THE JOURNAL OF SEX RESEARCH
https://doi.org/10.1080/00224499.2020.1768204

Personality and Sexual Orientation: New Data and Meta-analysis

Mark S. Allen and Davina A. Robson

School of Psychology, University of Wollongong

ABSTRACT

This research explored associations between personality and sexual orientation. In Study 1, we explored whether the Big Five trait dimensions relate to sexual orientation in a nationally representative sample of Australian adults (n = 13,351). Personality differences were observed between those who identified as heterosexual (straight), bisexual, and homosexual (gay/lesbian) on all five measured traits. In Study 2, we conducted an updated systematic review and meta-analysis of personality and sexual orientation. A total of 21 studies (35 independent samples, 262 effect sizes) comprising 377,951 men and women were identified that satisfied inclusion criteria. Results showed that bisexual individuals reported higher levels of openness than homosexual individuals, who in turn, reported higher levels of openness than heterosexual individuals. Bisexual individuals also report lower levels of conscientiousness than both heterosexual and homosexual individuals. Sex moderation effects showed that homosexual men scored higher than heterosexual men on neuroticism, agreeableness and conscientiousness, whereas homosexual women scored lower than heterosexual women on extraversion, agreeableness, and conscientiousness. There was also evidence that personality differences between sexual orientation categories tend to decline with age. These findings align with the gender-shift hypothesis and should be of interest to theorists working in personality science and sexual identity development.

Introduction

Personality refers to the characteristic manner in which people feel, think and behave. The most commonly adopted framework of personality trait structure is the five-factor model (Digman, 1990; McCrae & John, 1992). This model considers that five overarching trait dimensions subsume a number of more specific trait facets (Costa & McCrae, 2017; Soto & John, 2017). The dimensions are *neuroticism* (the degree to which individuals are prone to emotional instability), *extraversion* (the quantity and intensity of interpersonal interactions), *openness* (individuals' tendency to seek out novel experiences), *agreeableness* (individuals' concern for cooperation and social harmony), and *conscientiousness* (that captures organization and goal-directed behavior). This personality structure has been observed in adolescent and adult samples (Caspi et al., 2005) and across a variety of languages and cultures (Allik et al., 2017). Personality is susceptible to change over the lifespan (Damian et al., 2019; Roberts et al., 2006) and how people score on assessments of trait dimensions predicts life outcomes such as academic and occupational success, depression, cardiovascular conditions, subjective well-being, and sexual and reproductive health (Allen & Walter, 2018a; Bogg & Roberts, 2004; Kotov et al., 2010; Poropat, 2009; Steel et al., 2008).

For a long time, psychologists have considered that personality traits might differ between people with different sexual orientations (e.g., Evans, 1970; Hopkins, 1969). Sexual orientation refers to the relative sexual attraction to persons of the same sex, to both sexes, or to the opposite sex, and sexual identity refers to a person's self-conception as homosexual, bisexual, or heterosexual (Bailey et al., 2016). Both genetic and environmental inputs have been identified as important for both sexual orientation (Bogaert & Skorska, 2020; Ganna et al., 2019; Jannini et al., 2010; Sanders et al., 2017, 2015) and personality (Bleidorn et al., 2018; De Moor et al., 2012; Nagel et al., 2018), and the biopsychosocial factors that shape personality development might also be those that contribute to sexual orientation. Indeed, early childhood behaviors have an important role in both personality development (Caspi et al., 2005; Young et al., 2019) and sexual identity formation (Bailey & Zucker, 1995; Rieger et al., 2008), and twin studies have found that some of the genetic variation underlying sexual orientation is also important for trait personality (Zietsch et al., 2011). If the same genetic and/or environmental factors are shaping both personality and sexual orientation, then the association between personality and sexual orientation could be non-causal, with neither sexual orientation directly affecting personality nor personality affecting sexual orientation.

Personality and sexual orientation might be shaped through the same mechanistic factors (e.g., hormones, parenting styles) leading to a spurious association. However, it is also possible that personality and sexual orientation have a causal relationship. For example, disclosure of same-sex sexual attraction can increase likelihood of negative responses

CONTACT Mark S. Allen mark_allen@uow.edu.au School of Psychology, University of Wollongong, Northfields Avenue, Wollongong, 2522 Australia
Supplementary data can be accessed on the publisher's website.

from significant others, as well as discrimination and stigmatization from the broader societal environment (Legate et al., 2012), and these experiences might feed into personality change. Social stereotypes regarding gender norms for homosexual and heterosexual persons (e.g., the stereotype that gay men are flamboyant and effeminate) might also lead some people to behave in ways that are consistent with those stereotypes (Lippa, 2008). Such stereotype-driven behavior change might progress into stable personality traits. In such cases, formation of a particular sexual identity is contributing to personality change.

It might also be the case that personality change contributes to sexual identity. Sexual identity development theories (e.g., Cass, 1979, 1984) often consider that sexual identity formation is a stage-based reflective process that involves self-definition (discovering and defining oneself as a sexual minority individual), self-acceptance (accepting oneself as a sexual minority individual) and disclosure (publicly disclosing sexual identity). Personality, and openness in particular, is thought to be important for engaging in this process (Zoeterman & Wright, 2014). For instance, people higher in openness (who explore different values, ideas, and ways of being) are less likely to be discouraged by emotional turmoil that might lead to identity foreclosure – making a commitment without full exploration (Zoeterman & Wright, 2014). Since openness is subject to change in response to life experience (Bleidorn et al., 2018; Schwaba et al., 2019) any increase in openness might contribute somewhat to sexual identity development.

As far as we are aware, only one investigation has explored personality change as it relates to sexual orientation (Allen & Walter, 2018b). In this study of Australian adolescents, personality traits at age 12, and change in personality between age 12 and 14, were explored as predictors of sexual identity at age 14. Interestingly, the study found that lower levels of conscientiousness at age 12 (for girls only), mean-level increases in neuroticism, and greater instability in extraversion, between age 12 and 14, were associated with a greater likelihood of same-sex sexual attraction at age 14 (Allen & Walter, 2018b). These findings indicate that change in personality might be important for sexual identity development. However, a more plausible explanation of research findings is that trait personality and sexual identity interconnect through cyclic feedback loops. Indeed, personality is most variable during adolescence and young adulthood (Costa et al., 2019; Damian et al., 2019) and sexual identity development occurs over a timespan of several years (Rendina et al., 2019; Rosario et al., 2011). It is likely that personality change feeds into sexual identity development that feeds back into personality change.

Sex differences in personality have consistently been observed across cultures (De Bolle et al., 2015; Schmitt et al., 2008). Compared to men, women tend to score higher on neuroticism and agreeableness, and to a lesser extent, on extraversion and conscientiousness. Based on *implicit inversion theory* (Kite & Deaux, 1987) – that considers sexual minority individuals display attributes more typical of the other sex – the *gender-shift hypothesis* (Lippa, 2005) outlines that homosexual men express feminine-type traits, and therefore should have personalities akin to those of heterosexual women, whereas homosexual women express masculine-type traits and therefore should have personalities akin to those of heterosexual men. This hypothesis was tested in a meta-analysis of 16 studies (26 independent samples, 110 effect sizes) and 346,723 men and women (Allen & Walter, 2018a). The meta-analysis compared personality traits of men and women who identified as heterosexual to those who identified, at least to some extent, as homosexual. It was found that homosexual men and women scored higher on openness than heterosexual men and women, that homosexual men scored higher on neuroticism than heterosexual men, and that homosexual women scored lower on neuroticism than heterosexual women. Extraversion, agreeableness and conscientiousness were unrelated to sexual orientation in both men and women (Allen & Walter, 2018a). Perhaps the most important finding was that all associations showed substantial heterogeneity across studies (i.e., greater variation in results than would be expected by chance alone) that could not be explained by sample characteristics such as age or sex.

One potential explanation for the high heterogeneity estimates is that included studies often combined sexual minority samples. Sexual orientation is best measured on a continuum – from an exclusive attraction to members of the opposite sex to an exclusive attraction to members of the same sex (Bailey et al., 2016) – and people tend to adopt one of three main sexual identities. People tend to identify as heterosexual (straight), bisexual, or homosexual (gay/lesbian). Women are more likely to report a bisexual than an exclusively same-sex orientation whereas men show the opposite pattern (Bailey et al., 2016). Researchers have noted the importance of separating bisexual individuals in sexual identity formation research (Balsam & Mohr, 2007; Rosario et al., 2011). A second potential explanation for the high heterogeneity estimates is the use of non-representative samples. Only four of the 16 studies included in the meta-analysis had used samples that were representative of the general population, with most research being conducted using convenience samples (Allen & Walter, 2018a). Given these potential limitations, further primary research is needed to estimate the magnitude of personality differences between heterosexual, bisexual and homosexual persons. In this first study, we explore whether personality traits differ between people with different sexual identities in a new nationally-representative sample of Australian adults.

Study 1: New Data

Method

Sample

The Household, Income and Labor Dynamics in Australia (HILDA) project is a nationally representative household panel survey that collates data on family, income, and work related processes in Australia (Wooden et al., 2002). Participants were recruited using a multistage approach, targeting a random sample of households across different geographic regions (Census Collection Districts). A random sample of 488 Census Collection Districts were selected, each consisting of 200–250 households. In each sample, between 22 and 34 dwellings were selected based on occupancy rates of the

area. The questionnaires are administered to every member of the household (aged 15 years and over) and the HILDA sample is considered broadly representative of the Australian adult population (Wooden et al., 2002). This study used data collected at Wave 12 (2013) and Wave 13 (2014). A total of 13,351 individuals (7158 women; 6193 men; mean age = 45.4 years, SD = 18.4, range = 15–100 years) completed questions on sexual identity in 2013 and returned to complete a personality assessment 12 months later.

Measures

Sexual Identity

An adapted version of the item recommended by the UK Office of National Statistics (Haseldon et al., 2009) was used to measure sexual identity. Participants were asked: "Which of the following options best describes how you think of yourself?", with response options of 1 (*heterosexual or straight*), 2 (*gay or lesbian*), 3 (*bisexual*), 4 (*other*), 5 (*unsure/don't know*) and 6 (*prefer not to say*). In terms of frequency of responses, 93.4% of responders (n = 12,472) identified as heterosexual or straight, 1.4% of responders (n = 191) identified as gay or lesbian, 1.3% of responders (n = 173) identified as bisexual, 0.7% of responders (n = 97) identified as other, 0.8% of responders (n = 112) were unsure of their sexual identity, and 2.3% of responders (n = 306) preferred not to say.

Personality

Participants responded to 28 adjectives (Saucier, 1994) that correspond to five personality dimensions: neuroticism (6 items; e.g., "temperamental"), extraversion (6 items; e.g., "lively"), openness (6 items; e.g., "imaginative"), agreeableness (4 items; e.g., "cooperative"), and conscientiousness (6 items; e.g., "orderly"). Items were scored from 1 (*does not describe me at all*) to 7 (*describes me very well*). Internal consistency coefficients (Cronbach's alpha) for the sample were .80 (neuroticism), .76 (extraversion), .74 (openness), .78 (agreeableness), and .79 (conscientiousness). This measure of personality has shown evidence of test–retest reliability and predictive validity in previous studies on the HILDA sample (Losoncz, 2009).

Results

Preliminary tests showed that, compared to men, women reported higher levels of extraversion (d = 0.21), agreeableness (d = 0.54) and conscientiousness (d = 0.19), and lower levels of openness (d = 0.10). Independent samples t-tests were used to compare personality traits between men and women reporting different sexual identities. Means, standard deviations, and effect size differences between sexual identity groups are reported in Table 1. The data show that homosexual men reported higher levels of extraversion, openness, agreeableness and conscientiousness, than heterosexual men. Bisexual men reported higher levels of openness and neuroticism than heterosexual men, and lower levels of conscientiousness than homosexual men. The data also show that homosexual women reported higher levels of openness, and lower levels of extraversion and agreeableness, than heterosexual women. Bisexual women reported higher levels of neuroticism and openness, and lower levels of conscientiousness, than heterosexual women, and higher levels of extraversion and lower levels of conscientiousness than homosexual women.

Discussion

Study 1 tested whether personality traits differ between people with different sexual identities. Consistent with previous research (Allen & Walter, 2018a), the largest effect size difference between heterosexual and homosexual individuals was on openness to experience. Openness also showed a medium effect size difference between heterosexual and bisexual men and women. However, findings for other dimensions differ in a number of ways from findings reported in the recent meta-analysis (Allen & Walter, 2018a). The meta-analysis found heterosexual and homosexual individuals did not differ in levels of extraversion, agreeableness or conscientiousness, and found a sex moderation effect for neuroticism such that homosexual men tended to report higher neuroticism than heterosexual men, whereas homosexual women tended to report lower neuroticism than heterosexual women. In the current study, the effect size for neuroticism was of the same direction and magnitude for women and men, and differences between homosexual and heterosexual individuals were observed for extraversion, agreeableness and conscientiousness.

Table 1. Personality trait differences between persons with different sexual identities in the HILDA sample.

	1. Heterosexual		2. Bisexual		3. Homosexual		Effect size differences		
	M	SD	M	SD	M	SD	SMD_{1-3}	SMD_{1-2}	SMD_{2-3}
Men									
Neuroticism	2.81	1.06	3.21	1.30	2.98	1.19	0.15	0.34*	0.18
Extraversion	4.29	1.02	4.24	1.32	4.52	1.11	0.22*	0.04	0.23
Openness	4.30	1.02	4.82	1.23	4.66	1.08	0.34***	0.46***	0.14
Agreeableness	5.20	0.89	5.32	0.93	5.47	0.89	0.30**	0.14	0.16
Conscientiousness	5.04	1.00	4.85	1.38	5.30	1.10	0.24**	0.16	0.36*
Women									
Neuroticism	2.76	1.09	3.20	1.12	2.97	1.14	0.19	0.40***	0.20
Extraversion	4.54	1.13	4.53	1.22	4.18	1.15	0.32**	0.00	0.30*
Openness	4.19	1.06	4.69	1.11	4.64	1.13	0.41***	0.46***	0.04
Agreeableness	5.69	0.83	5.56	1.00	5.40	1.02	0.31**	0.14	0.16
Conscientiousness	5.25	1.02	4.73	1.18	5.07	1.07	0.17	0.48***	0.31*

For men, heterosexual n = 5813, bisexual n = 54, homosexual n = 105; For women, heterosexual n = 6659, bisexual n = 119, homosexual n = 86. SMD_{1-3} = standardized mean difference between heterosexual and homosexual identity; SMD_{1-2} = standardized mean difference between heterosexual and bisexual identity; SMD_{2-3} = standardized mean difference between bisexual and homosexual identity. Personality trait scores could range from 1 to 7.
*p <.05, **p <.01, ***p <.001

These differences might be explained by previous research often combining bisexual and homosexual individuals in a single grouping (Allen & Walter, 2018a). Indeed, in the current study we found that bisexual individuals tended to score higher on neuroticism than heterosexual individuals (for both men and women), and there were notable differences on conscientiousness and extraversion between those who identified as bisexual and those who identified as homosexual. This effect was such that bisexual men and women tended to have lower levels of conscientiousness than homosexual men and women, and bisexual women tended to have higher levels of extraversion than homosexual women. While the largest personality differences do appear to be between heterosexual and other sexual identities, the observed personality differences between bisexual and homosexual individuals suggests that an updated meta-analysis is necessary that separates effects for bisexual and homosexual persons.

Study 2: Systematic Review and Meta-Analysis

Method

This research synthesis was conducted in line with established guidelines for the reporting of systematic reviews and meta-analyzes (Moher et al., 2009). The data files for all analyzes reported in this meta-analysis are available in a permanent online repository (https://osf.io/xy4bq/).

Eligibility Criteria

Research exploring associations between sexual orientation (straight, bisexual, and gay/lesbian) and personality were eligible for inclusion. Asexual orientation (no attraction to either sex) was not included. Studies needed to include a measure of personality that was consistent with personality trait theory (i.e., assess cross-situational consistency in thought, feeling, and behavior) and assess at least one of the big five traits: neuroticism, extraversion, openness, agreeableness, or conscientiousness.

Search Strategy

We extracted all relevant studies of personality and sexual orientation from the most recent meta-analysis (Allen & Walter, 2018a) for full text search (n = 16). We then ran an electronic search to locate relevant articles published from December 2017 (the date of the electronic search in Allen & Walter, 2018a) up to the current search date (March 2019). The 10 databases searched were: Web of Science; PubMed; Science Direct; Scopus; PsycINFO, PsycARTICLES, MEDLINE, CINHAL and ERIC via EBSCO; and ProQuest. The search terms used were: personality [or extraver*/or extrover*/or introver*/or intraver*/or neurotic*/or "emotional stability"/or openness/or agreeable*/or conscientious*/or "big five"/or "five factor"/or trait] AND "sexual orientation" [or "sexual identity"/or bisexual/or homosexual*/or gay/or lesbian]. A single researcher screened the titles, keywords, and abstracts of each study for eligibility. If a study appeared to meet eligibility criteria, or if the relevance of the study was uncertain, full texts were obtained. Full texts of all identified studies were then independently assessed for inclusion by two researchers.

Figure 1 provides an illustration of the screening procedure. A total of 459 records were identified through electronic databases. After removal of duplicates, title and abstract screening, the full texts of 26 studies were obtained for full text search. The reasons for exclusion were no assessment of relevant personality traits, no usable information or effect sizes, and an abstract without a full method section. In one instance where two studies had used the same dataset we selected the study that was published first. Three studies did not provide enough information and the authors were contacted via e-mail to request the missing effect sizes (or the dataset). The authors of one study provided the missing information and the study was included in the meta-analysis. No response was received from the authors of the second study. For the third study, the lead author was unwilling to provide either the missing information or the dataset (despite the journal's open data policy). These studies were excluded from the meta-analysis. In total, 21 studies were identified that were eligible for inclusion.

Analytic Strategy

Calculation of the pooled mean effect size (standardized mean difference [SMD] and 95% confidence interval [CI]) was computed using inverse-variance weighted random effects meta-analysis. The inverse-variance method involves each effect size being given a weight equal to the inverse of its variance (Borenstein et al., 2009). Effect sizes were taken directly from the published article or were computed from means and standard deviations reported in the article (effect sizes for individual studies are available in Supplementary File S1). Data reported in two previous studies that had combined bisexual and homosexual categories (Allen & Desille, 2017; Allen & Walter, 2018b) were reanalyzed to provide separate effects (reanalysis is reported in Supplementary File S2). Egger's regression asymmetry test (Egger et al., 1997) was used to identify small sample effects. If there is no publication bias then estimates should vary most in small sample studies (due to random error) and least in large sample studies (Egger et al., 1997). Asymmetry in the predicted funnel shape of the plot is an indication of publication bias.

We report the I^2 statistic as an estimate of the total variation across studies due to heterogeneity rather than sampling error (Higgins et al., 2003). Values of 25%, 50% and 75% are considered to represent low, medium and high levels of heterogeneity (Higgins et al., 2003). An I^2 value above 50%, together with a statistically significant Q statistic (which provides a test of the hypothesis that variation in effect sizes across studies is greater than that expected by chance alone), prompted a search for potential moderators of the effect. To test the impact of moderating variables, we employed a protocol for random effects meta-regression (Borenstein et al., 2009) in which the SMD between sexual orientation categories is set as the criterion variable and the moderating variable is entered as a predictor, with studies weighted by their inverse variance weights. We first tested for sex moderation effects in the full

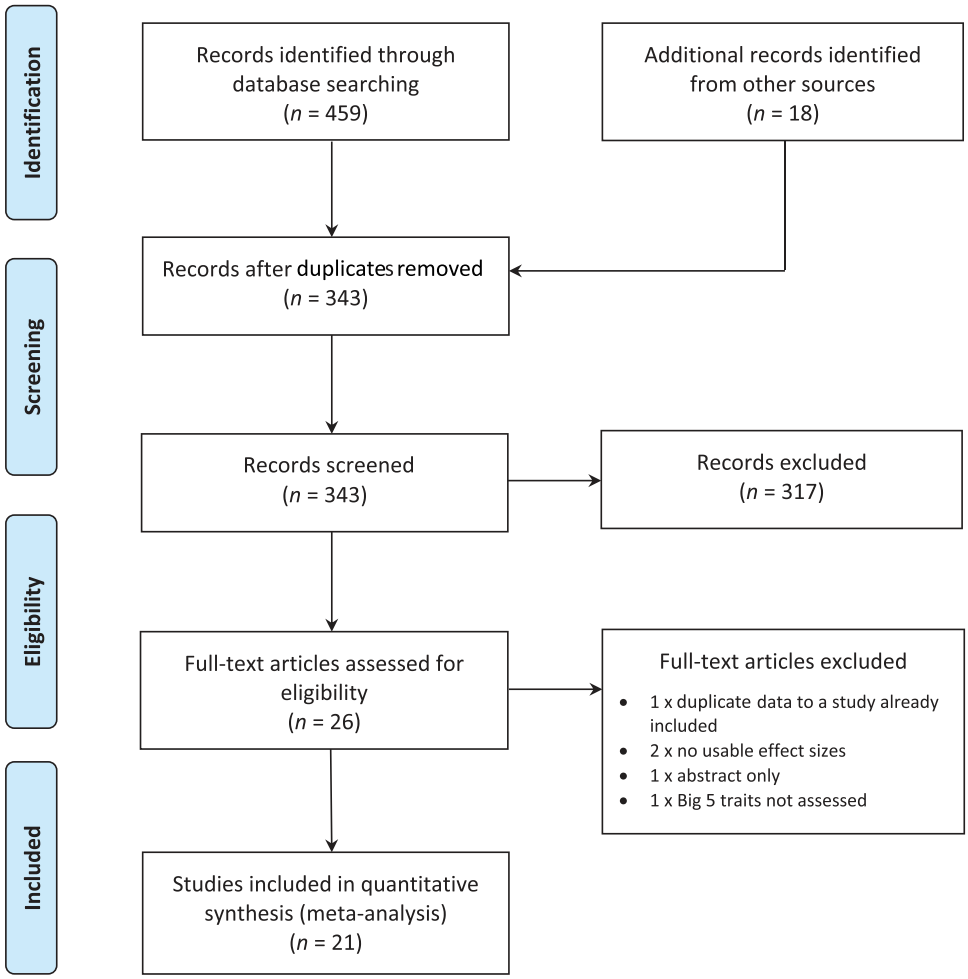

Figure 1. Flow diagram for database search and record screening.

sample (for each personality dimension) and then tested for age moderation effects within male and female samples.

Because it is statistically impossible to support the hypothesis that a true effect size is exactly zero (Lakens, 2017), null hypothesis statistical testing (NHST) was followed up using (two one-sided) equivalence tests (TOST; Schuirmann, 1987) for meta-analysis. TOST helps to prevent the incorrect conclusion that an effect is absent based on non-significant results (Lakens, 2017). By rejecting an effect more extreme than predetermined lower and upper equivalence bounds, it is possible to act as if the true effect is close enough to zero for practical purposes (Lakens et al., 2018). For TOST analyzes, equivalence bounds were set at SMD = ± 0.22 in line with current guidelines for effect size interpretation in individual differences research (Gignac & Szodorai, 2016). Results falling within this range are deemed equivalent to the absence of a meaningful effect. Analyzes were computed using *CMA 3.0* statistical software (Borenstein et al., 2014).

Results

The characteristics of included studies are presented in Table 2. The 21 studies included 262 usable effect sizes (see Supplementary File S1). The studies sampled a total of 377,951 individuals, including 179,188 women (47.4%) and 198,763 men (52.6%). The grand-mean age was 30.4 (± 12.6) years. The populations sampled were undergraduate students (n = 8), military sample (n = 1), clinical sample (n = 1), participants recruited from LGBT websites (n = 3), and community/nationally-representative samples (n = 8). We first updated previous meta-analytic findings (Allen & Walter, 2018a) to include data from Study 1 and additional studies identified through the electronic search. This meta-analysis included studies that combined bisexual and homosexual persons in a single category. The findings for this updated meta-analysis are reported in Supplementary File S3. For main analyzes, 15 studies were included that had assessed sexual orientation as self-identified sexual identity and had separated effects for bisexual and homosexual individuals (see Table 2). Sample sizes, effect size estimates, heterogeneity estimates, and publication bias estimates for main analyzes are reported in Table 3. Eight studies that used population-based (non-convenience) samples (see Table 2) were explored in follow-up analyzes. Sample sizes, effect size estimates, heterogeneity estimates, and publication bias estimates for follow-up (population-based) analyzes are reported in Table 4.

Table 2. Descriptive information on included studies.

Study	Population	*N*	Mean age (± SD)	Sex	Personality traits	Sexual orientation measure
HILDA (Study 1)**	Nationally-representative Australian adults	13,351	45.4 (18.4)	6193 men; 7158 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	Sexual identity (heterosexual, bisexual, & homosexual)
Allen and Desille (2017)**	Nationally-representative English older adults	5745	65.6 (8.3)	2546 men; 3199 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	Sexual identity (heterosexual, bisexual, & homosexual)
Allen and Walter (2018b)**	Nationally-representative Australian adolescents	3460	14.5 (0.5)	1748 boys; 1712 girls	Neuroticism, Extraversion, Conscientiousness	Sexual identity (heterosexual, bisexual, & homosexual)
Barnes et al. (1984)	Undergraduate psychology students	307	19.0	307 men	Neuroticism, Extraversion	Involvement and intention to be involved in "homosexual acts"
Bogaert et al. (2018)**	International English language literate adults	96,381	37.1 (14.0)	49,251 men; 47,130 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	Sexual identity (heterosexual, bisexual, & homosexual)
Bourdage et al. (2007)	Undergraduate psychology students	230	22.5 (3.9)	108 men; 122 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	"Sexy seven" measure (homosexual and bisexual items combined)
Bozkurt et al. (2006)*	Homosexual men referred for military evaluation	108	25.3 (5.1)	108 men	Neuroticism, Extraversion	Sexual identity (homosexual & heterosexual)
Clemens et al. (2015)*	Mostly undergraduate students	678	18–30	346 men; 319 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	Sexual identity (homosexual & heterosexual)
Greaves et al. (2017)**	Nationally-representative New Zealand adults	14,227	47.0 (13.9)	5451 men; 9776 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	Sexual identity (heterosexual, bisexual, & homosexual)
Ifrah et al. (2018; Study 1)*	Young Israeli adults who visit LGBT websites	438	20.9 (4.7)	272 men; 166 women	Openness	Sexual identity (heterosexual & homosexual)
Ifrah et al. (2018; Study 2)**	General community Israeli adults	1276	45.2 (18.0)	1276 men	Openness	Sexual identity (heterosexual, bisexual, & homosexual)
Lippa (2005)*	Mostly undergraduate students	7651	~23	3680 men; 6067 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	Sexual identity (heterosexual & homosexual)
Lippa (2008)**	International English language literate adults	205,818	~32 (~11)	113,749 men; 91,963 women	Neuroticism, Extraversion, Agreeableness	Sexual identity (heterosexual, bisexual, & homosexual)
Peixoto and Nobre (2016)*	Portuguese adults who visit LGBT websites	285	~28 (~9)	142 men; 143 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	Sexual identity (heterosexual & homosexual)
Schmitt (2007)*	Mostly undergraduate students from 48 nations	16,362	NR	5310 men; 7589 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	Sexual identity (heterosexual, bisexual, & homosexual)
Schmitt and Buss (2000)	Undergraduate psychology students	367	23.0 (5.1)	131 men; 180 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	"Sexy seven" measure (homosexual and bisexual items combined)
Smith et al. (2007)	Undergraduate psychology students	118	NR	39 men; 79 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	"Sexy seven" measure (homosexual and bisexual items combined)
Wang et al. (2014)**	Nationally-representative young Swiss men	5875	~20 (~1)	5875 men	Neuroticism, Extraversion	Sexual identity (heterosexual, bisexual, & homosexual)
Wells and Schofield (1972)	Homosexual men attending clinics for STI treatment	91	27.3 (9.7)	91 men	Neuroticism, Extraversion	Homosexual men compared to standardized test scores on EPI
Wilson (1982)	Graduate students	92	21–50	92 women	Neuroticism, Extraversion	Heterosexual women compared to lesbian women (measure unknown)
Zheng et al. (2008)*	Chinese adults who visit LGBT websites	1070	23.4 (4)	436 men; 634 women	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness	Sexual identity (heterosexual & homosexual)
Zietsch et al. (2011)	Australian identical and non-identical twins	4563	30.8 (8.4)	1704 men; 2859 women	Neuroticism	Same-sex sexual attraction (homosexual and bisexual individuals combined)

NR, not reported. EPI, Eysenck Personality Inventory. STI, Sexually transmitted infection. *included in main analyzes, **included in main analyzes and analyzes of population-based research

Neuroticism

For homosexual vs. heterosexual comparisons, there was a significant moderation by sample sex, $k = 22$, $\chi^2(1) = 20.72$, $p < .001$, $R^2 = .55$. This effect was such that heterosexual men scored lower on neuroticism than homosexual men, $k = 12$, SMD = .41 (95% CI: .30, .52), but heterosexual and homosexual women did not differ on scores for neuroticism, $k = 9$, SMD = –.11 (95% CI: – .23, .02). Follow-up TOST indicated that, for women, the observed effect size was not significantly within equivalence bounds of ± .22, $z = 1.22$, $p = .098$. There were no significant age moderation effects in male or female samples. For heterosexual vs. bisexual comparisons, there was no significant moderation by sample sex, $k = 15$, $\chi^2(1) = 2.97$, $p = .085$,

Table 3. Pooled mean effects for personality trait differences between persons with different sexual identities.

	Heterosexual vs. Homosexual						Heterosexual vs. Bisexual						Homosexual vs. Bisexual					
	k	n_1	n_2	SMD (95% CI)	I^2	E_P	*k*	n_1	n_3	SMD (95% CI)	I^2	E_P	*k*	n_2	n_3	SMD (95% CI)	I^2	E_P
Both Sexes																		
Neuroticism	23	303,788	13,054	.15 (−.01,.32)	99	.24	15	302,944	15,968	.29 (.12,.44)	99	.12	15	12,435	15,968	.02 (−.11,.16)	94	.17
Extraversion	23	303,788	13,054	−.06 (−.12,.01)	88	.43	15	302,944	15,968	−.09 (−.19,.01)	95	.45	15	12,435	15,968	.01 (−.09,.10)	86	.43
Openness	20	127,612	5793	.30 (.14,.46)	97	.50	11	126,411	5819	.35 (.26,.45)	84	.07	11	4777	5815	.16 (.05,.27)	71	.16
Agreeableness	19	295,450	12,930	.03 (−.09,.15)	97	.21	12	294,678	15,803	−.11 (−.23,.02)	97	.44	12	12,347	15,803	−.04 (−.14,.06)	90	.09
Conscientiousness	19	129,959	5252	.02 (−.11,.14)	94	.47	12	129,187	5783	−.35 (−.44, −.26)	83	.11	12	4669	5783	−.21 (−.28, −.15)	23	.17
Men																		
Neuroticism	12	162,896	9029	.41 (.30,.52)	91	.47	8	162,540	6559	.37 (.25,.50)	89	.37	8	8699	6559	−.06 (−.25,.13)	92	.48
Extraversion	12	162,896	9029	.02 (−.04,.09)	73	.45	8	162,540	6559	−.10 (−.26,.06)	94	.16	8	8699	6559	−.04 (−.20,.12)	88	.26
Openness	10	62,169	4002	.26 (.06,.46)	95	.41	6	61,529	2231	.33 (.28,.37)	0	.28	6	3348	2227	.14 (.04,.24)	24	.47
Agreeableness	9	155,925	8925	.17 (−.03,.37)	98	.42	6	155,641	6434	.03 (−.14,.20)	95	.32	6	8631	6463	−.04 (−.20,.12)	90	.16
Conscientiousness	9	63,206	3514	.15 (−.08,.38)	95	.38	6	62,922	2125	−.19 (−.24, −.15)	0	.27	6	3220	2125	−.25 (−.30, −.19)	0	.11
Women																		
Neuroticism	10	140,892	4025	−.14 (−.30,.03)	95	.39	7	140,404	9409	.16 (.00,.32)	97	.02	7	3736	9409	.12 (−.14,.38)	96	.11
Extraversion	10	140,892	4025	−.15 (−.23, −.07)	76	.16	7	140,404	9409	−.10 (−.18, −.01)	86	.17	7	3736	9409	.03 (−.08,.14)	70	.01
Openness	9	65,443	1791	.34 (.02,.65)	98	.31	5	64,882	3588	.41 (.28,.53)	75	.02	5	1429	3588	.17 (.00,.34)	69	.00
Agreeableness	9	139,525	4005	−.09 (−.18,.01)	85	.40	6	139,037	9340	−.21 (−.29, −.13)	86	.44	6	3716	9340	−.04 (−.21,.12)	89	.30
Conscientiousness	9	66,753	1738	−.11 (−.23,.02)	83	.44	6	66,265	3658	−.45 (−.62, −.29)	88	.06	6	1449	3658	−.15 (−.21, −.09)	0	.21

k = number of pooled effect sizes, n_1 = number of heterosexual individuals in the analysis, n_2 = number of homosexual individuals in the analysis, n_3 = number of bisexual individuals in the analysis. E_P = significance value for Egger's regression asymmetry test (values below .05 indicate evidence of publication bias). I^2 = heterogeneity estimate expressed as a percentage (values about .50 indicate high heterogeneity and values above .75 indicate substantial heterogeneity)

R^2 = .22. Rather, bisexual individuals had higher levels of neuroticism than heterosexual individuals, k = 15, SMD = .29 (95% CI: .12, .44). There was a significant age moderation effect in male samples, k = 7, $\chi^2(1)$ = 6.73, p = .010, R^2 = .60. Observation of the regression slope showed that differences in levels of neuroticism between heterosexual and bisexual men decreased as the sample age increased. For homosexual vs. bisexual comparisons, there was no significant moderation by sample sex, k = 15, $\chi^2(1)$ = 1.79, p = .181, R^2 = .12, and no significant difference in levels of neuroticism, k = 15, SMD = .02 (95% CI: – .11, .16). Follow-up TOST indicated that the observed effect size was significantly within equivalence bounds of ± .22, z = 2.91, p = .002. There were no significant age moderation effects. All findings for neuroticism were mirrored in follow-up analyzes of population-based samples (Table 4).

Extraversion

For homosexual vs. heterosexual comparisons, there was a significant moderation by sample sex, k = 22, $\chi^2(1)$ = 7.27, p = .007, R^2 = .48. This effect was such that homosexual women had higher levels of extraversion than heterosexual women, k = 10, SMD = – .15 (95% CI: – .23, – .07), but homosexual and heterosexual men did not differ in levels of extraversion, k = 12, SMD = .02 (95% CI: – .04, .09). Follow-up TOST indicated that, for men, the observed effect size was significantly within equivalence bounds of ± .22, z = 5.76, p < .001. There was a significant age moderation effect for women, k = 9, $\chi^2(1)$ = 7.19, p = .007, R^2 = .58. This effect was such that the higher levels of extraversion among homosexual women (compared to heterosexual women) decreased as the sample age increased. For bisexual vs. heterosexual comparisons, there was no significant sex moderation effect. Rather, bisexual women reported lower levels of extraversion than heterosexual women, k = 7, SMD = – .10 (95% CI: – .18, – .01), with a similar, albeit non-significant, effect size for men, k = 8, SMD = – .10 (95% CI: – .26, .06). Interestingly, TOST analyzes showed that the observed effect size for women was significantly within equivalence bounds of ± .22, z = 2.77, p = .003 indicating the absence of a meaningful effect size, but the observed effect size for men was not within equivalence bounds of ± .22, z = 1.44, p = .074. There were no significant age moderation effects. For homosexual vs. bisexual comparisons, there was no significant sex moderation. Effects for both men, z = 2.26, p = .012, and women, z = 3.51, p < .001, were significantly within equivalence bounds of ± .22. Findings for extraversion were mirrored in follow-up analyzes of population-based samples (Table 4).

Openness

There were no significant sex moderation effects for openness. Rather, heterosexual individuals reported lower levels of openness than homosexual individuals, k = 20, SMD = .30 (95% CI: .14, .46), who in turn reported lower levels of openness than bisexual individuals, k = 11, SMD = .16 (95% CI: .05, .27). These effects emerged in both male and female samples. There was some evidence of publication bias for heterosexual vs. bisexual comparisons, k = 5, $t(3)$ = 3.76,

Table 4. Pooled mean effects for personality trait differences in (non-convenience) population-based data samples.

	Heterosexual vs. Homosexual						Heterosexual vs. Bisexual						Homosexual vs. Bisexual					
	k	n_1	n_2	SMD (95% CI)	I^2	E_P	*k*	n_1	n_3	SMD (95% CI)	I^2	E_P	*k*	n_2	n_3	SMD (95% CI)	I^2	E_P
Both Sexes																		
Neuroticism	13	290,621	12,161	.24 (.05,.43)	99	.37	13	290,621	15,666	.29 (.12,.46)	99	.15	13	12,161	15,666	.00 (–.14,.15)	95	.24
Extraversion	13	290,621	12,161	–.13 (–.22, –.04)	92	.16	13	290,621	15,666	–.11 (–.21,.00)	96	.41	13	12,161	15,666	–.00 (–.11,.10)	88	.48
Openness	9	114,319	4738	.21 (.18,.25)	7	.12	9	114,088	5517	.38 (.27,.49)	85	.15	9	4503	5513	.17 (.05,.29)	75	.24
Agreeableness	10	282,355	12,073	–.01 (–.20,.17)	99	.23	10	282,355	15,501	–.07 (–.21,.06)	98	.48	10	12,073	15,501	.01 (–.10,.11)	89	.19
Conscientiousness	10	116,864	4395	–.08 (–.22,.06)	89	.21	10	116,864	5481	–.37 (–.48, –.26)	86	.13	10	4395	5481	–.21 (–.28, –.13)	33	.25
Men																		
Neuroticism	7	157,457	8568	.48 (.33,.63)	95	.36	7	157,457	6463	.39 (.26,.52)	90	.36	7	8568	6463	–.09 (–.30,.11)	93	.46
Extraversion	7	157,457	8568	–.02 (–.10,.06)	78	.22	7	157,457	6463	–.12 (–.29,.05)	95	.17	7	8568	6463	–.05 (–.22,.13)	90	.28
Openness	5	56,677	3452	.21 (.16,.26)	10	.35	5	56,446	2135	.33 (.29,.38)	0	.47	5	3217	2131	.16 (.05,.27)	28	.41
Agreeableness	5	150,558	8500	.22 (–.06,.50)	99	.47	5	150,558	6367	.07 (–.12,.26)	96	.41	5	8500	6367	–.05 (–.23,.13)	92	.19
Conscientiousness	5	57,839	3089	.11 (.01,.21)	41	.11	5	57,839	2029	–.19 (–.23, –.14)	0	.39	5	3089	2029	–.25 (–.30, –.19)	0	.14
Women																		
Neuroticism	6	133,164	3593	–.05 (–.17,.06)	79	.16	6	133,164	9203	.16 (–.01,.33)	97	.03	6	3593	9203	.12 (–.17,.41)	96	.16
Extraversion	6	133,164	3593	–.22 (–.27, –.18)	19	.48	6	133,164	9203	–.12 (–.21, –.04)	86	.26	6	3593	9203	.01 (–.11,.12)	70	.01
Openness	4	57,642	1286	.24 (.15,.33)	24	.18	4	57,642	3382	.43 (.30,.57)	68	.04	4	1286	3382	.16 (–.07,.38)	73	.00
Agreeableness	5	131,797	3573	–.20 (–.33, –.07)	86	.15	5	131,797	9134	–.19 (–.28, –.10)	87	.45	5	3573	9134	.04 (–.10,.18)	82	.47
Conscientiousness	5	59,025	1306	–.29 (–.45, –.14)	69	.07	5	59,025	3452	–.49 (–.72, –.27)	90	.07	5	1306	3452	–.13 (–.20, –.07)	0	.32

k = number of pooled effect sizes, n_1 = number of heterosexual individuals in the analysis, n_2 = number of homosexual individuals in the analysis, n_3 = number of bisexual individuals in the analysis. E_P = significance value for Egger's regression asymmetry test (values below .05 indicate evidence of publication bias). I^2 = heterogeneity estimate expressed as a percentage (values about .50 indicate high heterogeneity and values above .75 indicate substantial heterogeneity)

p = .016, and for homosexual vs. bisexual comparisons, k = 5, $t(3)$ = 20.89, p < .001, in female samples. These small sample effects were accompanied by significant age moderation effects, such that differences in openness between heterosexual and bisexual women, k = 4, $\chi^2(1)$ = 8.84, p = .002, R^2 = 1.00, and between homosexual and bisexual women, k = 4, $\chi^2(1)$ = 10.17, p = .001, R^2 = 1.00, decreased as the sample age increased. As smaller sample studies also tended to have older participants, it is unknown whether age moderation effects reflect publication bias. Similar findings were observed in follow-up analyzes of population-based samples.

Agreeableness

For homosexual vs. heterosexual comparisons, there was a significant moderation by sample sex, k = 18, $\chi^2(1)$ = 7.33, p = .007, R^2 = .33. Observation of male and female samples showed a non-significant effect for men, k = 9, SMD = .17 (95% CI: – .03, .37), and also for women, k = 9, SMD = – .09 (95% CI: – .18, .01). For analyzes run exclusively on population-based samples, the same sex moderation effect emerged, k = 10, $\chi^2(1)$ = 11.60, p < .001, R^2 = .60. This effect was such that homosexual women had lower levels of agreeableness than heterosexual women, k = 5, SMD = – .20 (95% CI: – .33, – .07), but that homosexual and heterosexual men did not differ in levels of agreeableness, k = 5, SMD = .22 (95% CI: – .06, .50). The positive effect size for men was comparable to the negative effect size for women and was not significantly within equivalence bounds of ± .22. For women, there was a significant age moderation effect, k = 8, $\chi^2(1)$ = 12.94, p < .001, R^2 = .73, showing that differences in levels of agreeableness between homosexual and heterosexual women tended to decrease as the sample age increased.

For heterosexual vs. bisexual comparisons, there was also a significant moderation by sample sex, k = 12, $\chi^2(1)$ = 10.33, p = .001, R^2 = .55. This effect was such that bisexual women scored lower on agreeableness than heterosexual women, k = 6, SMD = – .21 (95% CI: – .29, – .13), but that bisexual and heterosexual men did not differ in levels of agreeableness, k = 6, SMD = .03 (95% CI: – .14, .20). TOST analyzes showed that the observed effect size for men was significantly within equivalence bounds of ± .22, z = 2.21, p = .014. For homosexual vs. bisexual comparisons, there was no significant sex moderation effect. There were no significant differences between homosexual and bisexual individuals on levels of agreeableness, k = 6, SMD = – .04 (95% CI: – .21, .12). TOST analyzes showed that the observed effect size for both men, z = 2.23, p = .013, and women, z = 2.12, p = .017, was significantly within equivalence bounds of ± .22. There were no significant age moderation effects and findings were mirrored in analyzes of population-based samples.

Conscientiousness

For homosexual vs. heterosexual comparisons, there was no significant moderation by sample sex, k = 18, $\chi^2(1)$ = 3.53, p = .060, R^2 = .19. However, a clear sex moderation effect did emerge in analyzes of population-based samples, k = 10, $\chi^2(1)$ = 20.78, p < .001, R^2 = .85. This effect was such that

homosexual women had lower levels of conscientiousness than heterosexual women, k = 5, SMD = – .29 (95% CI: – .45, – .14), and homosexual men had higher levels of conscientiousness than heterosexual men, k = 5, SMD = .11 (95% CI: .01, .21). The effect size for men was significantly within the equivalence bounds of ± .22. There were no significant age moderation effects. For heterosexual vs. bisexual comparisons, there was also a significant moderation by sample sex, k = 12, $\chi^2(1)$ = 5.44, p = .020, R^2 = .41. This effect was such that bisexual men and women had lower levels of conscientiousness than heterosexual men and women, but the effect was stronger for women, k = 6, SMD = – .45 (95% CI: – .62, – .29), than for men, k = 6, SMD = – .19 (95% CI: – .24, – .15). For homosexual vs. bisexual comparisons, there was no significant moderation by sample sex. Rather, bisexual individuals had lower levels of conscientiousness than homosexual individuals, k = 12, SMD = – .21 (95% CI: – .28, – .15). There were no significant age moderation effects and findings were mirrored in population-based samples.

Discussion

Study 2 updated a recent meta-analysis of personality and sexual orientation (Allen & Walter, 2018a) to include bisexual orientation as a separate category. In contrast to the previous meta-analysis, that analyzed 110 effect sizes, the current meta-analysis extracted 262 effect sizes and computed separate analyzes for studies adopting self-reported sexual identity measures and non-convenience population-based samples. As in Study 1, notable differences were observed on all five trait dimensions between those who identified as heterosexual, those who identified as homosexual, and those who identified as bisexual. Study 2 also tested age moderation effects and found some evidence that personality trait differences between people of different sexual orientations tend to decline with age. Effect size differences for significant effects tended to be small-medium, and for non-significant effects the absence of a meaningful effect could not always be established using two-one-sided equivalence tests.

General Discussion

This research sought to determine whether personality differs between heterosexual, bisexual, and homosexual persons. Findings from Study 2 (that integrate Study 1) indicate that bisexual individuals report higher levels of openness than homosexual individuals, who in turn, report higher levels of openness than heterosexual individuals. Bisexual individuals also showed lower levels of conscientiousness than heterosexual and homosexual individuals. Sex moderation effects were observed for neuroticism, extraversion, agreeableness, and conscientiousness. These effects were such that homosexual men scored higher than heterosexual men on neuroticism, agreeableness and conscientiousness, whereas homosexual women scored lower than heterosexual women on extraversion, agreeableness, and conscientiousness. There was also evidence that personality trait differences between sexual orientation categories tend to decline with age. Overall, the findings of this research suggest small-medium effect size differences in trait personality between persons of different sexual orientation.

The finding that homosexual men and women scored higher on openness than heterosexual men and women is consistent with findings reported in a recent meta-analysis (Allen & Walter, 2018a) as well as theoretical propositions that openness should be most important for sexual identity formation (Lippa, 2005; Zoeterman & Wright, 2014). An important finding was that bisexual individuals reported higher levels of openness than both heterosexual individuals (medium effect size) and homosexual individuals (small effect size). This indicates that the association between openness and sexual orientation – if considered on a continuum from completely heterosexual to completely homosexual – is curvilinear in nature. This finding might be anticipated given that bisexual individuals tend to experience more identity confusion and emotional turmoil than homosexual individuals (Balsam & Mohr, 2007) meaning high levels of openness might be a useful attribute to discourage identity foreclosure (making a commitment without full exploration) among those who might otherwise adopt a bisexual orientation (see Zoeterman & Wright, 2014).

The findings of this research differ somewhat from those reported in a recent meta-analysis (Allen & Walter, 2018a) that found limited evidence for the gender-shift hypothesis. The previous meta-analyzes found that heterosexual and homosexual persons did not differ on extraversion, agreeableness or conscientiousness (Allen & Walter, 2018a). In fact, the only sex moderation effect observed was for neuroticism in which homosexual men reported higher levels of neuroticism than heterosexual men and homosexual women reported lower levels of neuroticism than heterosexual women. None of those findings were observed here. Rather, the neuroticism sex moderation effect indicated that while heterosexual men did score lower on neuroticism than homosexual (and bisexual) men, homosexual and heterosexual women did not differ in levels of neuroticism. Important sex moderations were also observed for extraversion (such that homosexual women report higher levels of extraversion than heterosexual women, but levels of extraversion did not differ between homosexual and heterosexual men), agreeableness (such that homosexual women report lower levels of agreeableness than heterosexual women, whereas homosexual men report higher levels of agreeableness than heterosexual men), and conscientiousness (such that homosexual women report lower levels of conscientiousness than heterosexual women, whereas homosexual men report higher levels of conscientiousness than heterosexual men).

By separating effects for bisexual and homosexual individuals, and focusing on higher quality studies (studies of self-reported sexual identity and representative data samples), we have been able to remove much of the excessive heterogeneity observed in the previous meta-analysis, narrowing confidence intervals, and revealing important sex moderations. That sex moderation effects were observed on four of the five dimensions provides some evidence for the gender-shift hypothesis (Lippa, 2005). Compared to men, women tend to score higher on neuroticism and agreeableness, and to a lesser extent, on extraversion and conscientiousness (De Bolle et al., 2015;

Schmitt et al., 2008). Given these personality differences between men and women, the sex moderation effects observed for neuroticism, agreeableness and conscientiousness (between homosexual and heterosexual individuals) are in the direction predicted by the gender-shift hypothesis. The sex moderation effect for extraversion – showing that homosexual women score higher that heterosexual women on extraversion – is not in the direction predicted by the gender-shift hypothesis given that heterosexual women tend to score higher on extraversion than heterosexual men (albeit with a small effect size). This finding might be explained by cultural factors, as sex differences in extraversion do not always transfer across world regions (Schmitt et al., 2008).

Another important new finding was that bisexual individuals tend to score lower on conscientiousness than heterosexual and homosexual individuals, and this effect emerged for both men and women. Combined with the sex moderation effect for homosexual and heterosexual individuals (the finding that homosexual women report lower levels of conscientiousness than heterosexual women, whereas homosexual men report higher levels of conscientiousness than heterosexual men), this pattern of results is indicative of a curvilinear effect for conscientiousness (similar to openness) but only among women. For men, this pattern of results is indicative of a linear association (see Table 4). Because bisexual individuals tend to experience more identity confusion and emotional turmoil than homosexual individuals (Balsam & Mohr, 2007), we can speculate that – similar to high openness – low conscientiousness might be a useful attribute to discourage identity foreclosure (see Zoeterman & Wright, 2014) but only among women. For men, low conscientiousness might be less important to processes involved in identity formation and further research is required to help understand why this might be the case. Further research into these processes could also help to explain why a bisexual orientation is more common among women than among men (Bailey et al., 2016).

Researchers have invested a considerable amount of time investigating how trait personality changes over the lifespan (Caspi et al., 2005; Costa et al., 2019; Damian et al., 2019; Roberts et al., 2006). This research indicates that as people become older neuroticism tends to decrease, whereas agreeableness and conscientiousness tend to increase (the maturity principle). The age moderation effects observed in the current study – showing that differences between sexual orientation groups tend to decline with age – might be important to understanding personality trajectories. It was found that the medium effect size difference in neuroticism between heterosexual and homosexual men, the small effect size difference in extraversion between heterosexual and homosexual women, the small-medium effect size difference in openness between heterosexual, bisexual and homosexual women, and the small effect size difference in agreeableness between heterosexual and homosexual women, all decreased in magnitude as the sample age increased. Given these age moderation effects, sexual orientation might be an important consideration in personality trajectories across the lifespan. It might be the case that general personality trajectories (decreases in neuroticism, and increases in agreeableness and conscientiousness) differ in sexual minority samples. Compared to heterosexual men, homosexual men might show a greater decline in neuroticism and less of a decline in agreeableness and conscientiousness. Compared to heterosexual women, homosexual women might show a greater decline in agreeableness and conscientiousness. Longitudinal research is needed to test these possibilities directly.

The current research has a number of potential shortcomings that readers must consider when interpreting findings. First, while the current meta-analysis provides estimates for population-based samples, the samples included were somewhat limited to industrialized nations and how well findings transfer to all world regions remains unknown. Indeed, sex differences in personality do not always transfer across cultures (Schmitt et al., 2008) and further research in needed to test whether personality differences between people of different sexual orientations can be applied to all world regions. Second, the meta-analysis tested for linear effects between three sexual orientation categories. The pattern of results indicated that some associations might be curvilinear in nature if sexual orientation is considered on a continuum from fully heterosexual to fully homosexual. Researchers have suggested that in-between groups (e.g., primarily heterosexual, mostly homosexual) might also be important and distinct sexual minority categories (Savin-Williams, 2016; Walton et al., 2016) and future research might consider exploring (more directly) the magnitude of potential curvilinear effects. There is also some evidence that people who identify as asexual (no sexual attraction to persons of either sex) have distinct personality profiles (Bogaert et al., 2018; Carvalho et al., 2017) and further research into asexual samples is also important. In addition, other non-heterosexual identity labels are increasingly being used (e.g., pansexual, queer; Goldberg et al., 2020) that could also be explored in relation to personality.

A third limitation is the focus on higher-level personality dimensions rather than lower-level trait facets. Research has found that women tend to score higher than men on extraversion facets related to warmth and sociability, whereas men tend to score higher than women on extraversion facets related to assertiveness and excitement seeking (Costa et al., 2001). To more adequately test the gender shift hypothesis, researchers should look to explore lower-level trait facets. A fourth potential limitation relates to measurement differences in sexual orientation with some studies focusing on self-reported sexual identity (categorized) and others exploring relative levels of same-sex sexual attraction. These differences in conceptualization might contribute somewhat to increased measurement error. A final limitation is that included studies used cross-sectional research designs and therefore whether associations between personality and sexual orientation are spurious or causal in nature remains unknown. Prospective research designs can help provide information on how personality development and sexual identity development interconnect over the adult lifespan.

Despite these potential limitations, the current research extends knowledge in this important area and findings for all five personality dimensions reported in the previous meta-analysis (Allen & Walter, 2018a) have been superseded in this work. For neuroticism, our results show that rather than

sexual orientation differences for both men and women (Allen & Walter, 2018a), only men tend to differ on scores for neuroticism. For openness, rather than a straightforward difference between heterosexual and homosexual persons (Allen & Walter, 2018a), our results indicate a curvilinear association in which bisexual individuals score highest on openness. For extraversion, agreeableness and conscientiousness, rather than no personality differences across sexual orientation categories for men or women (Allen & Walter, 2018a), our results show sex moderation effects in which sexual orientation groups differ on all these dimensions. Furthermore, rather than these differences being static across the lifespan (i.e., no age moderation effects; Allen & Walter, 2018a), our results indicate that personality differences between persons of different sexual orientation tend to decline with age. In other words, the current research provides more precise estimates in meta-analysis and greater support for the gender-shift hypothesis overall.

In terms of research progression, researchers might consider exploring further how personality relates to processes important in sexual identity formation. The minority stress model of sexual orientation (Meyer, 2003) outlines that sexual minorities are at greater risk of mental health problems (see Allen, 2018; Semlyen et al., 2016), because of stigma, prejudice, and discrimination that create a stressful social environment. The degree to which sexual minority individuals are susceptible to such stress is thought to be moderated by personality traits (Bailey, 2020) that are particularly important in stress and coping (Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007). Researchers might also consider exploring further how personality relates to stages of sexual identity development. Stage based models (e.g., Cass, 1979) have received some criticism for not considering individual difference factors that might explain why some individuals do not progress through stages in a linear manner or progress through all stages (Rosario et al., 2011). These variations in identity formation might be explained, in part, by personality traits and further research into these processes can help increase understanding of sexual identity development.

To conclude, this research has identified small-medium effect size differences in personality traits between heterosexual, bisexual, and homosexual persons. Important differences were found on all five personality dimensions, and effects were generally in line with predictions of the gender-shift hypothesis. Results also showed that personality trait differences between sexual orientation categories tend to decline with age. The findings of this research could have implications for theory and research on personality trajectories over the lifespan, and might also be of interest to health care professionals working with sexual minority (LGB) individuals. Sexual identity development can be a complex and often difficult process (Rosario et al., 2011) and personality tests might become a useful method to identify individuals who might benefit greatest from inclusion in support programs for sexual identity distress. More generally, personality tests could be useful in helping LGB individuals gain greater self-awareness of their own personality. We recommend further research using prospective designs, in understudied cultural groups and world-regions, and more rigorous tests of potential curvilinear associations, to further understand how personality and sexual orientation interconnect over the lifespan.

References

Allen, M. S. (2018). Change in adolescent mental health between age 12 and 14 predicts sexual activity and sexual orientation at age 14. *Mental Health & Prevention*, *10*, 9–12. https://doi.org/10.1016/j.mhp.2018.02.002

Allen, M. S., & Walter, E. E. (2018a). Linking big five personality traits to sexuality and sexual health: A meta-analytic review. *Psychological Bulletin*, *144*(10), 1081–1110. https://doi.org/10.1037/bul0000157

*Allen, M. S., & Desille, A. E. (2017). Personality and sexuality in older adults. *Psychology & Health*, *32*(7), 843–859. https://doi.org/10.1080/08870446.2017.1307373

*Allen, M. S., & Walter, E. E. (2018b). Personality stability and change between age 12 and 14 predicts relationships, sexual activity, and same-sex sexual attraction at age 14. *Journal of Research in Personality*, *74*, 95–101. https://doi.org/10.1016/j.jrp.2018.02.009

Allik, J., Church, A. T., Ortiz, F. A., Rossier, J., Hřebíčková, M., De Fruyt, F., Realo, A., & McCrae, R. R. (2017). Mean profiles of the NEO Personality Inventory. *Journal of Cross-cultural Psychology*, *48*(3), 402–420. https://doi.org/10.1177/0022022117692100

Bailey, J. M. (2020). The minority stress model deserves reconsideration, not just extension. *Archives of Sexual Behavior*. Advance online publication. https://doi.org/10.1007/s10508-019-01606-9

Bailey, J. M., Vasey, P. L., Diamond, L. M., Breedlove, S. M., Vilain, E., & Epprecht, M. (2016). Sexual orientation, controversy, and science. *Psychological Science in the Public Interest*, *17*(2), 45–101. https://doi.org/10.1177/1529100616637616

Bailey, J. M., & Zucker, K. J. (1995). Childhood sex-typed behavior and sexual orientation: A conceptual analysis and quantitative review. *Developmental Psychology*, *31*(1), 43–55. https://doi.org/10.1037/0012-1649.31.1.43

Balsam, K. F., & Mohr, J. J. (2007). Adaptation to sexual orientation stigma: A comparison of bisexual and lesbian/gay adults. *Journal of Counseling Psychology*, *54*(3), 306–319. https://doi.org/10.1037/0022-0167.54.3.306

*Barnes, G. E., Malamuth, N. M., & Check, J. V. P. (1984). Personality and sexuality. *Personality and Individual Differences*, *5*(2), 159–172. https://doi.org/10.1016/0191-8869(84)90048-5

Bleidorn, W., Hopwood, C. J., & Lucas, R. E. (2018). Life events and personality trait change. *Journal of Personality*, *86*(1), 83–96. https://doi.org/10.1111/jopy.12286

*Bogaert, A. F., Ashton, M. C., & Lee, K. (2018). Personality and sexual orientation: Extension to asexuality and the HEXACO model. *Journal of Sex Research*, *55*(8), 951–961. https://doi.org/10.1080/00224499.2017.1287844

Bogaert, A. F., & Skorska, M. N. (2020). A short review of biological research on the development of sexual orientation. *Hormones and Behavior*, *119*. https://doi.org/10.1016/j.yhbeh.2019.104659

Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin*, *130*(6), 887–919. https://doi.org/10.1037/0033-2909.130.6.887

Borenstein, M., Hedges, L. V., Higgins, J., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Wiley.

Borenstein, M., Hedges, L. V., Higgins, J., & Rothstein, H. R. (2014). *Comprehensive meta-analysis version 3.0 [computer software]*. National Institutes of Health.

*Bozkurt, A., Isikli, H., Demir, F., Ozmenler, K. N., Gulcat, Z., Karlidere, T., & Aydin, H. (2006). Body image and personality traits of male-to-female transsexuals and homosexuals. *Social Behavior and Personality*, *34*(8), 927–937. https://doi.org/10.2224/sbp.2006.34.8.927

*Bourdage, J. S., Lee, K., Ashton, M. C., & Perry, A. (2007). Big five and HEXACO model personality correlates of sexuality. *Personality and Individual Differences*, *43*(6), 1506–1516. https://doi.org/10.1016/j.paid.2007.04.008

Carvalho, J., Lemos, D., & Nobre, P. J. (2017). Psychological features and sexual beliefs characterizing self-labeled asexual individuals. *Journal of Sex & Marital Therapy*, *43*(6), 517–528. https://doi.org/10.1080/0092623X.2016.1208696

Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual Review of Psychology*, *61*(1), 679–704. https://doi.org/10.1146/annurev.psych.093008.100352

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology*, *56*(1), 453–484. https://doi.org/10.1146/annurev.psych.55.090902.141913

Cass, V. C. (1979). Homosexuality identity formation: A theoretical model. *Journal of Homosexuality*, *4*(3), 219–235. https://doi.org/10.1300/J082v04n03_01

Cass, V. C. (1984). Homosexual identity formation: Testing a theoretical model. *Journal of Sex Research*, *20*(2), 143–167. https://doi.org/10.1080/00224498409551214

*Clemens, C., Atkin, D., & Krishnan, A. (2015). The influence of biological and personality traits on gratifications obtained through online dating websites. *Computers in Human Behavior*, *49*, 120–129. https://doi.org/10.1016/j.chb.2014.12.058

Connor-Smith, J. K., & Flachsbart, C. (2007). Relations between personality and coping: A meta-analysis. *Journal of Personality and Social Psychology*, *93*(6), 1080–1107. https://doi.org/10.1037/0022-3514.93.6.1080

Costa, P. T., & McCrae, R. R. (2017). The NEO inventories as instruments of psychological theory. In T. A. Widiger (Ed.), *The Oxford handbook of the five factor model* (pp. 11–37). Oxford University Press.

Costa, P. T., McCrae, R. R., & Löckenhoff, C. E. (2019). Personality across the life span. *Annual Review of Psychology*, *70*(1), 423–448. https://doi.org/10.1146/annurev-psych-010418-103244

Costa, P. T., Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology*, *81*(2), 322–331. https://doi.org/10.1037/0022-3514.81.2.322

Damian, R. I., Spengler, M., Sutu, A., & Roberts, B. W. (2019). Sixteen going on sixty-six: A longitudinal study of personality stability and change across 50 years. *Journal of Personality and Social Psychology*, *117*(3), 674–695. https://doi.org/10.1037/pspp0000210

De Bolle, M., De Fruyt, F., McCrae, R. R., Löckenhoff, C. E., Costa, P. T., Aguilar-Vafaie, M. E., … Terracciano, A. (2015). The emergence of sex differences in personality traits in early adolescence: A cross-sectional, cross-cultural study. *Journal of Personality and Social Psychology*, *108*(1), 171–185. https://doi.org/10.1037/a0038497

De Moor, M. H., Costa, P. T., Terracciano, A., Krueger, R. F., De Geus, E. J., Toshiko, T., … Amin, N. (2012). Meta-analysis of genome-wide association studies for personality. *Molecular Psychiatry*, *17*(3), 337–349. https://doi.org/10.1038/mp.2010.128

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*, *41*(1), 417–440. https://doi.org/10.1146/annurev.ps.41.020190.002221

Egger, M., Davey Smith, G., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ*, *315*(7109), 629–634. https://doi.org/10.1136/bmj.315.7109.629

Evans, R. B. (1970). Sixteen personality factor questionnaire scores of homosexual men. *Journal of Consulting and Clinical Psychology*, *34*(2), 212–215. https://doi.org/10.1037/h0029029

Ganna, A., Verweij, K. J., Nivard, M. G., Maier, R., Wedow, R., Busch, A. S., … Lundström, S. (2019). Large-scale GWAS reveals insights into the genetic architecture of same-sex sexual behavior. *Science*, *365*(6456). https://doi.org/10.1126/science.aat7693

Gignac, G. E., & Szodorai, E. T. (2016). Effect size guidelines for individual differences researchers. *Personality and Individual Differences*, *102*, 74–78. https://doi.org/10.1016/j.paid.2016.06.069

Goldberg, S. K., Rothblum, E. D., Russell, S. T., & Meyer, I. H. (2020). Exploring the Q in LGBTQ: Demographic characteristic and sexuality of queer people in a U.S. representative sample of sexual minorities. *Psychology of Sexual Orientation and Gender Diversity*, *7*(1), 101–112. https://doi.org/10.1037/sgd0000359

*Greaves, L. M., Barlow, F. K., Huang, Y., Stronge, S., & Sibley, C. G. (2017). Personality across sexual identity and gender in a national probability sample in New Zealand. *Sex Roles*, *77*(9–10), 653–662. https://doi.org/10.1007/s11199-017-0752-0

Haseldon, L., Joloza, T., & Household, L. M. (2009). *Measuring sexual identity: A guide for researchers*. Office for National Statistics.

Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *BMJ*, *327*(7414), 557–560. https://doi.org/10.1136/bmj.327.7414.557

Hopkins, J. H. (1969). The lesbian personality. *The British Journal of Psychiatry*, *115*(529), 1433–1436. https://doi.org/10.1192/bjp.115.529.1433

*Ifrah, K., Shenkman, G., & Shmotkin, D. (2018). How does sexual orientation relate to openness to experience in adulthood. *Personality and Individual Differences*, *131*, 164–173. https://doi.org/10.1016/j.paid.2018.04.030

Jannini, E. A., Blanchard, R., Camperio-Ciani, A., & Bancroft, J. (2010). Male homosexuality: Nature or culture? *The Journal of Sexual Medicine*, *7*(10), 3245–3253. https://doi.org/10.1111/j.1743-6109.2010.02024.x

Kite, M. E., & Deaux, K. (1987). Gender belief systems: Homosexuality and the implicit inversion theory. *Psychology of Women Quarterly*, *11*(1), 83–96. https://doi.org/10.1111/j.1471-6402.1987.tb00776.x

Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking "big" personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin*, *136*(5), 768–821. https://doi.org/10.1037/a0020327

Lakens, D. (2017). Equivalence tests: A practical primer for t tests, correlations, and meta-analyses. *Social Psychological and Personality Science*, *8*(4), 355–362. https://doi.org/10.1177/1948550617697177

Lakens, D., Scheel, A. M., & Isager, P. M. (2018). Equivalence testing for psychological research: A tutorial. *Advances in Methods and Practices in Psychological Science*, *1*(2), 259–269. https://doi.org/10.1177/2515245918770963

Legate, N., Ryan, R. M., & Weinstein, N. (2012). Is coming out always a "good thing"? Exploring the relations of autonomy support, outness, and wellness for lesbian, gay, and bisexual individuals. *Social Psychological and Personality Science*, *3*(2), 145–152. https://doi.org/10.1080/10532528.2005.10559831

Lippa, R. A. (2005). Sexual orientation and personality. *Annual Review of Sex Research*, *16*(1), 119–153.

Lippa, R. A. (2008). Sex differences and sexual orientation differences in personality: Findings from the BBC internet survey. *Archives of Sexual Behavior*, *37*(1), 173–187. https://doi.org/10.1007/s10508-007-9267-z

Losoncz, I. (2009). Personality traits in HILDA. *Australian Social Policy*, *8*, 169–198. https://search.informit.com.au/documentSummary;dn=200908263;res=IELAPA

McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality*, *60*(2), 175–215. https://doi.org/10.1111/j.1467-6494.1992.tb00970.x

Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychological Bulletin*, *129*(5), 674–697. https://doi.org/10.1037/0033-2909.129.5.674

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med, 6*(7).

Nagel, M., Jansen, P. R., Stringer, S., Watanabe, K., de Leeuw, C. A., Bryois, J., … White, T. (2018). Meta-analysis of genome-wide association studies for neuroticism in 449,484 individuals identifies novel genetic loci and pathways. *Nature Genetics*, *50*(7), 920–927. https://doi.org/10.1038/s41588-018-0151-7

*Peixoto, M. M., & Nobre, P. (2016). Personality traits, sexual problems, and sexual orientation: An empirical study. *Journal of Sex & Marital Therapy*, *42*(3), 199–213. https://doi.org/10.1080/0092623X.2014.985352

Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin*, *135*(2), 322–338. https://doi.org/10.1037/a0014996

Rendina, H. J., Carter, J. A., Wahl, L., Millar, B. M., & Parsons, J. T. (2019). Trajectories of sexual identity development and psychological well-being for highly sexually active gay and bisexual men: A latent

growth curve analysis. *Psychology of Sexual Orientation and Gender Diversity*, *6*(1), 64–74. https://doi.org/10.1037/sgd0000308

Rieger, G., Linsenmeier, J. A., Gygax, L., & Bailey, J. M. (2008). Sexual orientation and childhood gender nonconformity: Evidence from home videos. *Developmental Psychology*, *44*(1), 46–58. https://doi.org/10.1037/0012-1649.44.1.46

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*, *132*(1), 1–25. https://doi.org/10.1037/0033-2909.132.1.1

Rosario, M., Schrimshaw, E. W., & Hunter, J. (2011). Different patterns of sexual identity development over time: Implications for the psychological adjustment of lesbian, gay, and bisexual youths. *Journal of Sex Research*, *48*(1), 3–15. https://doi.org/10.1080/00224490903331067

Sanders, A. R., Beecham, G. W., Guo, S., Dawood, K., Rieger, G., Badner, J. A., … Gejman, P. V. (2017). Genome-wide association study of male sexual orientation. *Scientific Reports*, *7*(1), 16950. https://doi.org/10.1038/s41598-017-15736-4

Sanders, A. R., Martin, E. R., Beecham, G. W., Guo, S., Dawood, K., Rieger, G., … Duan, J. (2015). Genome-wide scan demonstrates significant linkage for male sexual orientation. *Psychological Medicine*, *45*(7), 1379–1388. https://doi.org/10.1017/S0033291714002451

Saucier, G. (1994). Mini-markers: A brief version of Goldberg's unipolar big-five markers. *Journal of Personality Assessment*, *63*(3), 506–516. https://doi.org/10.1207/s15327752jpa6303_8

Savin-Williams, R. C. (2016). Sexual orientation: Categories or continuum? Commentary on Bailey et al. (2016). *Psychological Science in the Public Interest*, *17*(2), 37–44. https://doi.org/10.1177/1529100616637618

Schmitt, D. P. (2007). Sexual strategies across sexual orientations: How personality traits and culture relate to sociosexuality among gays, lesbians, bisexuals, and heterosexuals. *Journal of Psychology & Human Sexuality*, *18*(2–3), 183–214. https://doi.org/10.1300/J056v18n02_06

Schmitt, D. P., Realo, A., Voracek, M., & Allik, J. (2008). Why can't a man be more like a woman? Sex differences in big five personality traits across 55 cultures. *Journal of Personality and Social Psychology*, *94*(1), 168–182. https://doi.org/10.1037/0022–3514.94.1.168

*Schmitt, D. P., & Buss, D. M. (2000). Sexual dimensions of person description: Beyond or subsumed by the big five? *Journal of Research in Personality*, *34*(2), 141–177. https://doi.org/10.1006/jrpe.1999.2267

Schuirmann, D. J. (1987). A comparison of the two one-sided tests procedure and the power approach for assessing the equivalence of average bioavailability. *Journal of Pharmacokinetics and Biopharmaceutics*, *15*(6), 657–680. https://doi.org/10.1007/BF01068419

Schwaba, T., Robins, R. W., Grijalva, E., & Bleidorn, W. (2019). Does openness to experience matter in love and work? Domain, facet, and developmental evidence from a 24-year longitudinal study. *Journal of Personality*, *87*(5), 1074–1092. https://doi.org/10.1111/jopy.12458

Semlyen, J., King, M., Varney, J., & Hagger-Johnson, G. (2016). Sexual orientation and symptoms of common mental disorder or low well-being: Combined meta-analysis of 12 UK population health surveys. *BMC Psychiatry*, *16*(1), Article 67. https://doi.org/10.1186/s12888-016-0767-z

*Smith, C. V., Neziek, J. B., Webster, G. D., & Paddock, E. L. (2007). Relationships between daily sexual interactions and domain-specific and general models of personality traits. *Journal of Social and Personal Relationships*, *24*(4), 497–515. https://doi.org/10.1177/0265407507079236

Soto, C. J., & John, O. P. (2017). The next big five inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *Journal of Personality and Social Psychology*, *113*(1), 117–143. https://doi.org/10.1037/pspp0000096

Steel, P., Schmidt, J., & Shultz, J. (2008). Refining the relationship between personality and subjective well-being. *Psychological Bulletin*, *134*(1), 138–161. https://doi.org/10.1037/0033-2909.134.1.138

Walton, M. T., Lykins, A. D., & Bhullar, N. (2016). Beyond heterosexual, bisexual, and homosexual: A diversity in sexual identity expression. *Archives of Sexual Behavior*, *45*(7), 1591–1597. https://doi.org/10.1007/s10508-016-0778-3

*Wells, B. W., & Schofield, C. B. (1972). Personality characteristics of homosexual men suffering from sexually transmitted diseases. *The British Journal of Venereal Diseases*, *48*(1), 75–78. https://doi.org/10.1136/sti.48.1.75

*Wang, J., Dey, M., Soldati, L., Weiss, M. G., Gmel, G., & Mohler-Kuo, M. (2014). Psychiatric disorders, suicidality, and personality among young men by sexual orientation. *European Psychiatry*, *29*(8), 514–522. https://doi.org/10.1016/j.eurpsy.2014.05.001

Wilson, M. L. (1982). Neuroticism and extraversion of female homosexuals. *Psychological Reports*, *51*(2), 559–562. https://doi.org/10.2466/pr0.1982.51.2.559

Wooden, M., Freidin, S., & Watson, N. (2002). The household, income and labour dynamics in Australia (HILDA)survey: Wave 1. *The Australian Economic Review*, *35*(3), 339–348. https://doi.org/10.1111/1467-8462.00252

Young, E. S., Simpson, J. A., Griskevicius, V., Huelsnitz, C. O., & Fleck, C. (2019). Childhood attachment and adult personality: A life history perspective. *Self and Identity*, *18*(1), 22–38. https://doi.org/10.1080/15298868.2017.1353540

*Zheng, L., Goldberg, L. R., Zheng, Y., Zhao, Y., Tang, Y., & Liu, L. (2008). Reliability and concurrent validation of the IPIP big-five factor markers in China: Consistencies in factor structure between internet-obtained heterosexual and homosexual samples. *Personality and Individual Differences*, *45*(7), 649–654. https://doi.org/10.1016/j.paid.2008.07.009

*Zietsch, B. P., Verweij, K. J., Bailey, J. M., Wright, M. J., & Martin, N. G. (2011). Sexual orientation and psychiatric vulnerability: A twin study of neuroticism and psychoticism. *Archives of Sexual Behavior*, *40*(1), 133–142. https://doi.org/10.1007/s10508-009-9508-4

Zoeterman, S. E., & Wright, A. J. (2014). The role of openness to experience and sexual identity formation in LGB individuals: Implications for mental health. *Journal of Homosexuality*, *61*(2), 334–353. https://doi.org/10.1080/00918369.2013.839919