavioral exercises, an important part of CBT, were not common treatment topics. Treatment changes in the first year of treatment were mostly apparent on sexual self-regulation and did not differ between the groups. While preliminary treatment effects were positive, treatment more specialized towards the needs of the subgroups might have more pronounced effects.

## Endnotes

<sup>1</sup> While this is referred to as “voluntary treatment” because it is not imposed by a judge, in practice this is not completely voluntary as these clients often experience pressure from their social network to enter treatment.

<sup>2</sup> The facility’s electronic case file system only allowed classifications of “paraphilic disorder”, not the option for “paraphilia” that DSM-5 does provide.



# Chapter 9

## **General Discussion**

## General discussion

### Main findings and Key Statements

*An interplay of changeable factors seems to contribute to the development of deviant sexual interests, among which excitation transfer and normative deficiency.*

Sexual deviance can be problematic if it negatively affects quality of life, and if it is a risk factor for sexual (re)offenses. Little is known about the development of sexual deviance. This thesis centered around the question: how do deviant sexual interests develop?

Chapter 2 provided a systematic review of 49 theories on the etiology of sexual deviance, from which common etiological themes were extracted using thematic analysis. It was theorized that an interplay of dynamic, changeable factors contributes to the development of deviant sexual interests. These include excitation transfer, a lack of sexual response to normative stimuli (“normative deficiency”), conditioning, and social learning. This can be integrated into an Incentive Motivational Model, which is a common approach in general sexology (Ågmo & Laan, 2022; Both et al., 2007; Toates, 2014). This model looks at sexual motivation as an emotional response to a sexually relevant stimulus. These stimuli are salient because they signal potential reward in the form of sexual arousal and gratification. Processing emotional stimuli causes activation of the emotion systems in the brain and prepares for behavioral action (LeDoux, 2012). Behavioral action may, for instance, consist of approaching the stimulus, ultimately resulting in sexual interaction, or entertaining a sexual fantasy, resulting in masturbation. Sexual arousal, and especially sexual gratification, are strong reinforcers, causing one to return to the sexual stimulus and strengthen its connection with sexual arousal even further (operant conditioning). As suggested in Chapter 2, social learning may play a role when, for instance, peers approve certain behaviors or sexual partners introduce new sexual stimuli. Suggested neurobiological predispositions lie in the sensitivity for reward, the processing of visual cues, or the strength of the sexual reaction.

Smid and Wever (2019) explicitly apply the Incentive Motivational Model to sexual deviance using the mechanisms of excitation transfer and normative deficiency. Excitation transfer refers to the transfer of arousal between various emotions. Sexual arousal is tightly coupled with general sympathetic arousal, which allows overflow between emotional arousal and sexual motivation (Ågmo & Laan, 2022). Some stimuli have strong emotional reactions, such as pain, humiliation, anger, or disgust. Through excitation transfer, the emotional reactions of such stimuli might overflow in sexual arousal, making the stimulus potent enough to induce sexual

arousal or even sexual gratification. Repeated coupling of that stimulus and sexual arousal may eventually result in a stable sexual interest. The normative deficiency hypothesis suggests that excitation transfer might especially hold for people who have no strong sexual response to normative sexual stimuli. After all, an emotional stimulus to enhance sexual arousal would be redundant if the sexual motivation would already be strong enough.

While excitation transfer has often been researched between various emotions, most research focusing on sexual arousal stems from the last century. Chapter 3 describes an experimental study in which we tried to create excitation transfer from emotions to sexual arousal in 30 healthy men in a laboratory setting. Emotional arousal, compared to a neutral state, caused increased sexual arousal in response to a sexual stimulus in half of the sample. Conform the definitions of sexual deviance and paraphilia in the Stable-2007 (Fernandez et al., 2014) and DSM-5-TR (American Psychiatric Association, 2022), we induced sexual arousal by means of a nonnormative, unusual stimulus (nonerotic emotional film). Stronger excitation transfer effects were related to decreased penile reactivity to normative stimuli (erotic film), supporting the normative deficiency hypothesis. Based on this pilot study, Chapter 4 proposed a follow-up study with a more sexually diverse sample with improved methodology, which we intend to implement in the near future.

If emotions can influence sexual arousal, might different emotions then be related to different deviant sexual interests? Deviant sexual interests in general often co-occur. It is unclear if certain interests more frequently co-occur with specific others, forming clusters of deviant sexual interests, potentially fueled by different emotions. This principle was explored in Chapter 5 in an online survey with a sexually diverse sample. It was found that meaningful clusters of deviant sexual interests could be discerned. Interests in submissive and dominant sexual activities more often co-occurred together, as did interests in mysophilic (filthy or soiled things) and illegal sexual activities. Chapter 6 aimed to see if the results from Chapter 5 could be replicated in a sample representative to the Dutch adult male population. In this representative sample, largely the same pattern could be discerned where submission and dominance were more closely related, as well as mysophilic and illegal sexual activities. In this sample, the intensity of the sexual acts was more important than in the original study. Submission/masochism and dominance/sadism were conjoined and a “light BDSM” and more “heavy BDSM” cluster were discerned. The same distinction was apparent for two clusters of both illegal and mysophilic sexual acts, discerning a less extreme (e.g., exhibitionism, fetishistic) and more extreme cluster (e.g., force, feces).



In the lab study into excitation transfer (Chapter 3), aggression/dominance was the emotion that affected sexual arousal the strongest and most often. Similarly, in the cluster studies (Chapters 5 and 6), the cluster regarding dominant and sadistic sexual activities was the most prevalent cluster of deviant sexual interests among men. In the lab study, disgust was the emotion that affected sexual arousal the least often, and the cluster regarding mysophilic sexual activities was the least prevalent cluster of deviant sexual interests. It is hypothesized that deviant sexual interests might cluster because they have a shared function, for instance, related to excitation transfer with certain emotions. Future studies could explore why not every emotion has the same effect. A possible starting point may lie in individual differences in autonomic reactivity. Emotions have different bodily signatures: some raise sympathetic arousal and some lower it (Kreibig, 2010). People may need different levels of stimulation to reach a sufficient level of sexual arousal.

The normative deficiency hypothesis was explored in Chapter 7 regarding pedophilic interests. Using meta-analyses and systematic review, samples of people who had sexually offended against children with and without pedophilia were compared to control groups. It was concluded that pedophilia was not only related to increased sexual interest in children, but to decreased sexual interest in adults as well. Although the correlational findings provided no direction for cause and effect, they support the normative deficiency hypothesis that people with decreased normative sexual interests (in adults) might be more susceptible to deviant sexual interests (in children).

The first seven chapters of this thesis focused on fundamental research, providing proof for the involvement of emotions and possibly normative sexual interests in the development of sexual deviance. Chapter 8 of this thesis explored how sexual deviance is currently considered in outpatient treatment to reduce the risk of recidivism in people who have sexually offended. It was concluded that any sexual deviance was present in about two-thirds of the clients. This means that one-third of the clients had no signs of sexual deviance as measured with the Stable-2007, DSM-5, or self-report. Clients without sexual deviance more often had impulse control problems. A tentative analysis of the first year of treatment indicated that there was no different treatment approach between these two groups, nor any difference in treatment effects. It was hypothesized that treatment might profit from a more responsive approach, where the difference is acknowledged and incorporated between clients with primarily sexual deviance and those with primarily impulse control problems.

From the findings in this thesis, three concluding key statements were derived:

1. Deviant sexual interests seem malleable, to some extent;
2. Emotions can increase sexual arousal to deviant stimuli;
3. A normative deficiency seems related to deviant sexual interests.

These statements will be addressed in the following, incorporating clinical implications and suggestions for future research.

### **Key Statement 1: Deviant Sexual Interests Seem Malleable, to Some Extent**

*Changeable factors contribute to deviant sexual interests. Despite a limited research base, there is evidence indicating that deviant sexual interests are malleable, to some extent.*

This thesis showed that most scholars subscribe dynamic, changeable factors to the development of sexual deviance, namely excitation transfer, normative deficiency, conditioning, and social learning (Chapter 2). If changeable factors contribute to the development of deviant sexual interests, it does not necessarily mean that deviant sexual interests are changeable. Changeable factors can put into motion unchangeable processes. While relatively many research findings show that sexual offense behavior can change (e.g., Gannon et al., 2019; Schmucker & Lösel, 2017), virtually no research explores whether deviant sexual behaviors and interests can change. Not all people who sexually offend have deviant sexual interests, and not all people with deviant sexual interest will show corresponding behaviors, let alone sexual offenses. The overreliance on sexual offending studies has the additional consequence that there is little research on women, as most sexual offenses are committed by men (Cortoni et al., 2017). Furthermore, there is a lack of studies into other deviant sexual interests than pedophilia. Despite these limitations in the literature, there are some indications that deviant sexual behaviors, as well as interests, are changeable to some extent.

Olver and Stockdale (2020) reviewed literature about treatment change in men who have sexually offended. They concluded that sexual deviance was significantly reduced during various comprehensive cognitive behavioral treatment programs. Sexual deviance was measured by self-reported deviant sexual interest scores or deviant sexual behavior items on risk assessment instruments. One meta-analysis more specifically showed that sex offending treatment programs had larger reductions in sexual recidivism when they incorporated some form of arousal

reconditioning (Gannon et al., 2019). Likewise, a meta-analysis showed that conditioning techniques effectively decreased pedophilic and hebephilic sexual arousal (McPhail & Olver, 2020). Broadly speaking, conditioning techniques aim to either pair an aversive stimulus with deviant sexual arousal, or pair reward with normative sexual arousal (Ware et al., 2021). McPhail and Olver (2020) looked at effects of specific conditioning interventions. They found that olfactory aversion, sensitization, and satiation (see Table 1 for descriptions) reduced pedophilic arousal, but this was based on a few studies and small samples.

There is discussion regarding the changeability of pedophilic interests, with authors stating that they cannot change (e.g., Seto, 2016) and authors stating that they can (e.g., Fedoroff, 2018). A distinction must be made between the object of sexual interest and the strength of an interest. While the object of interest is less likely to change, the strength of an interest may be more easily managed (Fedoroff, 2018; Seto, 2016). It may not be feasible to remove children as a competent sexual stimulus for most people with pedophilia. Treatment of pedophilia should not be viewed as a “cure”, but rather as an attempt to weaken sexual interest in children and strengthen sexual interest in adults to a sufficiently satisfactory level.

Just as deviant sexual interests seem malleable, it seems possible to increase the strength of normative sexual interests. While not a frequent focus of research, there are indications that sexual interest in adults can increase in people with pedophilia. Müller et al. (2014) described a sample of people with pedophilia, the majority of whom had committed a sexual offense against a child, who were treated at the Sexual Behaviours Clinic of the University of Ottawa, Canada. About half of the sample showed increased sexual interest in adults from their first to their second physiological assessment with penile plethysmography. Anecdotally, Fedoroff (2018, p.211) states that “[i]n interview, most [Sexual Behaviours Clinic] patients report a change in their sexual interests from children to adults. They report they are now able to reach orgasm by thinking of adults only.” The meta-analysis of McPhail and Olver (2020) showed that small increases in sexual interest in adults were caused by interventions aimed at decreasing pedophilic interests, namely a combination of aversion and extinction-based interventions (see Table 1).

In sum, despite a limited research base, there is evidence that deviant sexual interests are malleable, to some extent. Emotion is one of the mechanisms to affect deviant sexual interests, as discussed in the following paragraph.

**Table 1***Descriptions of Conditioning Techniques Described in This Thesis*

<b>Technique</b>	<b>Description</b>
(Olfactory) Aversion	The pairing of a deviant sexual stimulus or behavior with an aversive stimulus (such as a foul odor).
Sensitization	The client rehearses the chain of events leading to the unwanted sexual behavior, but disrupts thoughts/arousal by imagining negative consequences or a successful escape from the situation (see vignette “Behavioral technique: Closed sensitization” in Chapter 1).
Satiation	The client first masturbates to orgasm using an appropriate fantasy. This both pairs sexual arousal with normative fantasy and induces an subsequent refractory period during which orgasm is more difficult to achieve. The client then repeatedly masturbates to or verbalizes deviant sexual fantasies until their arousing properties are extinct through loss of valence or boredom.
Extinction	The reward that was previously paired with a deviant sexual stimulus is extinguished, for instance, by means of abstinence or satiation.

## **Key Statement 2: Emotions can Increase Sexual Arousal to Deviant Stimuli**

*Emotions can increase or decrease sexual arousal. Sexual behavior might improve negative mood states. Being able to regulate emotions thus seems a useful tool to regulate sexuality.*

Our lab study to excitation transfer (Chapter 3) concluded that emotions can increase sexual arousal to deviant stimuli. The most important follow-up question is under what conditions the deviant sexual arousal will sustainably last, thus forming a stable interest. Also, it is still unclear for whom the mechanism of excitation transfer works best, as excitation transfer was only visible in half of the participants. With that in mind, this paragraph tries to translate research into some global starting points for treatment regarding emotion regulation and sexual functioning.

The ability to regulate emotions includes several aspects from early attention to stimuli, the experience of emotion, the cognitive interpretation of emotion, to the control of a response (V. J. Fischer et al., 2022; Gross, 2015; McRae & Gross, 2020). Regarding early attention, strategies can, for instance, be employed to divert attention away from an unwanted sexual stimulus. Brogan et al. (2020) provided an example with adolescents with intellectual disabilities who had committed sexual offenses. Attention diversion by means of counting backwards from 100 to 0 helped decrease their self-reported sexual arousal to a video of a celebrity they found attractive.

Most research concerns later stages of emotion regulation, i.e., the experience and interpretation of emotions. A scoping review concluded that in various experimental paradigms, the use of emotion regulation strategies lead to more control over the sexual response (V. J. Fischer et al., 2022). This may be true for both increasing and decreasing sexual arousal. The instruction to imagine a relaxing scene lowered sexual arousal to a sexual stimulus in men and women (Brom, Laan, Everaerd, Spinhoven, Cousijn, et al., 2015). The instruction to focus on bodily sensations and positive feelings increased sexual arousal to a sexual stimulus in men and women (Brom et al., 2016; Pawłowska et al., 2021). Furthermore, specific emotions might be used to influence sexual arousal as well. It was, for instance, found that disgust reduced the subsequent physiological (but not self-reported) sexual response to a heterosexual erotic film in heterosexual women (Fleischman et al., 2015). Counterconditioning techniques to reduce deviant sexual arousal rely on this mechanism, such as olfactory aversion or covert sensitization (see Table 1) (McGrath et al., 2010; Ware et al., 2021).

Emotion regulation often focusses on eliminating or reducing the impact of negative emotions, such as anger, sadness, or loneliness (Gunst et al., 2019; McCoy & Fremouw, 2010). Positive emotions are, however, just as essential for functional emotion regulation, and may as well influence sexual function (Gunst et al., 2017). Besides experiencing emotions, the *lack* of any emotional experience may be related to sexual offense behavior. The inability to experience emotions can result from trauma or attachment problems, which are relatively common among people who have committed sexual offenses (Gunst et al., 2017). Not being able to experience emotions might also mean that one is not able to experience the emotion of sexual gratification. This may drive people to continue to seek so (“empty wanting”) (Smid & Wever, 2019; Toates, 2014). Sexual gratification may then be more likely with deviant stimuli that elicit more powerful emotional reactions. The vignette *Summary Case File Client E.* illustrates how a lack of positive emotional experiences might contribute to deviant sexual behavior.

Besides specific emotion, general mood states (both positive and negative) were found to influence sexual motivation as well. In a daily diary study, 39 men who have sex with men reported increased masturbation after increased positive or negative affect (Miner et al., 2019). Similarly, in a sample of healthy men and women, a subsample of participants who described being easily aroused (high “sexual excitation proneness”) reported that their sexual motivation was increased one to two hours after an increase in negative affect (van Tuijl et al., 2022).

While emotions and mood may influence sexual arousal, the opposite is also likely true: Sex can influence mood. This is often referred to as sexual coping: using sex to improve mood. Sexual coping is a known risk factor that predicts sexual reoffenses (Brankley et al., 2021; Hanson et al., 2007; Helmus et al., 2021). Some studies provide evidence that sexual behavior improves later mood. Bergen et al. (2015) compared men and women who had online sexual contacts with adults ( $n = 640$ ) to those with online sexual contacts with children or adolescents ( $n = 77$ ). For both groups, their self-reported negative emotions improved after online sexual contact. There were a small decrease in sadness and large decreases in boredom and stress. The child-contact group had no more – or less – negative emotions before their online sexual contacts than the adult-contact group. Another study asked 410 men about their motives for engaging in online sexual activities such as watching porn or sexual chatting (Wéry & Billieux, 2016). The most-reported motives (80-90%) were related to sexual desire, for instance, to feel arousal, achieve orgasm, sexual satisfaction. Several sexual coping motives were often reported: to decrease stress (74%), because of boredom (71%), to forget daily problems (53%), and to not feel depressed or sad (38%).

If sex can improve mood, then *deviant* sex may likewise be used to improve mood. If one wishes to reduce sexual deviance, it might be useful to look at the connection between emotions and sex in the individual. Strategies to increase emotional awareness might be helpful, such as mindfulness and meditation. A systematic review concluded that mindfulness and meditation improved subjective sexual arousal, desire, and satisfaction in women (not enough studies were available with men) (Jaderek & Lew-Starowicz, 2019). Strategies to improve mood might be helpful as well. The guidelines for pharmacological interventions for paraphilic disorders include selective serotonin reuptake inhibitors (SSRIs), which are effective also in improving mood (Thibaut et al., 2020). Emotions and sexual arousal seem closely entangled, as they can influence each other back and forth. Being able to regulate emotions thus seems a useful tool to regulate sexuality.

*Summary Case File Client E.*

<i>Background</i>	Male, 29 years old, immigrant family from Thailand. Lives with parents. Simple job, possibly below his abilities. Restricted social life: parents, family friends, internet friends from Thailand. Despite living in the Netherlands for most his life, still has trouble understanding Dutch, all social contacts are Thai.
<i>Index behavior</i>	Client is referred to outpatient treatment by the police because he has been caught filming under girls' skirts on three separate occasions. Pending trial, the police recommended him to forensic treatment.
<i>Assessment</i>	DSM-5-TR: fetishistic disorder, upskirting videos. Sex life: masturbates 2-3 times a week, mostly to upskirting videos. Static-99R + Stable-2007 risk level: high regarding upskirting videos, low regarding other transgressive behaviors. Client admits that when he is filming, he "finally feels something for once in his life," something he describes as "exciting because it is wrong and he can be caught".
<i>Treatment plan</i>	Goal 1: stop masturbation to upskirting videos. Make safety plan to discover risk moments. Explore appropriate porn. Goal 2: improve emotional experience. Introduce more stimulating events in life by means of hobbies, social contacts. Sessions with psychomotor therapist for mind-body connection. Practice distraction tasks for risk moments. Keep emotion-diary to identify events related to positive feelings.
<i>Conclusion at dismissal</i>	Client is able to masturbate using appropriate porn. Is very determined to no longer watch upskirting videos because "if he starts there, he will spiral down". Client is able to experience urges and not act on them, using distraction and breathing exercises. Client has befriended two co-workers; they go bowling once a month. Client volunteers at the Dutch-Thai cultural foundation. He says he has learned to identify joy and excitement at times. Risk level has reduced to low regarding upskirting. Client feels confident that he has the tools not to relapse.

### **Key statement 3: A Normative Deficiency Seems Related to Deviant Sexual Interests**

*Further research to normative deficiency as a developmental factor for sexual deviance should focus on causality and generalization. Promising interventions to improve normative sexuality include healthy lifestyle changes, pharmacotherapy, sexological therapy, couples therapy, and reconditioning techniques.*

This thesis indicated that a normative deficiency (a lack of sexual interests in adults) was related to deviant sexual interests (in children) (Chapter 7). This concluding key statement has the least firm evidence base. Further research should focus on two aspects: causality and generalizability. First, does normative deficiency actually *cause* deviant sexual interests, and second, is this generalizable to other deviant sexual interests than pedophilia. For now, it is difficult to generalize these findings, because no other deviant sexual interest has been researched so systematically (Bickle et al., 2021). Some interview studies with BDSM-practitioners indicate that they find normative sex (non-BDSM sex) uninteresting and less pleasurable than BDSM sex (Simula, 2019; Taylor & Ussher, 2001). This could suggest a normative deficiency: they do not find enough satisfaction in normative sex and may need more stimulation.

Any guidance for treatment providers to improve normative interests in people with sexual deviance lies outside of forensic psychiatry. Sexological treatment helps couples or individuals who experience problems with sexual desire. Sexual dysfunctions are positively affected by lifestyle changes promoting a healthy diet, the avoidance of substance use, and regular physical activity, as well as diminishing psychosocial stressors (Mollaioli et al., 2020). Pharmacological treatment may sometimes be helpful, as well as individual and, if possible, couples therapy focused on relational and psychosexual functioning (Hackett et al., 2018; Weinberger et al., 2019). I see no reason why these types of interventions, as applied in general sexology, could not be helpful in forensic treatment of people with normative deficiency. Furthermore, conditioning techniques are promising interventions to pair normative sexual stimuli with rewarding sexual arousal and gratification, as discussed in the paragraph regarding key statement 1. Attention should be given to finding normative, legal stimuli that sufficiently work for the client. For some clients, it can take a while to find out which legal fantasies suit them, because they have not tried this for a long time, or have never done so. It is important to consider the effects of testosterone-lowering medication, which does not only suppress the sexual response to deviant stimuli but to normative stimuli as well. In a good therapeutic relationship and with motivated clients, one might be able to experiment with medication to stimulate positive experiences with sexual activity with age-appropriate partners (Smid, 2021).



Further research as well as treatment efforts should take into account two things: the deviant identity and proper assessment of sexual interests. Both will be discussed hereafter in relation to pedophilic interests.

### ***Pedophilic Identity***

*If people see (exclusive) pedophilia as part of their identity, this may obscure any residual sexual interest in adults.*

The DSM-5-TR discerns exclusive pedophilia from nonexclusive pedophilia. In nonexclusive pedophilia, there is some sexual interest in adults. In exclusive pedophilia, there is only sexual interest in children (“attracted only to children”) (American Psychiatric Association, 2022). This distinction might be important, because treatment presumably cannot install an interest in adults that does not exist, but it might be able to strengthen what is already there.

There is no clear operationalization of what constitutes exclusive or nonexclusive pedophilia (Seto, 2016). Exclusive could be defined as *zero* sexual interest in adults or as *less* sexual interest in adults than in children. In Austrian prison-samples of people with pedophilia who had sexually offended against children, 13-17% was diagnosed with exclusive pedophilia conform the DSM-IV(-TR) (Eher et al., 2010, 2015). The German Prevention Project Dunkelfeld offers professional help to self-identified pedophiles who are not necessarily convicted or offending. Here, 61% of the people with pedophilia reported to be “feeling exclusively aroused by fantasies with prepubescent (...) children” (Beier et al., 2009, p.547). Pedophilia is difficult to diagnose: one in three diagnoses of pedophilia may be wrong – a number similar to other, general psychological diagnoses (Mokros et al., 2018). Where one professional diagnoses pedophilia, another may not. This is presumed to not be different for exclusive versus nonexclusive pedophilia.

The label of “exclusive pedophilia” might reduce attention to sexual interest in adults. Some people with pedophilia report that they incorporate pedophilia as an – unwanted – part of their identity and expressed uncertainty about their abilities to have intimate relations with adults (Blagden et al., 2018; Jahnke et al., 2022). Sexual interest in children is larger with self-report than with other measures such as viewing time or penile plethysmography (Banse et al., 2010; Mokros et al., 2013; A. F. Schmidt et al., 2017). Consequently, sexual interest in adults may be larger when measured outside of conscious influence than with explicit self-report in people with pedophilia. A firm believe in an (unchangeable) pedophilic identity may cause their focus to merely lie on children and not adults as sexual possibilities.

It must be acknowledged that obtaining sexual interest in adults may not be a possible goal for every person. At the same time, it must not be discarded too easily as a possible treatment target.

### **Proper Assessment**

*Proper assessment helps to differentiate sexual interest in children from sexual interest in adults.*

Proper assessment is important to discover relevant treatment targets. The use of penile plethysmography to ascertain a sexual preference in children over adults is common in the U.S.A. and Canada, but not in Europe (Ellerby et al., 2010; Gannon et al., 2019; McGrath et al., 2010; Smid, 2021). This consists of measuring the penile circumference in response to child stimuli and adult stimuli, and subtract these from each other to report a “pedophilia-index”. In Europe, pedophilia is usually determined based on therapist judgment, which may or may not be based on client self-report. I recommend that assessment should include deviant sexual interests as well as normative sexual interests, with multiple types of instruments such as explicit self-report, therapist observation (as captured with, e.g., DSM-5-TR, Stable-2007, Screening Scale for Pedophilic Interests), implicit tasks (e.g., viewing time), or measurement of physiological functioning (penile plethysmography). Even self-report may know many varieties with possible different answers. For instance, bluntly asking about rape may be denied by people who answer affirmatively to a more behaviorally descriptive question, such as “Have you ever coerced somebody to intercourse by holding them down?” (Edwards et al., 2014). Regarding pedophilia, different answers are expected to “Are you a pedophile, yes or no?” versus “How much sexual interest in children do you have on a scale of 0% to 100%?” versus “How attractive are images of children in sexual positions to you on a scale from 1, very unattractive, to 7, very attractive?” Regarding the use of penile plethysmography, we recommend to not only relate normative (i.e., adult) and deviant (child) responses to each other but also report them individually, as they both have value.

Whereas no measure is truer than another, different measures might picture different aspects of sexuality. Proper assessment may help to nuance a pedophilic identity. Even a little sexual reaction to adults on any measure should be an indication to at least try to invest in normative sexual functioning, as is illustrated by the vignette *Therapy Session Excerpt Client R*.

*Therapy Session Excerpt Client R.*

Therapist: Could you mention anything you'd find attractive about adult women?

Client R: I never liked women. They just couldn't attract me in any way.  
*[Therapist and client keep circling a while, but nothing comes up]*

Therapist: And boys you do find attractive?

Client R: Er... Yes... Unfortunately.

Therapist: Let us try something to make the picture complete. Say we have four dimensions: boys, girls, men, women.  
*[Writes down four horizontal lines with "0" on the left and "100" on the right end]*

Please indicate on each dimension how much you find that attractive, use a percentage.

*[Client indicates boys 100, girls 20, men 0, women 10]*

Therapist: Okay, that is very informative. You've indicated women at 10. What makes you not choosing 0?

Client R: I guess... if you've got the right woman. They can be... sweet? In an adult way, I mean... Caring? That can be attractive somehow.

Therapist: Very good. Would you be open-minded towards trying to invest in this 10%?

Client R: Okay...  
*[Three months later. Therapist and client R have extensively practiced social skills. Client R has been on several dates with adult women via a dating app.]*

Therapist: Tell me about the last date.

Client R: It was a relief! I mean, not the date, the date was nothing. We have texted back and forth a bit afterwards but it's not gonna work. But at the end of the date we kissed. And... I found her attractive! Just a tad. But I did! I never thought I ever would...

### **Overall Strengths and Limitations**

*This thesis used various methods and samples from various populations. We provided a useful framework to explain the development of sexual deviance. Research is largely limited to sexual offending behavior, therefore, the findings can only be generalized to nonoffending populations with prudence.*

Specific strengths and limitations of each study were discussed in the various chapters. The current paragraph discusses overall strengths and limitations of this thesis. One of the strengths is that we used various study designs and approaches

to study sexual deviance, including meta-analyses and systematic reviews, online surveying, replication, and an experimental intervention. The latter allowed us to make causal rather than correlational inferences. Our approach included careful testing in feasibility and pilot phases. We sampled from various populations, including forensic samples of people who have sexually offended, a cohort of clients receiving forensic outpatient treatment, but also a sexually diverse nondelinquent sample and a representative population sample. While many scholars have emphasized that theories on the development of sexual deviance are lacking (Apostolou & Khalil, 2019; L. A. Craig & Bartels, 2021; A. F. Schmidt & Imhoff, 2021), we showed that this is not necessarily the case. There is, however, a lack of good quality theories. We recommended an incentive motivational model (Ågmo & Laan, 2022; Both et al., 2007; Toates, 2014) as a useful framework for research and treatment purposes to explain deviant sexual interests.

While not the specific aim of this thesis, an effort was made in the general discussion to translate fundamental findings into clinical implications. All suggestions are based on some empirical evidence, but mostly with sexually offending samples, which is not the same as sexually deviant samples. The literature is mainly based on correlational research, which limits causal inferences.

This thesis looked at sexual deviance from a broad perspective, including sexual interest in illegal stimuli such as in rape or children, as well as in itself harmless interests, such as BDSM or fetishes. This broad approach has advantages and disadvantages. Lumping together interests with legal and illegal topics can amplify stigmatization of the legal interests. It can also normalize illegal interests. This is something readers must keep in mind. As long as nobody is harmed by a sexual interest or behavior, it is by no means problematic. For research purposes it was useful to include legal deviant sexual interests, because it increased the pool of literature. Results may also be useful for the general population, as a number of people may suffer negative consequences from their deviant sexual interests. Only including offending samples skews results towards men with multidimensional problems such as impulsivity and problematic social environments. The findings can only be generalized to women and nonoffending populations with prudence. There is still much to gain in research into the treatment of nondelinquent people who suffer from sexual deviance. While many other factors may be very different between offending and nonoffending populations, the core of the development of deviant sexual interests may not be so different.

**Conclusion**

Deviant sexual interests seem malleable, to some extent. The roles of excitation transfer and normative deficiency designate that dynamic, changeable process take part in the etiology of sexual deviance. These same processes could potentially be deployed to diminish unwanted deviant sexual interests. This is most relevant in treatment of people who have committed sexual offenses to reduce the risk of future reoffenses but might also be informative for people who suffer negative consequences from their deviant sexual interests. More research is needed to explore which specific treatment techniques are effective in reducing sexual deviance, but improving emotion regulation and strengthening normative sexual interests are promising treatment options.





# Appendix



## References

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## English Summary

### Chapter 1

Sexual deviance is common. It is estimated that nearly half of the people has at least one deviant sexual interest, and about a quarter of the people has ever engaged in deviant sexual behavior. Sexual deviance can be defined as a deviation from various norms. It is mostly defined by social norms, in which society decides what is nonnormative, and legal norms, in which the law determines what is nonnormative. This thesis focuses on deviant sexual *interests* and uses sexual deviance as an umbrella term encompassing interest, behavior, preference, fantasy, or urge. We adopted a broad definition of deviant sexual interests, including sexual interest in illegal as well as in itself “harmless” but unusual behaviors.

In essence, sexual deviance is not problematic. Sexual deviance can, however, be problematic if it negatively affects health or quality of life, or acts as a risk factor for sexual offenses. It is unclear how often deviant sexual interests have a negative life impact or lead to sexual offenses. About two-thirds of the people convicted for sexual offenses have some level of deviant sexual interests. That means that about one-third of the sexual offenses is not associated with deviant sexual interests.

To reduce suffering or prevent sexual offenses, it can sometimes be necessary to address sexual deviance in treatment. Treatment to prevent sexual offenses should focus on risk factors related to the offense behavior and adopt a cognitive-behavioral approach. This means that sexual deviance must be targeted in treatment if it is an individually relevant risk factor for sexual reoffenses. Current treatment may, however, not be optimal, not least because it is unclear how sexual deviance develops. Assumptions about the development of sexual deviance shape the way we approach it. Therefore, this thesis focuses on the question: how does sexual deviance develop?

### Chapter 2

Chapter 2 presents a systematic review to theories on the development of deviant sexual interests. We conducted a systematic search of the databases PubMed and APA PsycInfo (EBSCO). Studies were included when they discussed a theory regarding the etiology or development of sexual deviance. Included studies were assessed on quality criteria for good theories, for instance, regarding testability or explanatory value. Common etiological themes were extracted using thematic analysis. We included 49 theories explaining sexual deviance in general as well as various specific deviant sexual interests, such as pedophilia (children) and sadism/

masochism (inflicting/receiving pain). Few theories ( $k = 7$ ) were of acceptable quality. These studies indicated that deviant sexual interests may develop as the result of an interplay of various factors: excitation transfer between emotions and sexual arousal, problems with “normative” sexuality, conditioning, and social learning. Neurobiological findings could not be included as no acceptable quality neurobiological theories could be retrieved. The important roles of excitation transfer and conditioning designate that dynamic, changeable processes take part in the etiology of sexual deviance. These same processes could potentially be deployed to diminish unwanted deviant sexual interests.

The following chapters three through seven correspond with results from this review. First, the mechanism of excitation transfer was explored: the transfer of arousal from one emotion to another.

### **Chapter 3**

Chapter 3 describes an experimental intervention to induce excitation transfer. In this pilot study, we investigated if we could induce excitation transfer between various emotions and sexual arousal in a lab setting with 30 male volunteers. We induced low-level sexual arousal in response to vibrostimulation and erotic film. This was done in four different emotional states (aggression/dominance, endearment, fear, disgust) and a neutral state. Sexual arousal was measured genitally using penile plethysmography, and via self-report. There was no mean group effect, possibly due to large interindividual variations. Still, 60% of the subjects showed more sexual arousal in at least one of the emotional states than in the neutral state. Excitation transfer was most prominent with aggression/dominance and least prominent with disgust. Genitally measured excitation transfer was strongly related to lower penile reactivity and to higher self-reported erotophilia (the love of erotica). This pilot study paves the way for further research into excitation transfer as a mechanism to increase the salience of stimuli that otherwise would not have been sexual in nature.

### **Chapter 4**

Chapter 4 is a protocol of a proposed follow-up study with improved methodology. Following the prior pilot study, several adjustments were made to the study protocol, including a stronger emotional manipulation by using 360-degree emotional film clips with virtual reality glasses. Additionally, we aim to include a larger sample of 50 adult male volunteers with more diverse sexual interests.

The previous chapters showed that emotions can influence sexual arousal. Following this idea, it was investigated in the following chapters five and six if specific deviant



sexual interests that often co-occur can be divided into clusters. Such clusters might hypothetically be related to a certain emotion. Various deviant sexual interests that evoke disgust, for example, may co-occur more often (feces, urine, vomit).

## Chapter 5

In chapter 5, we aimed to identify underlying clusters in a variety of deviant sexual interests. Participants rated 50 deviant sexual interests on a scale from 1 (very unappealing) to 7 (very appealing) in an anonymous, online survey. The 669 participants (61% female) came from various countries, mostly from the U.S.A. and the Netherlands. Using exploratory factor analysis, we investigated which interests often co-occurred in the total sample, and in women and men separately. Furthermore, we assessed self-reported sex life satisfaction, sexual outlet, and psychiatric symptoms (ADHD, depression, anxiety, and stress). Deviant sexual interests could be divided into five clusters that were largely comparable for women and men: (1) submission/masochism (receiving pain), (2) forbidden sexual activities, (3) dominance/sadism (inflicting pain), (4) mysophilia (dirtiness or soiled things), and (5) fetishism (objects or body parts). For women, having more deviant sexual interest related to more psychiatric symptoms and higher sexual outlet, whereas this relation was less explicit for men. Different clusters of deviant sexual interests may serve different underlying functions or motivations, for instance related to sexual and emotional regulation.

## Chapter 6

Chapter 6 describes a replication study to examine whether the findings from chapter 5 could be generalized to the general population. An online, anonymous sample of 256 men, representative of the Dutch adult male population, rated 32 deviant sexual interests on a scale from 1 (very unappealing) to 7 (very appealing). Exploratory and confirmatory factor analyses assessed whether similar clusters would emerge as in the original study. Four slightly different clusters of sexual interests were found: (1) extreme, illegal and mysophilic sexual activities, for example, with children, force, vomit, feces; (2) light BDSM<sup>1</sup> without real pain or suffering, for example, being tied, blindfolding, spanking; (3) heavy BDSM that may include pain or suffering, for example, gagging someone, seriously hurting; and (4) illegal but lower-sentenced and fetishistic sexual activities, for example, exposing genitals, spying others having sex, plush animals, blow-up dolls. The representative replication sample was more sexually conservative and showed less sexual engagement than the original convenience sample. Integrating both studies, on a fundamental level, the sexual interest in light BDSM activities seems to be a relatively separate construct from

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<sup>1</sup> Bondage and Discipline (BD), Dominance and Submission (DS) and Sadism and Masochism (SM)

extreme, forbidden, and mysophilic activities. Different emotional needs may underlie these clusters.

Subsequently, chapter 7 describes meta-analyses and a systematic review concerning the “normative deficiency” hypothesis. This hypothesis states that decreased sexual interest in normative stimuli contributes to increased sexual interest in deviant stimuli. This can be explored using studies that measure the sexual reaction to normative and deviant stimuli. While the normative deficiency is hypothesized to hold for any deviant sexual interest, research almost exclusively focuses on pedophilia, assessing sexual reactions to child and adult stimuli. Therefore, the normative deficiency hypothesis was investigated with respect to pedophilia in people who have committed sexual offenses.

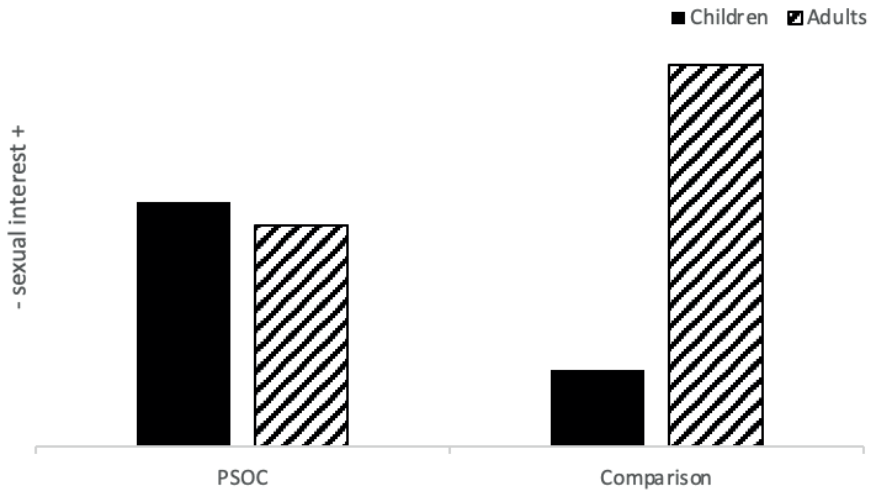
## Chapter 7

A sexual preference for children (pedophilia) is an important factor contributing to sexual (re)offending against children. Sexual interest in children is therefore frequently researched in people who have sexually offended against children (PSOC). Studies usually calculate a difference score in which the sexual response to adult stimuli is subtracted from the sexual response to child stimuli. These difference scores have shown more discriminative value between PSOC and non-PSOC groups than the responses to child stimuli alone. The current state of research makes it difficult to conclude if people with pedophilia are overly interested in children, or have lower interest in adults, or both. This is relevant knowledge in treatment for preventing sexual (re)offenses against children.

This study aimed to systematically analyze sexual interest in both children and adults in samples of men with pedophilia and comparison groups. We aimed to compare the absolute sexual responses to child stimuli and adult stimuli with each other. A total of 55 studies with 8,465 participants were included in four meta-analyses and a systematic review. Most included studies considered PSOC and not nonoffending pedophilic samples. About half of the included PSOC samples was presumed to be pedophilic based on clinical information. Firstly, the results indicated that PSOC with pedophilia did not have a clear sexual *preference* for children over adults: Their sexual response to children was equal to their sexual response to adults. Secondly, PSOC's sexual response to children was higher than comparison groups. Thirdly, PSOC's sexual response to adults was lower than comparison groups (see Figure 1).

**Figure 1**

*Schematic Representation of Sexual Responses PSOC and Comparison Groups (Schippers, Smid, Hoogsteder, Planting, et al., 2023)*



The current study circumvented the use of difference scores that are made relative to comparison groups. As such, we were able to conclude that, besides the traditional focus on sexual interest in children, the lack of sexual interest in adults may be a relevant factor in PSOC with pedophilia. More studies are needed to disentangle sexual interest in children from sexual interest in adults, while using carefully matched comparison groups that have similar demographic characteristics.

Relative to the previous chapters with fundamental research, chapter 8 reflects current clinical practice.

## Chapter 8

Chapter 8 explored the prevalence and consideration of sexual deviance in outpatient treatment for sexual offending behavior. Sexual deviance was assessed in 198 adult clients with a combination of the Stable-2007 (Fernandez et al., 2014), DSM-5 (American Psychiatric Association, 2022), or client self-report. Preliminary treatment effects over the first year were assessed using the Stable-2007 in a smaller subsample. Two groups of clients could be discerned with different needs: a sexual deviance group (two-thirds of the clients) with more sexual preoccupation and sexual coping, and a group with more impulse control disorders (about one-third). Treatment content was similar for both groups, meaning treatment did not specifically target the different needs in the different groups. Preliminary positive

treatment effects were found for both groups, which seemed mostly driven by improvements in sexual self-regulation. Treatment more specialized towards the needs of the subgroups and including more behavioral techniques might have more pronounced effects.

Chapter 9 contains a general discussion in which the findings from this thesis were integrated.

## Chapter 9

In chapter 2, it was theorized that an interplay of dynamic, changeable factors contributes to the development of deviant sexual interests. These include the transfer of arousal between various emotions (“excitation transfer”), a lack of sexual response to normative stimuli (“normative deficiency”), conditioning, and social learning. This can be integrated into an Incentive Motivational Model, which is a common approach in general sexology (Ågmo & Laan, 2022; Both et al., 2007; Toates, 2014). This model looks at sexual motivation as an emotional response to a sexually relevant stimulus. These stimuli are salient because they signal potential reward in the form of sexual arousal and gratification. Processing emotional stimuli causes activation of the emotion systems in the brain and prepares for behavioral action (LeDoux, 2012). Behavioral action may, for instance, consist of approaching the stimulus, ultimately resulting in sexual interaction, or entertaining a sexual fantasy, resulting in masturbation. Sexual arousal, and especially sexual gratification, are strong reinforcers, causing one to return to the sexual stimulus and strengthen its connection with sexual arousal even further (operant conditioning). Social learning may play a role when, for instance, approving peers reinforce certain behaviors or sexual partners introduce new sexual stimuli. Suggested neurobiological predispositions lie in the sensitivity for reward, the processing of visual cues, or the strength of the sexual reaction.

Smid and Wever (2019) explicitly apply the Incentive Motivational Model to sexual deviance using the mechanisms of excitation transfer and normative deficiency. Sexual arousal is tightly coupled with general, sympathetic arousal, which allows overflow between emotional arousal and sexual motivation (Ågmo & Laan, 2022). Some stimuli have strong emotional reactions, such as pain, humiliation, anger, or disgust. Through excitation transfer, the emotional reactions of such stimuli might overflow in sexual arousal, making the stimulus potent enough to induce sexual arousal or even sexual gratification. Repeated coupling of that stimulus and sexual arousal may eventually result in a stable sexual interest. A strong emotional stimulus to enhance sexual arousal is not necessary if the sexual motivation is already strong enough. Therefore, the normative deficiency hypothesis suggests that excitation

transfer might especially work for people who have no strong sexual motivation to normative sexual stimuli.

From the findings in this thesis, three concluding key statements were derived:

1. Deviant sexual interests seem malleable, to some extent;
2. Emotion can increase sexual arousal to deviant stimuli;
3. A normative deficiency seems related to deviant sexual interests.

Changeable factors contribute to deviant sexual interests. If changeable factors contribute to the development of deviant sexual interests, it does not necessarily mean that deviant sexual interests are changeable. Changeable factors can put into motion unchangeable processes. Despite a limited research base, there are some indications that deviant sexual behaviors, as well as interests, are changeable to some extent.

Emotion is one of the mechanisms to affect deviant sexual interests. Specific emotions and general mood states have shown to be able to increase or decrease sexual arousal. While emotions and mood may influence sexual arousal, the opposite is also likely true: Sexual behavior might improve negative mood states. If one wishes to reduce sexual deviance, it might be useful to look at the connection between emotions and sex in the individual. Being able to regulate emotions seems a useful tool to regulate sexuality.

Further research to normative deficiency as a developmental factor for sexual deviance should focus on two aspects: causality and generalization. First, does normative deficiency actually cause deviant sexual interests, and two, is this generalizable to other deviant sexual interests than pedophilia. Promising interventions to improve normative sexuality include healthy lifestyle changes, pharmacotherapy, sexological therapy, couples therapy, and reconditioning techniques. Further research as well as treatment efforts should take into account two things: the deviant identity and proper assessment of sexual interests. In the example of pedophilia that means: If people see pedophilia as part of their identity, this may obscure any residual sexual interest in adults. Proper assessment helps to differentiate sexual interest in children from sexual interest in adults.

A strength of this thesis is that it used various methods and samples from various populations. Additionally, we provided a useful framework to explain the development of sexual deviance. A limitation of the state of research in general and

some of the research in this thesis, is that it is largely limited to sexual offending behavior. Therefore, the findings can only be generalized to nonoffending populations with prudence.

### **Conclusion**

Deviant sexual interests seem malleable, to some extent. The roles of excitation transfer and normative deficiency designate that changeable processes take part in the etiology of sexual deviance. These same processes could potentially be deployed to diminish unwanted deviant sexual interests. This is most relevant in treatment of people who have committed sexual offenses to reduce the risk of future reoffenses. It might also be informative for people who suffer negative consequences from their deviant sexual interests. More research is needed to explore which specific treatment techniques are effective in reducing sexual deviance. Improving emotion regulation and strengthening normative sexual interests are promising treatment options.

# Nederlandse Samenvatting

## Hoofdstuk 1

Seksuele deviantie komt vaak voor. Naar schatting heeft bijna de helft van de mensen minstens één deviante seksuele interesse, en heeft ongeveer een kwart van de mensen ooit deviant seksueel gedrag getoond. Seksuele deviantie kan worden gedefinieerd als een afwijking van verschillende normen. Het wordt meestal gedefinieerd door sociale normen, waarin de maatschappij bepaalt wat niet-normatief is, en juridische normen, waarin de wet voorschrijft wat niet-normatief is. Dit proefschrift richt zich vooral op deviante seksuele *interesses*, en gebruikt de term seksuele deviantie als een paraplueterm voor interesse, gedrag, voorkeur, fantasie, of drang. We gebruiken een brede definitie van deviante seksuele interesses, die seksuele interesse in illegaal gedrag bevat, maar ook op zichzelf "onschadelijk" maar ongebruikelijk gedrag.

In essentie is seksuele deviantie niet problematisch. Seksuele deviantie kan echter problematisch zijn als het de gezondheid of kwaliteit van leven negatief beïnvloedt, of als risicofactor werkt voor seksuele delicten. Het is onduidelijk hoe vaak deviante seksuele interesses een negatieve impact hebben op het leven of leiden tot seksuele delicten. Ongeveer twee derde van de mensen die veroordeeld zijn voor seksuele delicten heeft enige mate van deviante seksuele interesses. Dat betekent dat ongeveer een derde van de seksuele delicten niets te maken heeft met deviante seksuele interesses.

Om lijden te verminderen of seksuele delicten te voorkomen, kan het in sommige gevallen nodig zijn om seksuele deviantie aan te pakken in behandeling. Behandeling om seksuele delicten te voorkomen zou zich moeten richten op risicofactoren gerelateerd aan het delictgedrag en zou een cognitief-gedragstherapeutische benadering moeten hebben. Dit betekent dat seksuele deviantie gericht moet worden behandeld als het voor een persoon een relevante risicofactor is voor herhaalde seksuele delicten. De huidige staat van behandeling is echter niet optimaal, met name omdat onduidelijk is hoe seksuele deviantie ontstaat. Aannames over de ontwikkeling van seksuele deviantie bepalen de manier waarop we het benaderen. Daarom richt dit proefschrift zich op de vraag: hoe ontstaat seksuele deviantie?

## Hoofdstuk 2

Hoofdstuk 2 geeft een overzicht van bestaande theorieën over het ontstaan van deviante seksuele interesses. We hebben de databases PubMed en APA PsycInfo (EBSCO) systematisch doorzocht. Artikelen werden meegenomen in dit onderzoek

wanneer zij een theorie bespraken over het ontstaan van seksuele deviantie. De kwaliteit van de meegenomen theorieën werd beoordeeld aan de hand van kwaliteitscriteria, bijvoorbeeld met betrekking tot testbaarheid en verklarende waarde. Met thematische analyse verzamelden we de veelvoorkomende thema's over het ontstaan van seksuele deviantie. We beoordeelden 49 theorieën die gingen over seksuele deviantie in het algemeen, evenals verschillende specifieke deviante seksuele interesses, zoals pedofilie (kinderen) en sadisme/masochisme (pijn doen/gedaan worden). Weinig theorieën waren van goede kwaliteit: slechts zeven voldeden aan de kwaliteitscriteria. Deze theorieën gaven aan dat deviante seksuele interesses zich kunnen ontwikkelen als gevolg van een samenspel van verschillende factoren: de overdracht van opwinding tussen emoties en seksuele opwinding ("opwindingsoverdracht"), problemen met normatieve seksualiteit ("normatief tekort"), conditionering, en leren door de sociale omgeving. Neurobiologische bevindingen konden niet worden meegenomen in het overzicht, omdat de gevonden neurobiologische theorieën niet van goede kwaliteit bleken. Opwindingsoverdracht, normatief tekort, conditionering, en sociaal leren zijn veranderlijke processen die worden toegeschreven aan het ontstaan van seksuele deviantie. Deze zelfde processen kunnen potentieel worden ingezet om ongewenste deviante seksuele interesses te verminderen.

Hoofdstuk 3 tot en met hoofdstuk 7 komen overeen met de resultaten uit het overzicht in hoofdstuk 2. Eerst werd het mechanisme van opwindingsoverdracht onderzocht: de overdracht van opwinding van de ene emotie naar de andere.

### Hoofdstuk 3

Hoofdstuk 3 beschrijft een experiment naar opwindingsoverdracht. In deze pilotstudie onderzochten we of we opwindingsoverdracht konden creëren tussen verschillende emoties en seksuele opwinding in een laboratorium met 30 mannelijke vrijwilligers. We wekten een laag niveau van seksuele opwinding op door middel van genitale vibraties en erotische filmfragmenten. Dit deden we in vier verschillende emotionele toestanden (agressie/dominantie, vertederding, angst, walging) en een neutrale toestand. Seksuele opwinding werd genitaal gemeten door een spanningsmeter om de penis, en via zelfrapportage. Er was geen gemiddeld groepseffect, mogelijk als gevolg van grote variaties tussen de proefpersonen. Toch vertoonde 60% van de proefpersonen meer seksuele opwinding in ten minste één emotionele toestand dan in de neutrale toestand. De opwindingsoverdracht was het meest prominent bij agressie/dominantie en het minst prominent bij walging. Genitaal gemeten opwindingsoverdracht was sterk gerelateerd aan een lagere reactiviteit van de penis en aan hogere zelfgerapporteerde erotofilie (aantrekking



tot erotiek). Deze pilotstudie maakt de weg vrij voor verder onderzoek naar opwindingsoverdracht als een mechanisme om de seksuele aantrekkingskracht van prikkels te vergroten die van zichzelf niet seksueel van aard zijn.

#### **Hoofdstuk 4**

Hoofdstuk 4 is een protocol van een voorgesteld vervolgonderzoek met verbeterde methodologie. Na de eerdere pilotstudie uit hoofdstuk 3 zijn er verschillende aanpassingen in het onderzoeksprotocol doorgevoerd. Een van deze aanpassingen is een sterkere emotionele manipulatie door het gebruik van 360-graden emotionele filmfragmenten met een *virtual reality*-bril. Een andere aanpassing is de rekrutering van een grotere onderzoeksgroep van 50 volwassen mannelijke vrijwilligers met meer uiteenlopende seksuele interesses.

Uit de voorgaande hoofdstukken bleek dat emoties seksuele opwinding kunnen beïnvloeden. Vanuit dat idee werd in hoofdstuk 5 en hoofdstuk 6 onderzocht of specifieke deviante seksuele interesses die vaak samen voorkomen in clusters kunnen worden ingedeeld. Dergelijke clusters kunnen hypothetisch gerelateerd zijn aan een bepaalde emotie. Verschillende deviante seksuele interesses die walging oproepen zouden bijvoorbeeld vaker samen kunnen voorkomen (uitwerpselen, urine, braaksel).

#### **Hoofdstuk 5**

Het doel van hoofdstuk 5 was om onderliggende clusters te onderscheiden in een verscheidenheid aan deviante seksuele interesses. Deelnemers beoordeelden 50 deviante seksuele interesses op een schaal van 1 (zeer onaantrekkelijk) tot 7 (zeer aantrekkelijk) in een anonieme, online enquête. De 669 deelnemers (61% vrouw) kwamen uit verschillende landen, voornamelijk uit de Verenigde Staten en Nederland. Met exploratieve factoranalyse keken we welke interesses vaak samen voorkwamen in de totale onderzoeksgroep, en onder vrouwen en mannen apart. Ook vroegen we naar de zelfgerapporteerde tevredenheid over het seksleven, de hoeveelheid seksuele activiteiten, en psychiatrische symptomen (ADHD, depressie, angst en stress). Deviante seksuele interesses konden worden verdeeld in vijf clusters die grotendeels vergelijkbaar waren voor vrouwen en mannen: (1) onderdanigheid/masochisme (pijn gedaan worden), (2) verboden seksuele activiteiten, (3) dominantie/sadisme (pijn doen), (4) mysofilie (vieze, smerige dingen), en (5) fetisjisme (objecten, lichaamsdelen). Bij vrouwen was er een positief verband tussen deviante seksuele interesse en psychiatrische symptomen en de hoeveelheid seksuele activiteiten, terwijl dit verband bij mannen minder duidelijk was. Verschillende clusters van deviante seksuele interesses kunnen mogelijk verschillende onderliggende

functies of motivaties dienen, bijvoorbeeld gerelateerd aan seksuele regulatie en emotieregulatie.

## Hoofdstuk 6

Hoofdstuk 6 beschrijft een replicatiestudie om te onderzoeken of de bevindingen uit hoofdstuk 5 gegeneraliseerd kunnen worden naar de algemene populatie. Een online, anonieme onderzoeksgroep van 256 mannen, representatief voor de Nederlandse volwassen mannelijke bevolking, beoordeelde 32 deviante seksuele interesses op een schaal van 1 (zeer onaantrekkelijk) tot 7 (zeer aantrekkelijk). Exploratieve en bevestigende factoranalyses toetsten of vergelijkbare clusters naar voren zouden komen als in het oorspronkelijke onderzoek. Er werden vier enigszins verschillende clusters van seksuele interesses gevonden: (1) extreme, illegale en mysofiele seksuele activiteiten, bijvoorbeeld met kinderen, dwang, braaksel, uitwerpselen; (2) lichte BDSM<sup>2</sup> zonder echte pijn of lijden, bijvoorbeeld vastbinden, blinddoeken; (3) zware BDSM die pijn of lijden met zich mee kan brengen, bijvoorbeeld verstikken, ernstig pijn doen; en (4) illegale maar lichter veroordeelde en fetisjistische seksuele activiteiten, bijvoorbeeld geslachtsdelen tonen, seksende mensen begluren, knuffelbeesten, opblaaspoppen. De representatieve onderzoeksgroep was meer seksueel conservatief en minder seksueel actief dan de oorspronkelijke steekproef. Kijkend naar beide studies, lijkt op een fundamenteel niveau de seksuele interesse in lichte BDSM-activiteiten een relatief gescheiden construct te zijn van de seksuele interesse in extreme, verboden en mysofiele activiteiten. Mogelijk liggen er verschillende emotionele behoeften ten grondslag aan deze clusters.

Hoofdstuk 7 beschrijft vervolgens meta-analyses en een systematisch overzicht met betrekking tot de “normatief tekort”-hypothese. Deze hypothese stelt dat een tekort aan seksuele interesse in normatieve prikkels bijdraagt aan een verhoogde seksuele interesse in deviante prikkels. Dit kan worden onderzocht met behulp van studies die de seksuele reactie op normatieve en deviante prikkels meten. Hoewel wordt aangenomen dat het normatieve tekort kan gelden voor elke deviante seksuele interesse, richt onderzoek zich vrijwel uitsluitend op pedofilie, waarbij seksuele reacties op prikkels van kinderen en volwassenen worden gemeten. Daarom werd de normatief tekort-hypothese onderzocht met betrekking tot pedofilie bij mensen die seksuele delicten hebben gepleegd.

## Hoofdstuk 7

Een seksuele voorkeur voor kinderen (pedofilie) is een belangrijke factor die bijdraagt aan het (herhaald) plegen van seksuele delicten tegen kinderen. Seksuele

<sup>2</sup> Bondage en Discipline (BD), Dominantie en Submissie (DS) en Sadisme en Masochisme (SM)

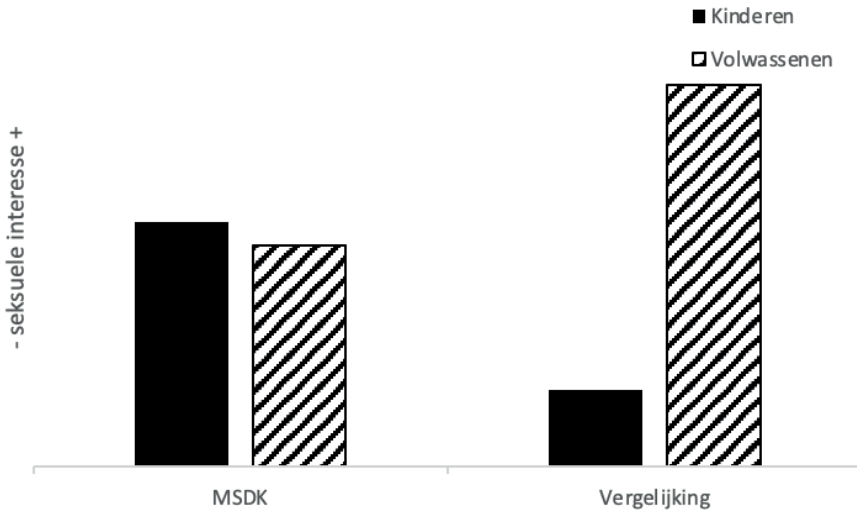
interesse bij kinderen wordt daarom veelvuldig onderzocht bij Mensen die Seksuele Delicten hebben gepleegd tegen Kinderen (MSDK). Studies berekenen meestal een verschilscore waarbij de seksuele reactie op volwassen prikkels wordt afgetrokken van de seksuele reactie op kindprikkel. Deze verschilcores hebben een grotere onderscheidende waarde tussen MSDK en niet-MSDK-groepen dan de reacties op kindprikkel alleen. De huidige stand van onderzoek maakt het moeilijk om te concluderen of mensen met pedofilie overmatig geïnteresseerd zijn in kinderen, of te weinig geïnteresseerd zijn in volwassenen, of beide. Dit is relevante kennis bij de behandeling ter voorkoming van seksuele delicten tegen kinderen.

Het doel van deze studie was om seksuele interesse in zowel kinderen als volwassenen te analyseren in onderzoeksgroepen van mannen met pedofilie en in vergelijkingsgroepen. We vergeleken daarvoor de absolute seksuele reacties op kindprikkel en volwassen prikkels met elkaar. In totaal zijn 55 onderzoeken met 8.465 deelnemers opgenomen in vier meta-analyses en een systematisch overzicht. De meeste van deze onderzoeken betroffen MSDK en geen niet-delinquente pedofiele onderzoeksgroepen. Ongeveer de helft van de MSDK-onderzoeksgroepen werd verondersteld pedofiel te zijn op basis van klinische informatie. De resultaten gaven ten eerste aan dat MSDK met pedofilie geen duidelijke seksuele voorkeur hadden voor kinderen boven volwassenen: Hun seksuele reactie op kinderen was gelijk aan hun seksuele reactie op volwassenen. Ten tweede was de seksuele reactie van MSDK op kinderen hoger dan bij vergelijkingsgroepen. Ten derde was de seksuele reactie van MSDK op volwassenen lager dan bij vergelijkingsgroepen (zie Figuur 1).

In het huidige onderzoek werd het gebruik omzeild van verschilcores die worden berekend ten opzichte van vergelijkingsgroepen. Zodoende konden we concluderen dat, naast de traditionele focus op seksuele interesse in kinderen, het gebrek aan seksuele interesse in volwassenen een relevante factor kan zijn bij MSDK met pedofilie. Er zijn meer onderzoeken nodig om de seksuele interesse in kinderen te onderscheiden van de seksuele interesse in volwassenen, waarbij zorgvuldig op elkaar afgestemde vergelijkingsgroepen worden gebruikt die vergelijkbare demografische kenmerken hebben.

**Figuur 1**

*Schematische Weergave van Seksuele Reactie MSDK en Vergelijkingsgroepen (Schippers, Smid, Hoogsteder, Planting, et al., 2023)*



In vergelijking met de voorgaande hoofdstukken met fundamenteel onderzoek, weerspiegelt hoofdstuk 8 de huidige klinische praktijk.

**Hoofdstuk 8**

In hoofdstuk 8 werd de prevalentie en overweging van seksuele deviantie onderzocht in de poliklinische behandeling van seksueel grensoverschrijdend gedrag. Seksuele deviantie werd beoordeeld bij 198 volwassen cliënten met een combinatie van de Stable-2007 (Fernandez et al., 2014), DSM-5 (American Psychiatric Association, 2022) of zelfrapportage door de cliënt. Voorlopige behandelresultaten gedurende het eerste jaar werden getoetst met de Stable-2007 in een kleinere subgroep. Er konden twee groepen cliënten worden onderscheiden met verschillende risicofactoren: een groep met seksuele deviantie (twee derde van de cliënten) met meer seksuele preoccupatie en seksuele coping, en een groep met meer stoornissen in de impulsbeheersing (ongeveer een derde). De inhoud van de behandeling was voor beide groepen vergelijkbaar, wat betekent dat de behandeling niet specifiek gericht was op de verschillende risicofactoren in de verschillende groepen. Voor beide groepen werden positieve voorlopige behandelresultaten gevonden, die vooral te danken lijken te zijn aan verbeteringen in de seksuele zelfregulatie. Een behandeling die zich meer specialiseert in de risicofactoren van de subgroepen en die meer gedragstechnieken bevat, zou meer uitgesproken effecten kunnen hebben.

Hoofdstuk 9 bevat een algemene discussie waarin de bevindingen uit dit proefschrift worden beschouwd.

## Hoofdstuk 9

In hoofdstuk 2 werd getheoretiseerd dat een samenspel van dynamische, veranderlijke factoren bijdraagt aan de ontwikkeling van deviante seksuele interesses. Deze omvatten de overdracht van opwinding tussen verschillende emoties (“opwindingsoverdracht”), een gebrek aan seksuele reactie op normatieve prikkels (het “normatief tekort”), conditionering en sociaal leren. Dit kan worden geïntegreerd in een *Incentive Motivational Model*, een gebruikelijke benadering in de algemene seksuologie (Ågmo & Laan, 2022; Both et al., 2007; Toates, 2014). Dit model beschouwt seksuele motivatie als een emotionele reactie op een seksueel relevante prikkel. Deze prikkels zijn aantrekkelijk omdat ze een potentiële beloning signaleren in de vorm van seksuele opwinding en bevrediging. Het verwerken van emotionele prikkels zorgt voor activering van de emotiesystemen in de hersenen en voorbereiding op gedrag (LeDoux, 2012). Gedrag kan bijvoorbeeld bestaan uit het benaderen van de prikkel, wat uiteindelijk resulteert in seksuele interactie, of uit seksueel fantaseren, wat resulteert in masturbatie. Seksuele opwinding, en vooral seksuele bevrediging, zijn sterke bekrachtigers waardoor iemand terugkeert naar de seksuele prikkel. Zo wordt de verbinding tussen de prikkel en seksuele opwinding nog verder versterkt (operante conditionering). Sociaal leren kan een rol spelen wanneer bijvoorbeeld goedkeurende leeftijdsgenoten bepaald gedrag versterken, of seksuele partners nieuwe seksuele prikkels introduceren. Neurobiologische aanleg kan bijvoorbeeld invloed hebben op de gevoeligheid voor beloning, de verwerking van visuele signalen, of de sterkte van de seksuele reactie.

Smid en Wever (2019) passen het *Incentive Motivational Model* toe op seksuele deviantie met behulp van de mechanismen van opwindingsoverdracht en het normatief tekort. Seksuele opwinding is nauw verbonden met algemene, sympathische opwinding, waardoor er een overloop mogelijk is tussen emotionele opwinding en seksuele motivatie (Ågmo & Laan, 2022). Sommige prikkels veroorzaken sterke emotionele reacties, zoals pijn, vernedering, woede of walging. Door opwindingsoverdracht kunnen de emotionele reacties van zulke prikkels overlopen in seksuele opwinding, waardoor de prikkel krachtig genoeg wordt om seksuele opwinding of zelfs seksuele bevrediging te veroorzaken. Herhaalde koppeling van die prikkel en seksuele opwinding kan uiteindelijk resulteren in een stabiele seksuele interesse. Een sterke emotionele prikkel om de seksuele opwinding te vergroten is niet nodig als de seksuele motivatie al sterk genoeg is. Het mechanisme van normatief tekort houdt in dat opwindingsoverdracht vooral

zou kunnen werken voor mensen die geen sterke seksuele motivatie hebben voor normatieve seksuele prikkels.

Uit de bevindingen in dit proefschrift zijn drie afsluitende kernstandpunten afgeleid:

1. Deviante seksuele interesses lijken kneedbaar, in enige mate;
2. Emotie kan de seksuele opwinding voor deviante prikkels vergroten;
3. Een normatief tekort lijkt verband te houden met deviante seksuele interesses.

Veranderlijke factoren dragen bij aan deviante seksuele interesses. Als veranderlijke factoren bijdragen aan de ontwikkeling van deviante seksuele interesses, betekent dit niet noodzakelijkerwijs dat deviante seksuele interesses veranderlijk zijn. Veranderlijke factoren kunnen onveranderlijke processen in gang zetten. Ondanks een beperkte onderzoeksbasis zijn er enkele aanwijzingen dat deviant seksueel gedrag, evenals interesses, in enige mate veranderlijk zijn.

Emotie is een van de mechanismen die deviante seksuele interesses beïnvloeden. Van specifieke emoties en algemene stemming is aangetoond dat ze de seksuele opwinding kunnen vergroten of verkleinen. Hoewel emoties en stemming de seksuele opwinding kunnen beïnvloeden, is het tegenovergestelde waarschijnlijk ook waar: seksueel gedrag kan een negatieve stemming verbeteren. Als men seksuele deviantie wil verminderen, kan het nuttig zijn om te kijken naar het verband tussen emoties en seks bij het individu. Het kunnen reguleren van emoties lijkt een nuttig instrument om seksualiteit te reguleren.

Verder onderzoek naar een normatief tekort in de ontwikkeling van seksuele deviantie zou zich op twee aspecten moeten concentreren: oorzaak en generalisatie. Ten eerste: veroorzaakt een normatief tekort daadwerkelijk deviante seksuele interesses, en ten tweede: is dit generaliseerbaar naar andere deviante seksuele interesses dan pedofilie? Veelbelovende interventies om normatieve seksualiteit te verbeteren omvatten gezonde levensstijlveranderingen, farmacotherapie, seksuologische therapie, relatietherapie en herconditioneringstechnieken. Verder onderzoek en behandeling moeten rekening houden met twee dingen: de deviante identiteit en een juiste beoordeling van seksuele interesses. In het voorbeeld van pedofilie betekent dat: Als mensen pedofilie als onderdeel van hun identiteit zien, kan dit de resterende seksuele interesse in volwassenen verdoezelen. Een juiste beoordeling houdt in dat de seksuele interesse in kinderen onderscheiden wordt van de seksuele interesse in volwassenen.

Een sterk punt van dit proefschrift is dat het verschillende methoden en steekproeven uit verschillende populaties gebruikt. Ook hebben we een nuttig raamwerk geboden om de ontwikkeling van seksuele deviantie te verklaren. Een beperking van de staat van onderzoek in het algemeen en van een deel van de onderzoeken in dit proefschrift, is dat het grotendeels betrekking heeft op seksueel delictgedrag. Daarom kunnen de bevindingen alleen met voorzichtigheid worden gegeneraliseerd naar niet-delinquente populaties.

## **Conclusie**

Deviantie seksuele interesses lijken kneedbaar, in enige mate. De belangrijke rollen van opwindingsoverdracht en conditionering duiden erop dat veranderlijke processen meespelen in het ontstaan van seksuele deviantie. Deze zelfde processen kunnen potentieel worden ingezet om ongewenste deviantie seksuele interesses te verminderen. Dit is het meest relevant bij de behandeling van mensen die seksuele delicten hebben gepleegd om het risico op toekomstige delicten te verkleinen. Het kan ook informatief zijn voor mensen die negatieve gevolgen ondervinden van hun deviantie seksuele interesses. Meer onderzoek is nodig om na te gaan welke specifieke behandeltechnieken effectief zijn in het verminderen van seksuele deviantie. Het verbeteren van de emotieregulatie en het versterken van normatieve seksuele interesses zijn veelbelovende behandelopties.

## Impact Chapter

Sexual deviance can be problematic if it negatively affects health or quality of life, or acts as risk factor for sexual offenses. It can be necessary to address sexual deviance in treatment for people who suffer negative consequences from their deviant sexual interests. It can also be necessary to address sexual deviance in treatment of people who have committed sexual offenses to reduce the risk of future reoffenses. Current treatment may not be optimal. One of the most important reasons for this is that little is known about the development of sexual deviance. This thesis centered around the question: how do deviant sexual interests develop? An interplay of changeable factors seems to contribute to the development of deviant sexual interests, among which excitation transfer and a normative deficiency. Excitation transfer concerns de transfer of arousal from an initially nonsexual emotion (e.g., anger) to sexual arousal. As a result sexual arousal is higher in an emotional state than in a neutral, nonemotional state. Normative deficiency means that there is a lack of sexual interest in normative stimuli, for instance, “vanilla” sex, consent, or adults. Three concluding key statements were formulated.

1. Deviant sexual interests seem malleable, to some extent;
2. Emotion can increase sexual arousal to deviant stimuli;
3. A normative deficiency seems related to deviant sexual interests.

Deviant sexual interests seem malleable, to some extent. The roles of normative deficiency and excitation transfer designate that dynamic, changeable processes take part in the etiology of sexual deviance. These same processes could potentially be deployed to diminish unwanted deviant sexual interests. There is evidence that sexual deviance can be reduced by comprehensive cognitive behavioral treatment programs or general behavioral and conditioning approaches, but more research is needed to explore which specific techniques are effective. Improving emotion regulation and strengthening normative sexual interests are promising treatment directions.

### Dissemination

*The findings from this thesis are informative for a wide audience, including treatment providers and individuals with sexual deviance. The findings were disseminated via peer-reviewed journals, social and professional internet platforms, conferences, lectures, a podcast, and a magazine.*



A PhD trajectory that is embedded in an outpatient treatment organization allows research and practice to continuously reinforce each other. Therapist expertise and client experiences have informed the research and its conclusions. The findings from this thesis regarding emotion regulation and normative sexuality have been input in the development of treatment programs and in training for professionals, to ensure that these are in the focus of attention in treatment of sexual offense behavior.

Knowledge about sexual deviance is not only informative for treatment providers, but also for clients and individuals with sexual deviance, researchers, judges, probation officers, policy makers, and society. We have tried to reach this wide audience in various ways. Each study was published in an international, peer-reviewed journal. The meta-analysis of sexual interest in adults in people with pedophilia (Chapter 7) went viral on r/Science<sup>3</sup>, a community of the popular forum Reddit. This was picked up by B4U-act: a community of therapists, researchers, and “minor-attracted persons”<sup>4</sup>. They reviewed our meta-analysis in their quarterly journal (B4QR, 2023) and invited us for an author response (Schippers, 2023). For each study in this thesis, a layman’s summary was distributed via LinkedIn to a professional network consisting of psychologists, sexologists, probation officers, researchers, and treatment providers. The findings of this thesis were presented at international conferences of the Association for the Treatment & prevention of Sexual Abuse (ATSA), and national conferences of ATSA’s Dutch liaison (NL-ATSA) and the Dutch Scientific Society for Sexology (NVVS). The research findings were also presented in various other outlets including lectures with psychology students, sexological therapists, or probation officers. Also, one episode of “De DFZS-Podcast”<sup>5</sup> covered this thesis. Finally, the contents of this thesis were published as a magazine, IN PRESS magazine, to be accessible to a nonacademic audience.

### **Scientific Relevance**

*The current thesis is scientifically relevant because it provides a framework to understand sexual deviance, including starting points for further research. Also, it adds to the debate regarding the changeability of sexual deviance. Furthermore, we provided concrete research materials that are available for wider use.*

The current findings are relevant to various scientific fields, as they result from research at the intersection between forensic psychiatry, sexology, general

<sup>3</sup> [https://www.reddit.com/r/science/comments/1015ymr/pedophilia\\_is\\_associated\\_with\\_lower\\_sexual/?rdt=61595](https://www.reddit.com/r/science/comments/1015ymr/pedophilia_is_associated_with_lower_sexual/?rdt=61595)

<sup>4</sup> <https://www.b4uact.org/>

<sup>5</sup> <https://open.spotify.com/show/32aUbbWCvIhR8IMCBU156i>

psychology, and emotion psychology. As discussed in Chapter 2, many scholars have stated that there are no theories explaining the development of sexual deviance. This chapter also showed that there is no lack of theories, however, not many theories were of good quality. Nonacceptable quality theories, for instance, were not precise, generalizable, or parsimonious. We provided a useful framework to understand deviant sexual interests, in the form of an incentive motivational model. This model is already commonly used to understand general sexual motivation.

Additionally, this thesis focused on excitation transfer and normative sexual interests. Excitation transfer is a known phenomenon, but its application to sexual arousal mostly dates back to the previous century. The impact of normative deficiency on sexual deviance has been suggested before, but never systematically researched. These starting points can inform further research.

There is a discussion on whether pedophilia develops as a result of nature or nurture, and whether it is changeable. Our conclusions could be positioned somewhere in the middle of these extremities. This thesis concluded that changeable factors may contribute to deviant sexual interests, and that deviant sexual interests seem malleable, to some extent.

On a practical level, this thesis included a procedure for a follow-up study to excitation transfer (Chapter 5). We have carefully screened, selected, and tested film fragments suitable for virtual-reality environments, which are available for wider use in experimental paradigms with emotion induction. In Chapter 2 we devised a checklist for “good theories”, including criteria regarding, for example, falsifiability, precision, and generalizability. This was, to our knowledge, not previously available, and can be used by other researchers for similar purposes.

### **Societal Relevance**

*This thesis has societal relevance because its findings can be used to improve treatment of sexual deviance. This can ultimately reduce negative consequences for individuals, victims and perpetrators of sexual offenses, and society.*

Besides scientific relevance, the current findings have societal relevance. More knowledge about the development of sexual deviance contributes to better treatment of people who have sexual deviance and people who have sexually offended. Sexual offenses can have severe and long-lasting negative consequences for victims. Additionally, the related costs and efforts of the judicial and health care

systems have an impact on society. By aiming to improve treatment, the ultimate goal of this thesis is to reduce negative consequences for individuals and society.

On various levels there are still many misconceptions about sexual deviance as well as sexual offenses. This feeds societal upheaval and stigma and may complicate access to adequate treatment. A common example is the idea that pedophilia is inevitably and intrinsically connected to sexual offenses. Such misconceptions are not only present in the general population, but even in probation officers and forensic professionals. More knowledge about sexual deviance will hopefully nuance these ideas. In lectures and workshops, we try to paint a picture about sexual deviance that is less black and white.

The forensic field does a lot of research to risk assessment that predicts the risk of recidivism. This important work is, unfortunately, limited to risk factors in people who have already committed sexual offenses. The research in this thesis explicitly focuses on a broader target group than that. Also, it dove into the origin of one of those risk factors, sexual deviance. The fundamental research in this thesis provided many new starting points for further research. On a practical, societal level, we aimed to translate the findings to clinical practice, with the ambition to improve treatment of sexual deviance.

## Curriculum Vitae

Eveline Schippers obtained her bachelor's degree in Psychology from Leiden University in 2012. She graduated cum laude from the research master's program in Psychology at the University of Amsterdam in 2014. Since then, Eveline has been employed in various capacities at both the outpatient division De Waag and clinical division Van der Hoevenkliniek of The Forensic Care Specialists. She researched sexual offending behavior and worked on various healthcare innovations and treatment programs. In parallel, Eveline conducted her PhD research at the Maastricht University between 2018 and 2023. Currently, she works as a team manager and program manager at De Waag. In the latter position, she is responsible for the content and implementation of the treatment program for sexual offending behavior at the various Waag locations. Eveline's professional aim is to bring theory and practice together to ameliorate forensic treatment to prevent sexual offense behavior.

## Thank You

Er zijn heel wat mensen die mijn leven de afgelopen jaren leuker hebben gemaakt. Zo leuk dat het makkelijker zou zijn geweest om dit proefschrift maar te laten zitten. Lieve familie en vrienden, dank voor de kleur en plezier die jullie mijn leven geven. Ik heb het proefschrift ondanks jullie toch maar afgemaakt.

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