



## Technical comment on Jonason, P. K., & Luoto, S. (2021). The dark side of the rainbow: Homosexuals and bisexuals have higher Dark Triad traits than heterosexuals. *Personality and Individual Differences*, 181, 111040

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The study of differences across sexual orientations can illuminate characteristics of individuals who are marginalized based on their sexual orientation and inform efforts to promote their health and well-being. However, there is potential for this work to pathologize sexual minorities (SMs), reflecting a troubling history within the social sciences (Herek, 2010). In light of continued discrimination and persecution of SM individuals, research examining differences across sexual orientations in stigmatizing outcomes like psychopathy must be methodologically rigorous and culturally sensitive. The study by Jonason and Luoto (2021) purporting to find sexual orientation-based differences in Dark Triad (DT) traits falls well short of this standard.

**Problems with analyses.** The authors conducted a series of single factor ANOVAs, followed by Scheffe's post-hoc tests, and an unspecified number of planned comparisons (i.e., *t*-tests)<sup>1</sup> rather than relying on a traditional multifactor ANOVA—the most obvious and appropriate analysis. Although their approach did not allow testing of the interaction between sex and sexual orientation, the authors reported post-hoc analyses consistent with the probing of such an interaction. The authors state they did so because they did not have the power to test the interaction, which is true. However, they should not have proceeded with analyses probing these differences using an alternative and inferior approach; differences in statistical significance are not the same as differences in effect size. Their approach resulted in dozens of group comparisons with only a weak family-wise Type I error correction in place for some but not all, which serves to increase the family-wise Type I error rate. Given these considerations, it is inappropriate to highlight and interpret non-significant differences (i.e.,  $p > .05$ ); a decision which effectively moves the rejection threshold from  $p < .05$  to  $p < .10$ —even

further increasing the family-wise Type I error rate. Tests or comparisons with a *p*-value greater than 0.05 should not be interpreted.

**Measurement invalidity.** The Dirty Dozen is a poor measure as it shows limited convergence with other measures of DT constructs (Maples et al., 2014; Miller et al., 2012); fails to assess one of the key constructs – Machiavellianism – in a manner that accords with theoretical descriptions (Miller et al., 2017); treats the constructs as unidimensional contrary to evidence (Miller et al., 2019); and results in findings inconsistent with other measures (Schreiber & Marcus, 2020). Measurement validity is particularly important in high-stakes, sensitive work such as that being conducted here.

**Sampling approach.** Analyses of group differences that include marginalized groups would ideally use representative and large samples to ensure the generalizability of the data to the broader groups of interest; unfortunately, neither was the case here. The use of snowball sampling raises concerns regarding non-representativeness and could yield clustered data that muddy conclusions about these groups. Individuals who are close enough to refer one another to a research study may share more characteristics than a random selection of individuals from the population, resulting in a more homogenous (and less representative) sample than would be collected through other strategies. Additionally, if drawing conclusions about sensitive topics, one would expect larger groups than some of those used here (e.g., gay women:  $n = 43$ ; bisexual men:  $n = 58$ ), especially given that these data were neither difficult nor expensive to collect.

**Lack of attention to sociocultural context as an explanatory factor.** Leading theoretical perspectives emphasize how minority stress can create health disparities among SMs (Meyer, 2003), yet this theory is not

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<sup>1</sup> Without pre-registration of the analytic plan it is impossible to discern which tests were planned or how many such comparisons were conducted. This is why we have previously called for the adoption of an open science approach in the Dark Triad literature (Miller et al., 2019).

mentioned until the final sentence. Contextual influences warrant greater consideration in light of these well-documented patterns. It is impossible to attribute between-group differences solely to the current theoretical framing given the absence of tests of underlying mechanisms.

*Inconsistency with guidelines from the APA for inclusive language.* The title of the manuscript misappropriates the iconography of queer liberation and empowerment (i.e., “Dark Side of the Rainbow”) in a distasteful, unseemly manner. In addition, APA guidelines for bias-free language specifically advise against using terms such as “homosexuals” and “homosexuality” due to their association with negative stereotypes and pathology; such guidelines are entirely ignored. Finally, multiple statements in the Discussion go beyond the findings and have the potential to reinforce negative stereotypes about SMs (e.g., “The pronounced Dark Triad profiles in bisexual individuals could contribute to their delinquent behavior;” p. 4).

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