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The Prevalence of BDSM in Finland and the Association between BDSM Interest and Personality Traits

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ABSTRACT

According to previous research, interest in BDSM (Bondage-Discipline, Dominance-Submission and Sadomasochism) activities is high in several European countries and various BDSM practices are not uncommon. There is a limited amount of research on the personalities of BDSM practitioners, but in previous research practitioners have been found to have better overall well-being and to be more educated than the general population. The current study explored the prevalence of BDSM interest and practice in a Finnish sample ($n = 8,137$, age range 18–60, $M = 30.14$, $SD = 8.08$) and investigated the association between BDSM interest and personality measured with the six-factor personality measure HEXACO. A total of 38% of the sample was interested in BDSM sex and non-heterosexual individuals displayed almost twice as much interest and at most 83% more participation in BDSM than heterosexual individuals. Younger participants (18–28 years old) displayed almost three times as much interest than older participants. There were some associations between BDSM interest and personality factors, but the effect sizes of these associations were modest. The study shows that BDSM interest is quite common among the Finnish population.

Introduction

BDSM is an abbreviation for bondage and discipline, dominance and submission, and sadism and masochism. The abbreviation usually refers to role-play of physical, psychological and sexual aspects involving power exchange between consensual participants (De Neef et al., 2019). To define BDSM with precision is difficult, because of the wide variety and variability of practices, but the power exchange aspect is usually involved (Brown et al., 2019; Hebert & Weaver, 2014). Enjoyment of physical and psychological control and pain (Hebert & Weaver, 2014), and physical restraint and intense sensory experiences (Holvoet et al., 2017) are also highlighted as key concepts. In addition, those who practice BDSM can be divided into two broad groups: those who want to be in control, and those who want to give up control (Hebert & Weaver, 2014). These groups are referred to as dominant and submissive. Being in both roles (switch) is also common (Hebert & Weaver, 2014). Not everyone identifies with these roles in BDSM and there are many more common roles (De Neef et al., 2019). In recent years, BDSM has enjoyed increased mainstream exposure, which is also reflected in the scientific research regarding the subject (De Neef et al., 2019). BDSM-related activities are still subject to misunderstandings and individuals practicing BDSM may be stigmatized (De Neef et al., 2019; Yost, 2010). Moser (2019) raised the point that all societies attempt to control the sexual behavior of its members and this mechanism can be exercised by defining certain sexual interests or practices as mental disorders.

According to previous research, BDSM practitioners have a relatively high well-being (Moser, 2009; Wismeijer & van Assen, 2013) and they often have an above-average level of education (Brown et al., 2019; Monteiro Pascoal et al., 2015). However, the number of studies investigating psychological characteristics of BDSM practitioners is limited and have, thus far, focused mostly (to our knowledge) on modern Western societies (see Table 1). Some psychological theories about the etiology of BDSM interest and practices have been developed but most of these have been psychoanalytically-based theories with little empirical support (Brown et al., 2019). Not much is known about the psychological characteristics of BDSM practitioners, but earlier research indicates that practitioners do not differ in a meaningful way from the general population (Hebert & Weaver, 2014; Wismeijer & van Assen, 2013). There is still a lack of understanding regarding the nature and prevalence of BDSM activities and this contributes to stigmatization of the phenomenon (Holvoet et al., 2017). Information regarding prevalence helps to address cultural differences seen in interest and practice and more knowledge of prevalence may help to reduce stigma, by making it visible that interest and practice in BDSM is not negligible. Thus, more research is required to further establish BDSM practices as a normal part of the spectrum of sexual behaviors. The current study aimed to establish the prevalence rates of interest and practice of BDSM in Finland, and also compare the personalities of those who were interested in BDSM with those who were not using a population-based sample of Finnish twins and siblings aged 18–60 years.

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Table 1. Prevalence rates of BDSM activity and interest.

Study	Sample	Age	Methods	Results
Coppens et al., 2020	Belgian general population (N = 1,289)	24–57	Online questionnaire	75% had interest in at least one BDSM activity. 15% only fantasized, 60% had put interest into practice at least once.
Holvoet et al., 2017	Belgian general population (N = 1,027)	18–65	Online questionnaire	47% of the sample had taken part in at least one BDSM activity, and additional 26% of the sample said they were interested in BDSM.
Joyal & Carpentier 2017	Canadian (Québec) population (N = 1,040)	18–64	Telephone interview and online questionnaire	Wish to experience masochism was reported by 24% (19% in men, 28% in women). For sadism it was 7% (10% in men and 5% in women).
Herbenick et al. 2014	American general population (N = 2,021)	18–91	Online questionnaire	29% found tying up partner or being tied up appealing. Sex with elements of experiencing pain was found appealing by 11%.
Richters et al. 2009	Australian general population (N = 19,841)	16–69	Telephone interview and computer-assisted telephone interview	2% of respondents had participated in BDSM sex in the past year
Tomassilli et al. 2003	American self-identified lesbian and bisexual women (N = 347)	M = 33.60 (9.93)	Questionnaire	Over 40% reported having engaged in at least one activity that can be considered BDSM. 25% reported having participated in several activities.
Bailey et al. 2003	British lesbian and bisexual women (N = 1,218)	M = 31.2 (6.4) and 34.4 (9.8)	Questionnaire	With women 19% of participants had occasional SM activity and 5% often. With men (past 10 years) 6% of participants had occasionally SM activity and 2% often .
Richters et al., 2003	Australian general population (N = 16,779)	16–59	Computer-assisted telephone interview	2% of men had BDSM activity and 1% of women
Renaud & Byers, 1999	Canadian undergraduate students (N = 292)	17–45	Questionnaire	72% of men and 59% of women had fantasies about being tied up. 65% of men and 58% of women had fantasies about tying up a partner.

Note. BDSM = Bondage & Discipline, Domination & Submission and Sadism & Masochism. Average age and standard deviation are given if they were retrievable from the study; in other cases only age range is reported.

Prevalence

The prevalence rates of BDSM interest and practice are varied (See Table 1 for studies describing prevalence rates). A commonly cited Australian study (Richters et al., 2003) found that 2% of men and 1% of women (aged 16–59 years) had practiced BDSM during the previous year. Other research has estimated prevalence of BDSM practice to be around 10% (Hebert & Weaver, 2014). Prevalence rates of practice increase significantly if the activities are specified (e.g., being tied up) rather than if study participants are asked to identify as BDSM practitioners or non-practitioners (De Neef et al., 2019). This may be due to the fact that BDSM has a more strict connotation than individual specific acts that go under the term BDSM (De Neef et al., 2019). Holvoet et al. (2017) also found support for this notion, as almost half of their sample had taken part in BDSM-like activities, but only 8% actually identified as BDSM practitioners.

The prevalence of BDSM interest and fantasies is much higher than the prevalence of practice. In a study of the Belgian general population, Holvoet et al. (2017) found that 47% of their sample (N = 1,027) had taken part in at least one BDSM-related activity and that 22% had had fantasies without putting them into practice. A Canadian study demonstrated that among university students, 72% of men and 59% of women had had fantasies about being tied up (Renaud & Byers, 1999). Men's and women's prevalence rates of BDSM practice/interest differ in almost all studies, depending on the activity (Brown et al., 2019); men tend to prefer a more dominant role and women a submissive role (De Neef et al., 2019). For example, in Wismeijer's and van

Assen's (2013) study, 48% of men (n = 464) in a sample of BDSM practitioners assumed the dominant role and 76% of women (n = 438) assumed the submissive role.

In the general population, about 90% identify as heterosexual (Bailey et al., 2016; Holvoet et al., 2017). This does not appear to be the case for the BDSM community, where in one study of BDSM practitioners, only 65% identified as heterosexual, with 23% identifying as bisexual, and 17% identified their sexual orientation as something other than hetero- or bisexual (percentages exceed 100% because multiple choices were allowed) (Brown et al., 2017). In one study of BDSM practitioners (Botta et al., 2019), only 40% of men (n = 141) and 30% of women (n = 125) identified exclusively as heterosexual. Non-heterosexual individuals also practice BDSM more frequently than heterosexuals (De Neef et al., 2019).

Personalities of BDSM Practitioners

Due to a scarcity of studies, the psychological characteristics of BDSM practitioners are not well understood. Earlier research on the psychological characteristics of BDSM practitioners has mostly focused on personality disorders and psychological disorders in relation to BDSM (Hebert & Weaver, 2014). There is evidence suggesting that BDSM practitioners have relatively good psychological health and there is also a lack of evidence suggesting that BDSM practices have adverse effects on well-being (Richters et al., 2008; Wismeijer & van Assen, 2013). Wismeijer and van Assen (2013) found that BDSM practitioners (n = 902) were less neurotic, less agreeable, more extraverted, more open to new experiences and more conscientious compared to a control group (n = 434), when assessed with the NEO

Five Factor inventory (NEO-FFI); however, the effect sizes were small for all the differences. The BDSM group of this study consisted of 464 Dutch men (average age 45.5 years) and 438 Dutch women (average age 37.0 years). The sample was gathered from the largest BDSM web forum in The Netherlands with a control group consisting of convenience sample involving 129 Dutch men (average age 40.0) and 305 Dutch women (average age 34.1). In the present study, we aimed to conceptually replicate the findings of Wismeijer and van Assen (2013) with a larger and more representative sample.

Hebert and Weaver (2014) assessed BDSM practitioners' ($N = 270$) personality with the HEXACO Personality Inventory and were mainly interested in the differences between practitioners who identified as dominant and as submissive. The sample was gathered from two different online BDSM communities on Reddit.com and one additional online community discussing sex more generally. The sample consisted of 93 men and 168 women with an average age of 25 years (range: 18–64). Results showed that dominant and submissive individuals differed on the extraversion and emotionality factors of the HEXACO Personality Inventory, so that dominant individuals scored higher on extraversion and submissive individuals scored higher on emotionality. Hebert and Weaver argued that BDSM practitioners cannot be considered a homogenous group and future research should take into account the BDSM preferences of the individual. They also reported that individuals with dominant or submissive roles did not differ on any of the HEXACO factors from the general population ranges established by Lee and Ashton (2004) in their validity study of the HEXACO.

These studies suggest that BDSM practitioners do not differ in terms of their personalities from the general population. Some studies have found that BDSM practitioners score higher on well-being compared to non-practitioners (Hebert & Weaver, 2014; Wismeijer & van Assen, 2013), while other studies have found conflicting evidence.

Aims of the Current Study

The practice of BDSM has been considered pathological for a long time, but studies (Hebert & Weaver, 2014; Wismeijer & van Assen, 2013) show that BDSM practitioners may in fact have better psychological health compared to non-practitioners. Historically, BDSM was thought to be caused by mental illness or a dysfunctional childhood (De Block & Adriaens, 2013; A. Brown et al., 2019). Indeed, BDSM is still associated with paraphilic disorders to some degree (Brown et al., 2019). BDSM activities were considered sexual disorders in the past in the Diagnostic and Statistical Manual of Mental Disorders (DSM) (Moser & Kleinplatz, 2006) and also in the World Health Organization's International Classification of Diseases (ICD), but both of these classification systems have removed or revised the previous definitions.

The prevalence of BDSM interest and practice is unknown in several European countries and to our knowledge no scientific studies reporting prevalence rates for the Nordic countries exist. Finland is a highly developed, not very religious Western country with rather liberal attitudes toward different sexual behaviors. Furthermore, previous studies (Hebert & Weaver,

2014; Wismeijer & van Assen, 2013) in which associations between BDSM practice and personality or other psychological traits have been studied have targeted mostly BDSM-practicing populations exclusively, and not general populations. Therefore, the first aim of the present study was to explore the prevalence of BDSM interest and BDSM-related activities, as well as their associations with age, sexual orientation and sex in a large Finnish sample better representing the general population than previous research. The second aim was to investigate how personality, measured with the HEXACO, differs between persons who are interested in BDSM activities and those who are not. Based on the study by Wismeijer and van Assen (2013) that found that their BDSM group was less neurotic, more extraverted, more open to new experiences, more conscientious and less agreeable compared with a control group, we hypothesized that in the current study our BDSM group (those who were interested in BDSM) and non-BDSM group (those who were not interested in BDSM) would similarly differ in the scores when measured with the HEXACO factors: emotionality, extraversion, openness to experience, conscientiousness and agreeableness. Based on previous research we also expected non-heterosexual individuals to express more interest in BDSM activities than heterosexual individuals.

Method

Participants

The sample used in the present study was a large, population-based adult sample, consisting of survey responses from twins and their siblings in Finland as part of the Genetics of Sexuality and Aggression (GSA) project. The participants were allowed to stop completing the survey at any time; 9,139 started the survey and 1,002 participants had stopped completing the survey at some point before reaching the BDSM-related questions at the end of the survey. The final sample therefore consisted of 8,137 individuals. The sample included responses from 2,790 males (34%) and 5,347 females (66%). The mean age of the participants was 30.14 years ($SD = 8.08$ years, $Md = 28$, range 18–60). The mean survey completion time was 66 minutes ($SD = 30.22$).

Letters of invitations to participate in an online survey were sent to Finnish twins and the siblings of those twins identified from the Central Population Registry in Finland. The participants were told that the study was a research project funded by the Academy of Finland and Åbo Akademi's Foundation and the goal was to study sexuality and aggressiveness. They were also told that participation was voluntary and anonymous.

The research plan for the data collection used in the present study was evaluated and accepted by the Ethics Review Board of the Åbo Akademi University. All participants provided written, informed consent in accordance with the Declaration of Helsinki. The survey was not developed specifically for this study and it contained several dozens of different questionnaires. The order of the questionnaires was always the same. The GSA project began in 2006 as a population-based longitudinal study with a research goal of studying sexuality and aggressiveness and heritability of these traits. Many scientific

articles have been published based on data collected as part of the project. Data used in this study was from the third data collection in the series of surveys. The participants in this data were twins and siblings who had participated in the project earlier, but there were also twins and their siblings who were invited to participate for the first time. The procedure of the data collection has been described in detail elsewhere (Tybur et al., 2020). Data collection concluded in the first week of January 2019. In total, 9,564 individuals (6,965 twins and 2,592 siblings, 7 unknown) responded, resulting in a total response rate of 29%, with 9,319 (97%) of respondents giving consent for the use of their data for scientific purposes. 8,137 participants answered the BDSM-related questions, who constituted the final sample in this study.

Measures

BDSM Interest and Practice

This instrument was self-constructed. Participants were asked eight questions regarding their BDSM interest and practices: “Have you been dominated, humiliated, controlled (e.g., bondage) or has your partner caused you pain, with mutual consent to achieve sexual pleasure?” with answer options “never/I have tried at least once/occasionally/monthly/weekly or more often/”. They were then asked to rate how enjoyable the activity was if they did not answer never, “Overall, how enjoyable do/did you experience this sort of sexual activity?” with Likert-scale answer options (1 not at all enjoyable – 5 very enjoyable). Similar questions and follow-up questions were asked regarding dominating behavior: “Have you dominated, humiliated, controlled (e.g., bondage) or caused pain to a partner, with mutual consent to achieve sexual pleasure?” and “Overall, how enjoyable do/did you experience this sort of sexual activity?” Also, general questions about interest (e.g., “Do you have interest in BDSM sex?”) with the dichotomous response option yes/no. The instrument also had other questions regarding BDSM (i.e., the feeling of innateness and partner BDSM interest) but they were out of scope for this study.

HEXACO-100

The HEXACO consists of six personality factors: honesty-humility (level of modesty and honesty), emotionality (level of anxiety and sentimentality), extraversion (level of sociability and cheerfulness), agreeableness (level of patience and forgiveness to others), conscientiousness (level of organization and prudence) and openness to experience (level of creativity and unconventionality) (Lee & Ashton, 2004). Each factor has its own subscale consisting of 16 items. The extraversion, conscientiousness and openness to experience factors are similar to the Big Five factors. The big five factors, agreeableness and neuroticism, correspond to the agreeableness and emotionality factors in HEXACO, but the content of the factors differ (Lee & Ashton, 2008). The sixth factor (honesty-humility) is not represented in the Big Five personality model, but there have been multiple studies supporting the “big six” structure (Lee & Ashton, 2008; Saucier, 2009). The HEXACO personality inventory has been translated to over 30 languages and it has been utilized successfully in many studies regarding, for example, ethical decision making, political attitudes and sexuality

(Bourdage et al., 2007; Chirumbolo & Leone, 2010; Lee et al., 2008). Each item of the questionnaire is rated on a 5-point Likert scale ranging from *Strongly disagree* (1) to *Strongly agree* (5). The mean of scores in each scale is calculated so that the possible score on each variable ranges from 1.0 to 5.0. Cronbach’s alphas of HEXACO were calculated for the people who answered the question regarding BDSM interest ($n = 8,137$) which was the sample used for the personality analyses. For the six personality factors (honesty-humility, emotionality, extraversion, agreeableness, conscientiousness and openness to experience) Cronbach’s alphas in the sample were: .82, .83, .90, .82, .79 and .83, respectively. The Finnish translation of the HEXACO questionnaire is freely available for download from www.hexaco.org.

Statistical Analyses

Associations between three different BDSM-related questions (submission, domination and interest) and sexual orientation, age, and gender were examined using χ^2 tests of independence with Cramér’s V as estimate of the strength of association. The gender used in our analyses was not self-reported, but was taken from the official gender reported in the central registry of Finland for the participants. The influence of BDSM interest on personality factors measured with the HEXACO Personality Inventory were tested using a series of generalized estimating equation (GEE) regression models. Separate models were conducted on each HEXACO factor which was treated as the dependent variable and age was used as a covariate and BDSM interest as an independent factor. Models for men and women were conducted separately. The GEE allows one to control for between-subjects dependence, which was necessary because the sample consisted of individuals from the same families. Partial η^2 was used to report effect sizes and as the GEE procedure in SPSS does not have an option to calculate effect size, effect sizes were estimated using an univariate General Linear Model procedure, using one randomly selected individual from each family to control for genetic relatedness. Not all personality factors tested passed the Levene’s test of equality of error variances and to account for possible deflation of p -values because of this, as well as to adjust for multiple hypothesis testing, we decided to use an alpha-level of .001 in all analyses.

All analyses were carried out using SPSS (PASW) 23.0 (SPSS Inc., Chicago, IL, USA).

Results

Prevalence of Practice

The answer frequencies for the question “Have you been dominated, humiliated, controlled (e.g., bondage) or has your partner caused you pain, with mutual consent to achieve sexual pleasure?” are presented in Figure 1, Figure 2 a and Figure 3a. There was a gender difference, with 37% of women having been dominated at least once or more compared to 23% of men ($\chi^2(4) = 236.575, p < .001$, Cramér’s V = .170). The prevalence of submission practices also displayed differences based on sexual orientation. The proportion of heterosexual participants

who reported having been dominated at least once or more was 30%, whereas the prevalence was 40% for homosexual participants and 54% for bisexual participants ($\chi^2(8) = 266.255$, $p < .001$, Cramér's $V = .129$). There was also a significant effect of age, with higher frequencies for younger age groups compared to older ones; 18–28 year old participants (36% reported having being dominated once or more), 32% of the 29–39 year olds, 21% of the 40–50 year olds and 22% of the 51–61 year olds ($\chi^2(12) = 170.773$, $p < .001$, Cramér's $V = .084$).

The response frequencies for the question “Have you dominated, humiliated, controlled (e.g., bondage) or caused pain to a partner, with mutual consent to achieve sexual pleasure?” are presented in Figure 2 b and 3b. A significant gender difference was detected, with 32% of men having dominated at least once or more compared to 25% of the women ($\chi^2(4) = 100.550$, $p < .001$, Cramér's $V = .111$). There was also a significant difference between heterosexual and non-heterosexual individuals, with 26% of heterosexual

individuals reporting having dominated once or more compared to higher figures among homosexual individuals (34%) and bisexual individuals (41%) ($\chi^2(8) = 88.629$, $p < .001$, Cramér's $V = .075$). Likewise, there was a difference between age groups in the frequency of domination; 18–28 year olds 29% reported having dominated once or more, compared with 28% of the 29–39 year olds, 18% of the 40–50 year olds and 22% of the 51–61 year olds ($\chi^2(12) = 86.780$, $p < .001$, Cramér's $V = .060$).

Prevalence of BDSM Interest

Data on frequencies for interest are reported in Figure 1a. Overall, 38% of the 8,137 participants said they were interested in BDSM sex. A total of 36% of men and 38% of women reported having an interest in BDSM sex and this difference was not statistically significant ($\chi^2(1) = 6.078$, $p = .014$, Cramér's $V = .014$). There was

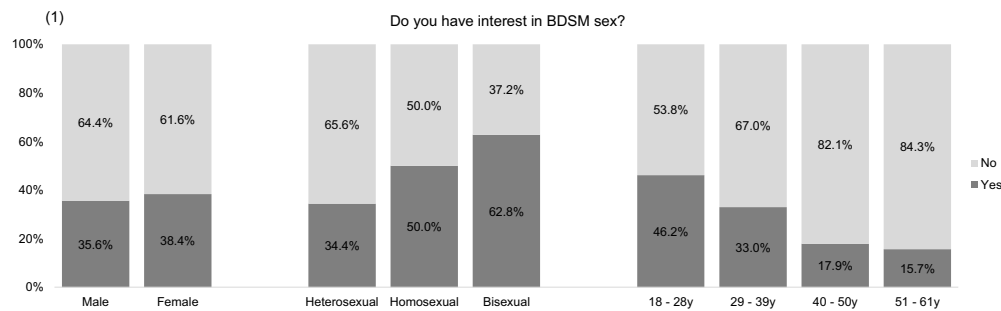


Figure 1. Answer frequencies regarding interest among men ($n = 2,760$), women ($n = 5,349$), heterosexual individuals ($n = 7,124$), homosexual individuals ($n = 220$), bisexual individuals ($n = 605$), 18–28 year olds ($n = 4,233$), 29–39 year olds ($n = 2,605$), 40–50 year olds ($n = 1,239$), and 51–61 year olds ($n = 51$).

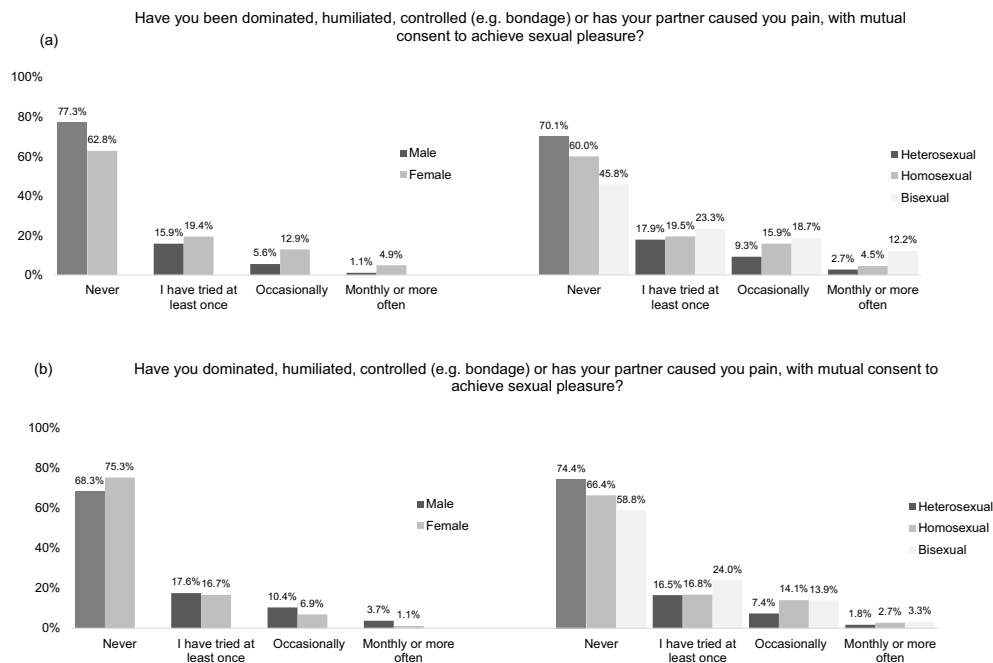


Figure 2. Answer frequencies regarding domination for men ($n = 2,760$), women ($n = 5,349$), heterosexual individuals ($n = 7,124$), homosexual individuals ($n = 220$), and bisexual individuals ($n = 605$). Figure 2b. Answer frequencies regarding domination for men ($n = 2,760$), women ($n = 5,349$), heterosexual individuals ($n = 7,124$), homosexual individuals ($n = 220$), and bisexual individuals ($n = 605$).

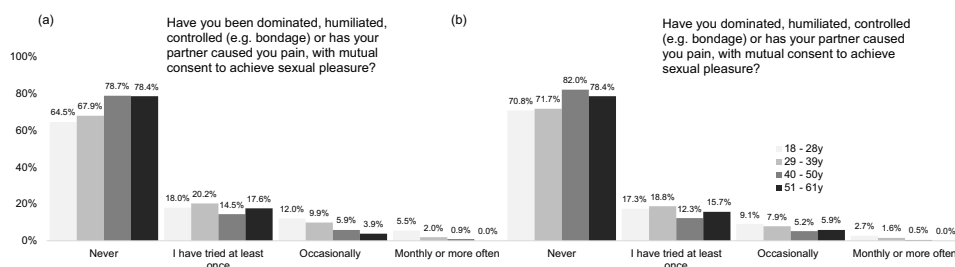


Figure 3. Answer frequencies regarding domination and submission for 18–28 year olds ($n = 4,233$), 29–39 year olds ($n = 2,606$), 40–50 year olds ($n = 1,240$), and 51–61 year olds ($n = 51$).

Table 2. Associations between the **HEXACO personality factors**, BDSM interest and age for men.

Variable	Wald χ^2	p	B	SE	Partial η^2 ^a
Honesty-Humility					
BDSM Interest	39.942	< .001	-.141	.044	.010
Age	92.392	< .001	.013	.001	.030
Emotionality					
BDSM Interest	1.249	.264	.023	.020	.001
Age	5.586	.018	-.003	.001	.005
Extraversion					
BDSM Interest	4.506	.034	-.057	.027	.000
Age	9.340	.002	.005	.002	.002
Agreeableness					
BDSM Interest	7.098	.008	-.055	.040	.002
Age	51.770	< .001	-.009	.001	.014
Conscientiousness					
BDSM Interest	22.150	< .001	-.095	.020	.007
Age	7.067	.008	.003	.001	.003
Openness to experience					
BDSM Interest	53.651	< .001	.174	.024	.024
Age	25.167	< .001	.007	.002	.010

Note. BDSM = Bondage & Discipline, Domination & Submission and Sadism & Masochism, Wald χ^2 = Wald chi squared, B = unstandardized regression coefficient, SE = standard error of the B

^a= effect size acquired from unianova General Linear Model. See methods for further information

a significant difference regarding BDSM interest related to sexual orientation: heterosexual individuals had an interest rate of 34%, homosexual individuals of 50% and bisexual individuals of 63% ($\chi^2(2) = 209.001$, $p < .001$, Cramér's $V = .162$). The youngest group (18–28 years) displayed the most interest at 46%, followed by the second youngest (29–39 years) at 33%, the third youngest (40–50 years) at 18% and the oldest group (51–60 years) at 16%; the observed differences were significant ($\chi^2(3) = 373.201$, $p < .001$, Cramér's $V = .214$).

Associations between Personality Structure and BDSM Interest

To investigate if individuals interested in BDSM ($n_{men} = 994$, $n_{women} = 2,053$) differed from those who were not ($n_{men} = 1,792$, $n_{women} = 3,289$) in terms of the HEXACO personality factors, a series of generalized estimating equation regression models were conducted. As can be seen in Tables 2 and 3, negative associations between BDSM interest and the personality factors honesty-humility and conscientiousness were found for men and women. In addition, there was a negative

Table 3. Associations between the **HEXACO personality factors**, BDSM interest and age for women.

Variable	Wald χ^2	p	B	SE	Partial η^2 ^a
Honesty-Humility					
BDSM Interest	65.004	< .001	-.127	.016	.013
Age	111.948	< .001	.011	.001	.024
Emotionality					
BDSM Interest	0.589	.443	-.011	.015	.000
Age	31.025	< .001	-.005	.001	.005
Extraversion					
BDSM Interest	2.433	.119	-.031	.020	.001
Age	90.874	.000	.012	.001	.019
Agreeableness					
BDSM Interest	13.812	< .001	-.059	.016	.004
Age	63.182	< .001	-.008	.001	.012
Conscientiousness					
BDSM Interest	36.931	< .001	-.092	.015	.008
Age	0.750	.386	-.001	.001	.000
Openness to experience					
BDSM Interest	109.441	< .001	.195	.019	.021
Age	25.140	< .001	.006	.001	.005

Note. BDSM = Bondage & Discipline, Domination & Submission and Sadism & Masochism, Wald χ^2 = Wald chi squared, B = unstandardized regression coefficient, SE = standard error of the B

^a= effect size acquired from unianova General Linear Model. See methods for further information.

association between BDSM interest and agreeableness for women but not for men. The only positive association was found between BDSM interest and openness to experience for both men and women. The effect sizes for all the negative and positive associations were small.

Discussion

In the present study, confirming our expectations, a high rate of interest in BDSM (38% for the total sample) was reported, especially among non-heterosexual participants (50–63%). Moreover, differences between heterosexual and non-heterosexual individuals were observed regarding the frequency of participating in dominating or submissive activities, with non-heterosexual individuals showing higher rates of participation. This also supported our expectation based on previous literature that non-heterosexual individuals would engage more often in BDSM activities compared with heterosexual individuals. As previous research has suggested, non-heterosexual individuals are highly represented in the BDSM community compared to heterosexual individuals and they practice BDSM more often (Botta et al., 2019; Brown et al., 2017; De Neef et al., 2019). There are, to our knowledge, no current theories discussing why non-heterosexual

individuals are so well represented in the BDSM community and why their practice and interest rates are higher than those of heterosexual individuals. A speculative hypothesis could be that having a minority sexual orientation and being part of the LGBT (lesbian, gay, bisexual and transgender) community may influence one to be more open and exploring of one's sexuality overall.

We also discovered age differences in interest and BDSM practice rates, with the youngest participants reporting most interest and most practice. Even though there were statistically significant differences between age groups in participation in submissive or dominant activities, the effect sizes were largely negligible, except for the effect size for age group and BDSM interest which was moderate (Cramér's $V = .21$). It appeared that the higher interest displayed by the younger individuals did not translate into more practice. Not much research has been done focusing on the effect of age regarding BDSM, but Holvoet et al. (2017) found that older participants had lower interest and participation rates in submission and dominance activities. These differences may reflect, as Holvoet et al. (2017) also suggested, cultural and generational differences where younger generations are more exposed to and have better access to BDSM-related media and the stigma experienced may not be as great as for the older generations. Also, aging affects hormone levels, which may lead to reduced interest in sex in general. Parenting may also make it harder to practice BDSM which could explain the displayed age pattern.

No significant gender differences in BDSM interest were found. However, expected gender differences were detected for the type of BDSM practice: 37% of women had participated in submissive activities once or more, compared to 23% of men. This finding is in line with previous research finding women's tendency to take on more submissive roles (De Neef et al., 2019; Wismeijer & van Assen, 2013). Not surprisingly, in this study 32% of men had participated once or more in domination activities compared to 25% of the women.

Men's preference for more dominant roles and women's preference for more submissive roles in BDSM-related sexual practices have been reported by previous studies (Wismeijer & van Assen, 2013). In a review De Neef et al. (2019) pointed out that in an evolutionary context male assertiveness is a trait which is valued by women in their potential male partners.

According to our analyses BDSM interest did have statistically significant associations with most of the HEXACO personality factors. For both men and women there was a negative association between BDSM interest and the personality factors honesty-humility, and conscientiousness, as well as a positive association between BDSM interest and openness to experience. Additionally, for women there was a negative association between BDSM interest and agreeableness. The effect sizes were small for all associations, with the largest being for honesty-humility (partial $\eta^2 = .010$ for men and partial $\eta^2 = .021$ for women, respectively) and for openness to experience (partial $\eta^2 = .024$ for men and partial $\eta^2 = .021$ for women, respectively). These results are partly in line with, and partly contrary to, the results found by Wismeijer and van Assen (2013). The findings that are consistent with their study were the positive association between BDSM interest and openness to experience and the negative association between BDSM interest and agreeableness (only for women in our study).

The findings that were not in line with Wismeijer and van Assen's (2013) study were the negative association between BDSM interest and conscientiousness and the finding that BDSM interest had no significant association with emotionality (neuroticism in the Big Five), extraversion, and agreeableness (for men). As mentioned earlier, the effect sizes were negligible at best, thus offering no real practical implications. Although our study found some statistically significant differences between the BDSM group and non-BDSM group, the mean differences (as implied by the effect sizes) in regards to the HEXACO personality factors between the groups were so small that they cannot be used to argue that the two groups differ importantly from each other. Since Wismeijer's & van Assen (2013) study BDSM has become more common; perhaps people who are open to new experiences are experiencing BDSM, but no other personality differences are relevant.

To the best of our knowledge, no previous studies have compared the personality characteristics based on levels of BDSM interest. The benefit of having the BDSM group and control group based on interest in BDSM was that it enabled us to use a much larger sample size than if we had used groups based on the prevalence of practice reported on our questionnaire. There were individuals in the BDSM interest group who did not practice BDSM, but it is unlikely that there would have been individuals who practiced BDSM in the group who reported they were not interested in BDSM. Previous studies on the personality of BDSM practitioners (Hebert & Weaver, 2014; Wismeijer & van Assen, 2013) have acquired their BDSM samples from online BDSM communities.

Limitations and Strengths of the Study

Some limitations need to be acknowledged. First, there was a fairly low response rate of 29%, which may have compromised the representativeness of the sample. But it is important to acknowledge that surveys which include sensitive questions (e.g., questions regarding sexual behavior or drug use) have a hard time achieving high response rates (Tourangeau & Yan, 2007). Also, the population studied was Finnish twins and their siblings and therefore some caution is warranted in applying these findings to the general population, because the overall environment in which individuals are raised may differ between families who only have one child versus families with twins and their siblings. The birth of two babies simultaneously presents a challenge to parents overall. On the other hand, there is evidence concluding that twins do not differ from non-twins on many behavioral measures (Barnes & Boutwell, 2013).

Because the study was about sexuality it may have over-sampled people who were interested in sexual variety and had more sexual experience. The BDSM questions were framed on sexual pleasure which may have excluded asexuals who practiced BDSM, although the prevalence of asexuality in Finland is low (Höglund et al., 2014).

Another limitation is that it was not possible to take into account the varied BDSM roles (submissive, dominant and switch) of the participants. These groups may differ on some psychological characteristics (Hebert & Weaver, 2014; Wismeijer & van Assen, 2013) when compared to one another,

which may lead to some information loss when only grouping participants based on their BDSM interest. The questionnaire presented to our participants did not include a question about their education which was a limitation, because we could not include education as a covariate in our personality analyses as Wismeijer and van Assen (2013) did. Another consideration is that the factors on the HEXACO Personality Inventory's are not identical to the Big Five factors. Extraversion, conscientiousness and openness to experience are similar in both. Agreeableness and emotionality (neuroticism in big five) are similar, but in HEXACO the content of the factors differ somewhat. However, it is worth noting that HEXACO has become increasingly popular and it can be argued that it is as good as the Big Five taxonomy (Anglim & O'Connor, 2019). Single-item measurement was also a limitation of our study. Another possible limitation is that BDSM-oriented individuals may have interpreted items on the honesty-humility scale differently e.g., item 24 "I am an ordinary person who is no better than others" and item 48 "I wouldn't want people to treat me as though I were superior to them."

One of the strengths of the study was the overall large sample size of over 8,000 individuals. This ensured that we had adequate power to detect possible effects if there were any. The sample also included a fairly large proportion of non-heterosexual individuals which enabled us to obtain new information about the interest in, and prevalence of, BDSM activity among individuals belonging to sexual minorities. A wide age range enabled us to reliably observe differences between age groups regarding BDSM-related questions.

Future Directions and Conclusions

Based on the results of the present study, it seems that interest in BDSM is very common in Finland and the personality of individuals who are interested in BDSM does not meaningfully differ from those who do not have such interests. Previous research suggested that BDSM practitioners do not have problems, so it is unlikely that those who are interested in BDSM would have. Furthermore, Brown et al. (2019) suggested that understanding the underlying psychometric structure behind BDSM is important, because BDSM interest and behavior can be a part of a latent factor of paraphilic interests or be a factor of its own. Exploring different personality characteristics' associations with different BDSM topics may help to identify what separates BDSM practitioners from those whose are diagnosed with sexual sadism disorder. Also of interest may be further exploration of the findings that non-heterosexual individuals displayed significantly more interest and participation in BDSM, and whether this can be explained by different levels of sexual desire between heterosexual and non-heterosexual individuals (Lippa, 2007). A. Brown et al. (2019) also hypothesized that sex drive could be a relevant factor in explaining BDSM interest and behavior. Currently there are no validated questionnaires on BDSM, which means that the same phenomenon is studied with differing definitions, questions and classifications. For example, fantasies are sometimes treated synonymously with interest. An important goal for future research is to develop validated questionnaires for BDSM interest and practice.

The area of BDSM research is at the stage of describing the phenomenon and associated phenomena. More research is needed to establish whether the prevalence of BDSM is equal across the globe and what cultural differences there might be, if there are any. An intriguing research area would be to collaborate with porn streaming websites and utilize the massive data which they have accumulated. This could ease the job of identifying the prevalence of BDSM interest across the world and identify differences between countries. This kind of approach has been used by Ogas and Gaddam (2012), who analyzed sexual terms used in web searches by almost 100 million users, but research presented in their book was not peer-reviewed and it was released outside of academia. It remains to be seen if this kind of approach will be utilized by researchers in the future.

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Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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