

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

Sexual Abuse
2023, Vol. 0(0) 1–22
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DOI: 10.1177/10790632231200841
journals.sagepub.com/home/sax


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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,

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Received: 11 April 2022; revised: 14 July 2023; accepted: 24 August 2023

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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

Introduction

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 seven-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; 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; 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; 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

Table 1. Types of Replications.

	Same Measurement and Analysis	Different Measurement and Analysis
Same dataset	Checking of analysis	Re-analysis of data
Same population	Exact replication	Conceptual replication
Different population	Empirical generalization	Generalization and extension

Adapted from [Tsang and Kwan \(1999\)](#) and [Walker et al. \(2017\)](#).

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 BDSM¹ identity ([Labrecque et al., 2020](#); [Mundy & Cioe, 2019](#); [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 for sexual offending in women is limited (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). 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 = .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 .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 non-invasive, 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; Klein et al., 2015) and general sexual functioning were assessed with the

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	.90	-.01	.01	.05
Feces	Myso	.88	.06	-.02	-.07
Forcing someone against will	Forbid	.78	.12	-.15	.08
Corpse	Myso	.65	-.11	.22	.17
Dirty underwear	Supposed Myso	.64	-.03	.06	.24
Vomit	Supposed Myso	.64	-.09	.20	.17
Someone aged 13–16	Forbid	.62	-.01	-.05	.25
Being tied	SubMas	.07	.88	.03	-.09
Tying someone	DomSad	-.05	.86	-.13	.15
Blindfolding someone	DomSad	-.04	.81	-.01	.04
Surrendering your will	SubMas	.12	.71	-.01	-.09
Someone at your mercy	DomSad	-.06	.64	-.10	.26
Spanking someone	DomSad	-.13	.63	.30	.13
Being spanked	SubMas	.02	.63	.36	-.05
Hot wax dripped on you	SubMas	.27	.38	.21	.04
Gagging someone	DomSad	.05	.18	.52	.27
Being made to gag	SubMas	.28	.20	.50	-.02
Blood	Myso	.41	-.02	.41	.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	.69
Dressed as plush animal	Fetish	-.03	.08	-.00	.68
Spying unsuspecting person	Forbid	.08	.24	-.22	.62
Rubbing unsuspecting person	Forbid	.10	.05	-.02	.59
Family member	Forbid	.19	-.03	-.00	.58
Medical examinations	Supposed Fetish	.10	.09	.02	.57
Verbally humiliating someone	DomSad	-.07	.09	.44	.51
Exposing your genitals	Forbid	.21	-.06	.12	.51
Blow-up doll	Fetish	.19	.09	.03	.45
Someone with obesity	Fetish	.07	-.02	.14	.45

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

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: χ^2 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

Table 3. EFA Factor Pearson Correlation Matrix.

Factor	BDSM-Light	BDSM-Heavy	Fetish-Forbidden
Forbidden-extreme	.29	.42	.72
BDSM-light		.32	.47
BDSM-heavy			.37

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

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 .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 intrusive², 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.

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.

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

Table 4. CFA Standardized Regression Weights.

Factor	Item	Estimate
Forbidden-extreme	Someone aged < 12	.94
	Dirty underwear	.86
	Corpse	.85
	Feces	.82
	Vomit	.82
	Someone aged 13–16	.80
BDSM-light	Forcing against will	.79
	Being tied	.91
	Tying someone	.90
	Blindfolding someone	.77
	Someone at your mercy	.76
	Spanking someone	.73
BDSM-heavy	Being spanked	.72
	Surrendering your will	.69
	Gagging someone	.78
	Being seriously hurt	.78
	Being made to gag	.75
	Family member	.72
Fetish-forbidden	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.

Factor	BDSM-Light	BDSM-Heavy	Fetish-Forbidden
Forbidden-extreme	.36	.76	.84
BDSM-light		.61	.54
BDSM-heavy			.78

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

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

Table 6. General Sexual Functioning in Replication Sample and Men From Original Sample.

Question, Response Options	Replication Sample (Population)	Men Original Sample	OR	95% CI
	<i>n</i>	<i>n</i>		
How many orgasms did you have each week?	256	252		
<1 p.w	40	10	.22	(.11, .46)
1–3	142	57	.23	(.16, .34)
4–6	46	68	1.69	(1.10, 2.58)
7–9	17	59	4.30	(2.43, 7.61)
10–12	5	32	7.30	(2.80, 19.07)
13+	6	26	4.79	(1.94, 11.86)
How many hours did you invest in sexual activity each week?	256	251		
<1 p.w	35	22	.61	(.34, 1.07)
1–3	146	80	.35	(.25, .51)
4–6	44	61	1.55	(1.00, 2.39)
7–9	18	44	2.81	(1.57, 5.02)
10–12	8	29	4.05	(1.81, 9.04)
13+	5	15	3.19	(1.14, 8.92)
How long were you involved in sexual activity before you reached orgasm?	256	251		
<5 min	44	7	.14	(.06, .31)
5–30 min	144	109	.60	(.42, .85)
30 min–1 hr	26	87	4.69	(2.90, 7.60)
1–2 hrs	5	33	7.60	(2.92, 19.81)
2+ hrs	2	9	4.72	(1.01, 22.08)
Never reached orgasm	35	6	.15	(.06, .37)
How satisfying was your sex life?	256	249		
Extremely unsatisfying	20	19	.97	(.51, 1.87)

(continued)

Table 6. (continued)

Question, Response Options	Replication Sample (Population)	Men Original Sample	OR	95% CI
	<i>n</i>	<i>n</i>		
Very unsatisfying	16	37	2.62	(1.42, 4.84)
Somewhat unsatisfying	44	54	1.33	(.86, 2.08)
Somewhat satisfying	120	80	.54	(.37, .77)
Very satisfying	48	39	.80	(.51, 1.28)
Extremely satisfying	8	20	2.71	(1.17, 6.27)
When you feel more stressed or unhappy than usual, are you...	256	243		
Less likely to masturbate/have sex	137	58	.27	(.19, 0.40)
Equally likely to masturbate/have sex	75	70	.98	(.66, 1.44)
More likely to masturbate/have sex	44	115	4.33	(2.87, 6.53)
Compared to most people, do you think that your actual sex life is...	256	243		
Boring	63	42	.64	(.41, .99)
Normal/ordinary	135	59	.29	(.20, .42)
Somewhat adventurous	52	69	1.56	(1.03, 2.35)
Kinky	6	73	17.89	(7.61, 42.07)
How often do you watch porn?	256	243		
Never	104	7	.04	(.02, .10)
Once a month or less	76	22	.24	(.14, .39)
More than once a month, less than once a week	42	39	.97	(.61, 1.57)
More than once a week, less than daily	29	123	8.02	(5.06, 12.72)
Daily	5	52	13.67	(5.36, 34.88)
Watching pornography primarily helps you to...	152	233		
Get aroused	87	116	.74	(.49, 1.12)
Stay aroused	35	32	.53	(.31, .90)
Achieve orgasm	30	85	2.34	(1.44, 3.78)

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 $p < .05$.

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., 2023; 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 (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.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Author Notes

The authors takes responsibility for the integrity of the data, the accuracy of the data analyses, and have made every effort to avoid inflating statistically significant results.

Statement of Authorship

Conceptualization: E.E.S., W.J.S.; Methodology: E.E.S., W.J.S., L.M.H.; Software: E.E.S.; Formal analysis: E.E.S.; Investigation: E.E.S.; Resources: L.M.H.; Writing-original draft: E.E.S.; Writing-review & editing: W.J.S., L.M.H., V. de V.; Supervision: W.J.S., L.M.H., V. de V.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. Bondage and Discipline (BD), Dominance and Submission (DS) and Sadism and Masochism (SM).
2. Naturally, the choice of words is not intended to diminish the seriousness of potential damage for victims.

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