ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

Preliminary Evidence of heightened discomfort tolerance in non-heterosexual individuals

Carmelo M Vicario[1*], Alessandro Capodici[1], Alice Giunta[1], Alessandra Falzone[1], Amelia Gangemi[1], Antonio Pennisi[1]

[1] Department of Cognitive Sciences, University of Messina, Messina (ME), Italy. cvicario@unime.it

Citation: Vicario C.M., Capodici A., Giunta A., Falzone A., Gangemi A., Pennisi A. (2024). Preliminary Evidence of heightened discomfort tolerance in non-heterosexual individuals. Preliminary Reports and Negative Results in Life Science and Humanities 1(2). https://doi.org/10.13129/3035-062X/prnr-4572

Abstract

This study delves into the interoceptive and emotional appraisals of non-heterosexual individuals, with the hypothesis that differences may exist when compared to their heterosexual counterparts.
Our results revealed a significant difference between heterosexual and non-heterosexual individuals, with the latter group displaying higher scores on the "not-distracting" subscale of the MAIA-2 questionnaire.
This finding provides evidence of heightened discomfort tolerance among non-heterosexual individuals, which may be mediated by adaptive mechanisms developed in response to stressors, in line with the minority stress theory.

Keywords: Interoception; Interoceptive awareness; Not distracting; Minority stress theory

Introduction

Non-heterosexual orientation, cross times and cultures, and are collectively perceived differently depending on the cultural, political, and religious structures of human societies (Tskhay and Rule, 2015).

As for the scientific community, in 1973 the American Psychiatric Association (APA) removed the diagnosis of homosexuality from the official classification of mental illness, the Diagnostic and Statistical Manual of Mental Disorders (DSM) (Drescher, 2010). Most recently provided descriptions define sexual orientation as “an enduring pattern of emotional, romantic, and/or sexual attractions to men, women, or both sexes” (APA 2008).

Different theoretical approaches characterize the contemporary scientific debate on the etiology of non-heterosexual orientation. The biological approach focuses on hormonal, genetic, neuroanatomical factors as influencers of sexual orientation to suggest that non-heterosexual orientation is innate and determined by biological factors (Swaab et al., 2021; Bogaert & Skorska, 2020); The social constructionist approach (e.g., Kitzinger, 1995; Diamond, 2008), which argues that sexual orientation is not a fixed or natural category, but a social and historical construct that varies across cultures and times; The interactionist approach (e.g., Kinitz et al., 2021, for a systematic review), which combines biological and environmental factors to explain sexual orientation. It suggests that non-heterosexual orientation is influenced by both innate predispositions and social learning experiences.

Most research on psychological correlates of non-heterosexual orientation have focused on sexual arousal (Safron et al., 2007; 2017; Sylva et al., 2013), perception and cognitive performance (Rahman, et al., 2003; Folkierska-Żukowska et al., 2020), and sex-related brain dymorphism

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

(Manzouri & Savic, 2018; 2019). Moreover, research has already placed emphasis on emotion dysregulation and distress in non-heterosexual individuals (Hatzenbuehler et al., 2008; Pachankis et al., 2015; 2020a). Beyond the most extreme cases–such as post-traumatic stress disorder and suicide attempts (Marchi et al., 2023; Wang et al., 2023), non-heterosexual people regularly experience negative emotions and states such as shame, fear, guilt, sadness, self-recrimination, and self-devaluation (Meyer, 2003; Lozano-Verduzco et al., 2023).

Another central aspect of the current debate on the origin of sexual orientation pertains to the evidence of similarities between non-heterosexual individuals and heterosexual individuals of the opposite sex. For instance, a recent large-scale study (n = 18,645) conducted by Abé et al. (2021) using a neuroimaging-genetics dataset on same-sex sexual behavior (SSB) has discovered and demonstrated multivariate neuroanatomical correlates of SSB. This suggests that genetic factors related to SSB may contribute to structural variations in specific brain structures, such as the volume of the lateral occipital and temporo-occipital cortices. In line with the authors' conclusions, these findings support the existence of a neurobiological basis for the differences in human sexuality.

We aim to provide new insights to the ongoing debate on the psychological aspects of non-heterosexuality by investigating dimensions of affective processing that have not been previously examined or remain unresolved. Specifically, we explore potential differences in alexithymia, which is considered a stable personality trait (Taylor & Bagby, 2012). Alexithymia pertains to the ability to identify and describe one's own feelings and emotions (e.g., Craparo et al., 2016; Barchetta et al., 2021; Vicario et al., 2021; 2023; Coppini et al., 2023). Given the existing evidence of emotion suppression in non-heterosexual individuals (Meyer, 2003), we anticipate that these individuals may exhibit higher levels of alexithymic traits compared to their heterosexual counterparts.

We also conducted an examination of disgust sensitivity (Olatunji et al., 2008), a well-established emotion relevant to explain several psychopathological conditions (Vicario, 2013; Culicetto et al., 2023; Capodici et al., 2024) that can impact various aspects of our social interactions, including our political affiliations (Elad-Strenge et al., 2020), religiosity (Yu et al., 2022), and our perception of morality (Vicario et al., 2017; Vicario and Rafal., 2017). Research on disgust sensitivity within the non-heterosexual population has been limited (Zhang et al., 2011) and has predominantly focused on disgust appraisal and related attitudes towards homosexuality (Caswell & Sackett-Fox, 2018; Wang et al., 2019). Considering the significance of disgust processing in sexual selection and grooming (Söylemez, Kapucu, 2024), our objective was to investigate whether differences in disgust sensitivity are associated with sexual orientation.

A further step of our investigation includes empathy, a multifaceted psychological process that plays a pivotal role in our ability to share and comprehend the experiences of others (Rameson et al., 2011). Initial studies have suggested that homosexual males exhibit significantly higher scores on empathy assessments compared to heterosexual males (Salais & Fischer, 1995). However, research on empathy differences between heterosexual and homosexual individuals remains inconclusive. For instance, Nette (2007) did not observe a heightened empathizing cognitive style among non-heterosexual women in comparison to their heterosexual counterparts. Our study contributes to this area by conducting a more comprehensive examination, encompassing both the cognitive and affective dimensions of empathy.

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

Lastly, our assessment encompasses interoceptive awareness, which pertains to our ability to sense and understand the physiological condition of the body. Interoception is considered the foundation for subjective feelings and emotions (Calì et al., 2015). A growing body of literature provides evidence that variations in interoceptive states can influence various mental processes, including higher-order functions, such as moral decision-making (Vicario et al., 2018; Brown et al., 2020), generosity (Kerry et al., 2019), time perception (Vicario et al., 2019; 2020), and visuo-spatial attention (Tian et al., 2011) and political orientation (Ruisch et al., 2023), although the results are not consistent (Lucifora and Vicario, 2024).

Studies have also highlighted that atypical interoception can serve as an indicator of psychological distress, particularly in cases of chronic stress, potentially leading to alterations in the perception of bodily sensations (Schulz and Vögele, 2015). Notably, the 'minority stress model' (Meyer, 1995; 2003) has garnered widespread recognition and adoption as a fundamental framework for research into the well-being and health of individuals with non-heterosexual orientations for more than two decades (Diamond & Alley, 2022; Izutsu & Tsutsumi, 2021). According to this model, stigma, prejudice, and discrimination are core stressors affecting non-heterosexual individuals, akin to the experiences of ethnic minorities (Meyer 1995; Frost & Meyer, 2023). Given that stress related to sexual orientation represents a consistent and significant component in the lives of non-heterosexual individuals, we anticipate identifying altered interoceptive sensitivity in non-heterosexuals when compared to controls. However, it's important to note that our specific prediction is not predetermined, as the existing literature has reported both heightened (Price and Hooven, 2018) and reduced (Schulz and Vögele, 2015) interoceptive sensitivity in response to stress and discomfort (e.g., Duschek et al., 2017).

Materials and Methods

1.1 Participants

The study involved 39 participants in the non-heterosexual group, comprising 20 females, with a mean age of 33.51 years (SD 8.44), and 109 participants in the control group, which included 70 females, with a mean age of 29.73 years (SD 7.91). Within the non-heterosexual group, there were 6 homosexual, 12 bisexual, and 2 asexual females, as well as 16 homosexual and 3 bisexual males. Participants were recruited through various online social platforms.

1.2 Instruments and Procedures

All participants provided written informed consent prior to their inclusion in the study, and data were collected anonymously. To screen for potential psychiatric comorbidities, we used the Short Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) (Mason et al., 2005). This four-scale questionnaire assesses psychosis-proneness, primarily schizotypy, and includes scales for unusual experiences, cognitive disorganization, introvertive anhedonia, and impulsive nonconformity.

Additional measures included in our study were the Toronto Alexithymia Scale (TAS-20), a self-report scale used to assess alexithymia. The TAS-20 comprises three subscales (difficulty identifying

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

feelings, difficulty describing feelings, and externally oriented thinking) and includes a total of twenty items (Bagby et al., 1994). We also employed the Disgust Sensitivity Scale - revised version (DS-R) to measure levels of disgust sensitivity across three domains (core disgust, animality reminder disgust, and contamination disgust) through 27 items (Olatunji et al., 2007).

To assess empathy, we used the Questionnaire of Cognitive and Affective Empathy (QCAE), a 31-item self-report multidimensional questionnaire that evaluates both affective and cognitive empathy. The QCAE consists of 5 subscales, including Affective Empathy (comprising emotion contagion, peripheral responsivity, and proximal responsivity) and Cognitive Empathy (encompassing perspective taking and online simulation) (Reniers et al., 2011).

Finally, we employed the Multidimensional Assessment of Interoceptive Awareness - version 2 (MAIA-2), a 37-item self-report questionnaire designed to measure various dimensions of interoception, including noticing, not-distracting, not-worrying, attention regulation, emotional awareness, self-regulation, body listening, and trusting (Mehling et al., 2018).

1.3 Statistical Methods

We conducted separate repeated measures ANOVAs to assess group differences for the respective measures. The factors considered were GROUP (heterosexual, non-heterosexual) and SEX (male, female) as the between-subject factors, while RESPONSES to the respective questionnaires served as within-subject factors. Post hoc comparisons were conducted using the Duncan test. In all statistical analyses, the significance level was set at $p < 0.05$. Data analysis was carried out using Statistica software, version 8.0, by StatSoft, Inc., based in Tulsa, USA.

Results

Our analysis did not include asexual individuals, as the primary focus of this study was on examining differences related to sexual orientation.

O-LIFE

We detected a significant main effect of SUBSCALE factor [$F(3, 426)=7.92$, $p<0.001$, $\eta p2 = 0.052$]. No further significant results were found (see supplemental material, table S1 for details).

TAS-20

We detected a significant main effect of SEX [$F(1, 142)=7.24$, $p=0.007$, $\eta p2 = 0.048$], documenting higher score in male ($M=17.39$, ± 0.663) compared to female ($M=14.94$, ± 0.626) participants. We also detected a significant main effect of SUBSCALE factor [$F(2, 284)=30.9$, $p<0.001$, $\eta p2 = 0.179$]. No further significant results were found (see supplemental material, table S2 for details).

DS-R

We detected a significant main effect of subscale factor [$F(2, 284)=532.5$, $p<0.001$, $\eta p2 = 0.789$]. The SUBSCALE x SEX interaction term was also significant [$F(2, 284)=7.45$, $p<0.001$, $\eta p2 = 0.049$]. Post-hoc comparison documented ($p=0.002$) a higher score in female ($M=31.80 \pm 1.07$ SE)

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

compared to male participants (M=28.13 ± 1.13 SE). No further significant results were found (see supplemental material, table S3 for details).

QCAE

We detected a significant main effect of SUBSCALE factor [F(1, 42)=853.1, p<0.001, ηp2 = 0.857]. No further significant results were found (see supplemental material, table S4 for details).

MAIA-2

We detected a significant main effect of SUBSCALE factor [F(7, 994)=92.39, p<0.001, ηp2 = 0.394]. The SUBSCALE x SEX interaction term was also significant [F(7, 994)=4.31, p<0.001, ηp2 = 0.029]. Post-hoc comparison documented higher score (p<0.001) for the not distracting subscale in female (M=16.96 ± 0.744 SE) compared to male (M=13.04 ± 0.788) participants. No further significant results were found (p > 0.056).

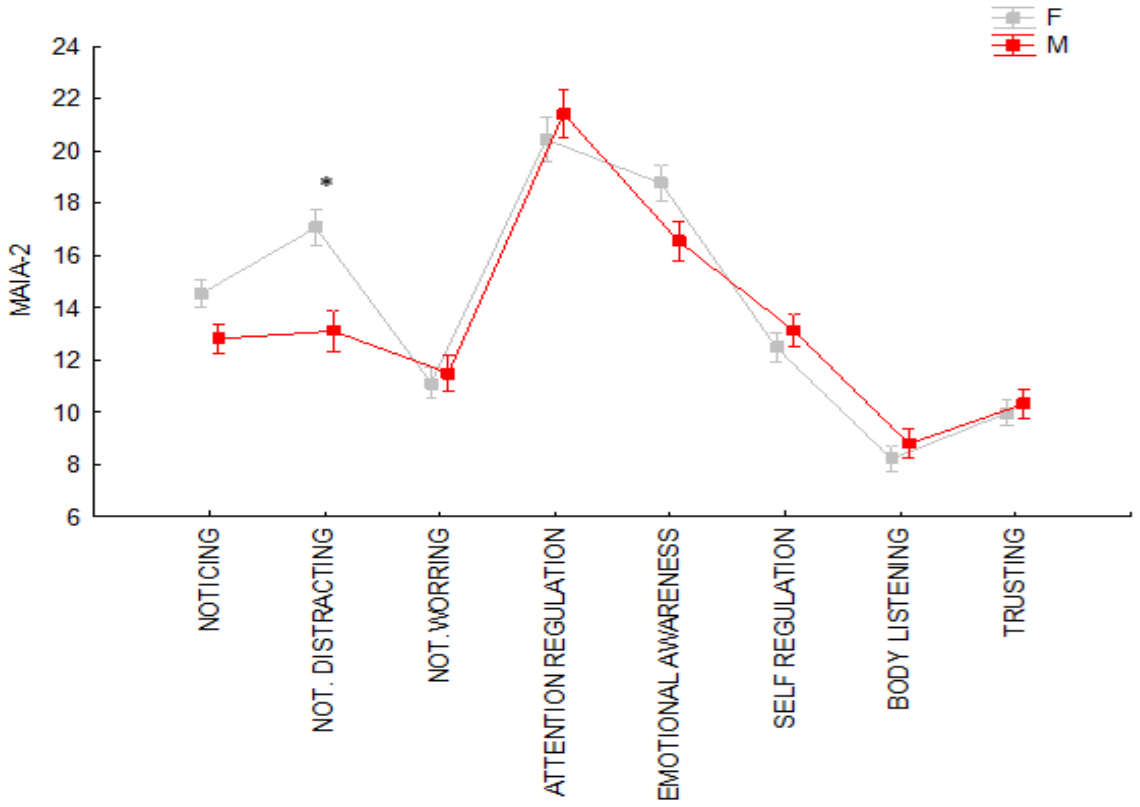

Figure 1. The figure provides mean scores for each sub-scale of MAIA-2 for male and female participants. * Indicates significant difference. Vertical bars denote ± standard error of means.

Finally, we detected a significant SUBSCALE x SEX x GROUP interaction term [F(7, 994)=2.25, p=0.027, ηp2 = 0.015]. Post-hoc comparison documented higher (p=0.028) score in the non-heterosexual male (M= 14.78 ± 1.29) compared to heterosexual males (M=11.30 ± 0.90) for the not distracting variable (See Figure 2). No further significant results were found (see supplemental material, table S5 for details).

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

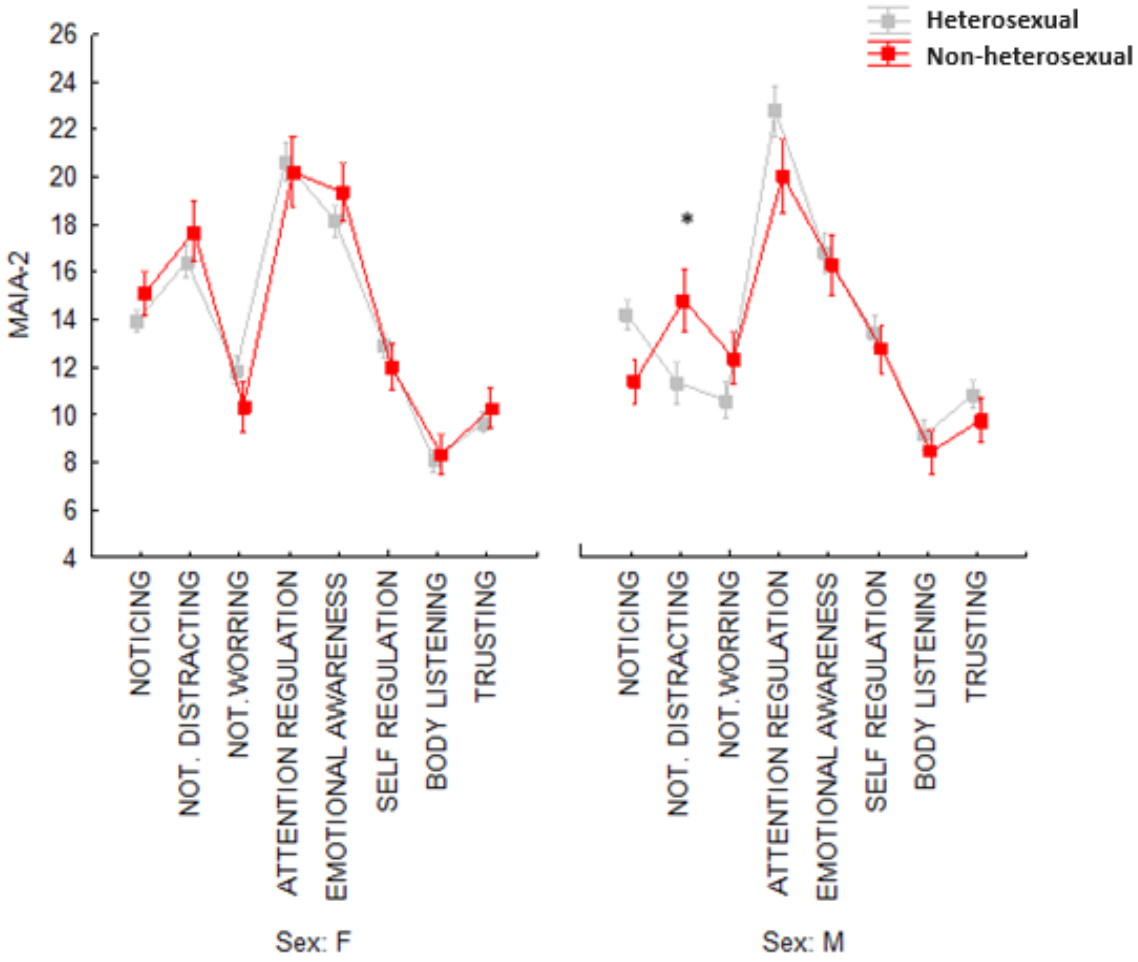

Figure 2. The figure provides mean scores for each sub-scale of MAIA-2 for heterosexual and non-heterosexual participants. * Indicates significant difference. Vertical bars denote ± standard error of means.

Discussion

In this study, our objective was to explore the interoceptive and emotional responses of non-heterosexual individuals, guided by the hypothesis that these evaluations differ from those of heterosexual individuals.

Overall, we only observed a significant difference in interoception between heterosexual and non-heterosexual males individuals. Non-heterosexual males scored higher on the "not-distracting" subscale of the MAIA-2 questionnaire compared to their heterosexual counterparts. This subscale measures the ability to acknowledge rather than ignore or distract oneself from sensations of discomfort or pain. Higher scores on this subscale, which are generally viewed as adaptive (Mehling et al., 2018), suggest a stronger connection with unpleasant sensations. This finding aligns with the minority stress theory (Iniewicz et al., 2017) and corroborates evidence that identifies stigma, prejudice, and discrimination as core stressors for non-heterosexual individuals (Meyer 1995; Frost & Meyer, 2023). It can be interpreted as an indication of higher discomfort tolerance among non-heterosexual individuals, potentially mediated by some form of adaptation mechanism. This is consistent with research (e.g., di Fronso et al., 2022) that associates interoception with resilience,

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

suggesting that individuals with greater awareness of their body's internal changes (higher interoceptive awareness) are better equipped to handle stress (higher resilience levels). Furthermore, Roberts et al. (2021) recently discovered that enhancing interoceptive awareness through mindfulness practice leads to a reduction in distress. Given that our non-heterosexual participants did not exhibit signs of mental distress, as suggested by their O-Life scores, their heightened interoceptive awareness in managing discomfort may reflect their successful adaptive response to their condition of stress from belonging to a minority group. On the other hand, such difference for the "not distracting" subscale was not found between heterosexual and non-heterosexual female participants. This could be due to a potential ceiling effect resulting from the higher score of females in this specific subscale compared to male participants.

Our study also confirms previous evidence on higher disgust sensitivity in female, compared to male participants (e.g., Sevi, 2023). Finally, we found higher alexithymia score in male, compared to female participants, which is also in line with previous works in the field (for a meta-analysis see Levant et al., 2009).

Some limitations of the present study should be acknowledged. Firstly, the overall number of non-heterosexual participants was relatively low, and we did not employ a sample size calculation. Additionally, data on anxiety and stress coping, which could have provided more robust support for the minority stress hypothesis, were not collected. Future studies could address these limitations by including a larger sample of non-heterosexual individuals and expanding investigations to include other methods of assessing interoception.

Conflicts of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Abé, C., Lebedev, A., Zhang, R., Jonsson, L., Bergen, S. E., Ingvar, M., Landén, M., & Rahman, Q. (2021). Cross-sex shifts in two brain imaging phenotypes and their relation to polygenic scores for same-sex sexual behavior: A study of 18,645 individuals from the UK Biobank. Human Brain Mapping, 42(7), 2292-2304. https://doi.org/10.1002/hbm.25388

American Psychological Association. (2008). Answers to your questions for a better understanding of sexual orientation & homosexuality. Retrieved July 19, 2023, from https://www.apa.org/topics/lgbtq/orientation

Bagby, R. M., Parker, J. D., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale—I. Item selection and cross-validation of the factor structure. Journal of Psychosomatic Research, 38(1), 23–32. https://doi.org/10.1016/0022-3999(94)90005-1

Barchetta, S., Martino, G., Craparo, G., Salehinejad, M. A., Nitsche, M. A., & Vicario, C. M. (2021). Alexithymia is linked with a negative bias for past and current events in healthy humans. International Journal of Environmental Research and Public Health, 18(13), 6696. https://doi.org/10.3390/ijerph18136696

Bogaert, A. F., & Skorska, M. N. (2020). A short review of biological research on the development of sexual orientation. Hormones and Behavior, 119, 104659. https://doi.org/10.1016/j.yhbeh.2019.104659

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

Brown, H., Proulx, M. J., & Stanton Fraser, D. (2020). Hunger bias or gut instinct? Responses to judgments of harm depending on visceral state versus intuitive decision-making. Frontiers in Psychology, 11, 2261. https://doi.org/10.3389/fpsyg.2020.02261

Calì, G., Ambrosini, E., Picconi, L., Mehling, W. E., & Committeri, G. (2015). Investigating the relationship between interoceptive accuracy, interoceptive awareness, and emotional susceptibility. Frontiers in Psychology, 6, 1202. https://doi.org/10.3389/fpsyg.2015.01202

Capodici, A., Pennisi, A., Rizzo, G., Falzone, A., & Vicario, C. M. (2024). Interoceptive and affective alterations in body integrity dysphoria: An online self-reporting study. Psychopathology, 57(2), 102-110. https://doi.org/10.1159/000525678

Caswell, T. A., & Sackett-Fox, K. (2018). Gender-atypical personality or sexual behavior: What is disgusting about male homosexuality? The Journal of Social Psychology, 158(5), 591–602. https://doi.org/10.1080/00224545.2018.1424111

Coppini, S., Lucifora, C., Vicario, C. M., & Gangemi, A. (2023). Experiments on real-life emotions challenge Ekman's model. Scientific Reports, 13(1), 9511. https://doi.org/10.1038/s41598-023-41499-8

Craparo, G., Gori, A., Dell'Aera, S., Costanzo, G., Fasciano, S., Tomasello, A., & Vicario, C. M. (2016). Impaired emotion recognition is linked to alexithymia in heroin addicts. PeerJ, 4, e1864. https://doi.org/10.7717/peerj.1864

Culicetto, L., Ferraioli, F., Lucifora, C., Falzone, A., Martino, G., Craparo, G., Avenanti, A., & Vicario, C. M. (2023). Disgust as a transdiagnostic index of mental illness: A narrative review of clinical populations. The Bulletin of the Menninger Clinic, 87(Supplement A), 53-91. https://doi.org/10.1521/bumc.2023.87.1.53

Diamond, L. M. (2008). Female bisexuality from adolescence to adulthood: Results from a 10-year longitudinal study. Developmental Psychology, 44(1), 5–14. https://doi.org/10.1037/0012-1649.44.1.5

Diamond, L. M., & Alley, J. (2022). Rethinking minority stress: A social safety perspective on the health effects of stigma in sexually diverse and gender-diverse populations. Neuroscience and Biobehavioral Reviews, 138, 104720. https://doi.org/10.1016/j.neubiorev.2022.104720

Duschek, S., Montoro, C. I., & Reyes Del Paso, G. A. (2017). Diminished interoceptive awareness in fibromyalgia syndrome. Behavioral Medicine, 43(2), 100-107. https://doi.org/10.1080/08964289.2017.1281869

di Fronso, S., Montesano, C., Costa, S., Santi, G., Robazza, C., & Bertollo, M. (2022). Rebooting in sport training and competitions: Athletes' perceived stress levels and the role of interoceptive awareness. Journal of Sports Sciences, 40(5), 542-549. https://doi.org/10.1080/02640414.2021.2006272

Drescher, J. (2010). Queer diagnoses: Parallels and contrasts in the history of homosexuality, gender variance, and the Diagnostic and Statistical Manual. Archives of Sexual Behavior, 39(2), 427–460. https://doi.org/10.1007/s10508-009-9531-5

Elad-Strenger, J., Proch, J., & Kessler, T. (2020). Is disgust a "conservative" emotion? Personality and Social Psychology Bulletin, 46(6), 896-912. https://doi.org/10.1177/0146167219870323

Folkierska-Żukowska, M., Rahman, Q., Marchewka, A., Wypych, M., Dróżdziel, D., Sokołowski, A., & Dragan, W. Ł. (2020). Male sexual orientation, gender nonconformity, and neural activity during mental rotations: An fMRI study. Scientific Reports, 10(1), 18709. https://doi.org/10.1038/s41598-020-74886-0

Frost, D. M., & Meyer, I. H. (2023). Minority stress theory: Application, critique, and continued relevance. Current Opinion in Psychology, 51, 101579. https://doi.org/10.1016/j.copsyc.2023.101579

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

Hatzenbuehler, M. L., McLaughlin, K. A., & Nolen-Hoeksema, S. (2008). Emotion regulation and internalizing symptoms in a longitudinal study of sexual minority and heterosexual adolescents. Journal of Child Psychology and Psychiatry, 49(12), 1270–1278. https://doi.org/10.1111/j.1469-7610.2008.01924.x

Hu, S. H., Wang, Q. D., Xu, Y., Liao, Z. L., Xu, L. J., Liao, Z. L., Xu, X. J., Wei, E. Q., Yan, L. Q., Hu, J. B., Wei, N., Zhou, W. H., Huang, M. L., & Zhang, M. M. (2011). Haemodynamic brain response to visual sexual stimuli is different between homosexual and heterosexual men. The Journal of International Medical Research, 39(1), 199–211. https://doi.org/10.1177/147323001103900121

Iniewicz, G., Sałapa, K., Wrona, M., & Marek, N. (2017). Minority stress among homosexual and bisexual individuals—From theoretical concepts to research tools: The Sexual Minority Stress Scale. Archives of Psychiatry and Psychotherapy, 19(3), 69–80.

Izutsu, T., & Tsutsumi, A. (2021). Mental health and psychosocial well-being of LGBT and intersex persons. In S. O. Okpaku (Ed.), Innovations in Global Mental Health (pp. 87-104). Springer. https://doi.org/10.1007/978-3-030-57296-

Kerry, N., Loria, R. N., & Murray, D. R. (2019). Gluttons for punishment? Experimentally induced hunger unexpectedly reduces harshness of suggested punishments. Adaptive Human Behavior and Physiology, 5(4), 352–370. https://doi.org/10.1007/s40750-019-00101-z

Kinitz, D. J., Salway, T., Dromer, E., et al. (2021). The scope and nature of sexual orientation and gender identity and expression change efforts: A systematic review protocol. Systematic Reviews, 10(14). https://doi.org/10.1186/s13643-020-01563-8

Kitzinger, C. (1995). Social constructionism: Implications for lesbian and gay psychology. In A. R. D'Augelli & C. J. Patterson (Eds.), Lesbian, gay, and bisexual identities over the lifespan: Psychological perspectives (pp. 136–161). Oxford University Press.

Levant, R. F., & Williams, C. M. (2009). The psychology of men and masculinity. In J. H. Bray & M. Stanton (Eds.), The Wiley-Blackwell Handbook of Family Psychology (pp. 588–599). Wiley Blackwell. https://doi.org/10.1002/9781444310238.ch41

Lozano-Verduzco, I., Martínez, L. Z., Mendoza-Pérez, J. C., Craig, S. L., & Eaton, A. D. (2023). Emotions, agency, and materiality: Embodiment of homophobic discrimination amongst Mexican LGBTQ+ youth. Journal of Homosexuality, 70(7), 1364–1385. https://doi.org/10.1080/00918369.2022.2030614

Lucifora, C., & Vicario, C. M. (2024). Interoceptive awareness does not predict political orientation: Evidence from Italian voters. Preliminary Reports and Negative Results in Life Science and Humanities, 1(1). https://doi.org/10.13129/3035-062X/prnr-4219

Manzouri, A., & Savic, I. (2018). Multimodal MRI suggests that male homosexuality may be linked to cerebral midline structures. PLOS ONE, 13(10), e0203189. https://doi.org/10.1371/journal.pone.0203189

Manzouri, A., & Savic, I. (2019). Possible neurobiological underpinnings of homosexuality and gender dysphoria. Cerebral Cortex, 29(5), 2084–2101. https://doi.org/10.1093/cercor/bhy090

Marchi, M., Travascio, A., Uberti, D., De Micheli, E., Grenzi, P., Arcolin, E., Pingani, L., Ferrari, S., & Galeazzi, G. M. (2023). Post-traumatic stress disorder among LGBTQ people: A systematic review and meta-analysis. Epidemiology and Psychiatric Sciences, 32, e44. https://doi.org/10.1017/S2045796023000586

Mason, O., Linney, Y., & Claridge, G. (2005). Short scales for measuring schizotypy. Schizophrenia Research, 78(2-3), 293–296. https://doi.org/10.1016/j.schres.2005.03.001

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

Mehling, W. E., Acree, M., Stewart, A., Silas, J., & Jones, A. (2018). The multidimensional assessment of interoceptive awareness, Version 2 (MAIA-2). PLOS ONE, 13(12), e0208034. https://doi.org/10.1371/journal.pone.0208034

Meyer, I. H. (1995). Minority stress and mental health in gay men. Journal of Health and Social Behavior, 36(1), 38–56. https://doi.org/10.2307/213728

Nettle, D. (2007). Empathizing and systemizing: What are they, and what do they contribute to our understanding of psychological sex differences? British Journal of Psychology, 98(Pt 2), 237-255. https://doi.org/10.1348/000712606X118005

Olatunji, B. O., Williams, N. L., Tolin, D. F., Abramowitz, J. S., Sawchuk, C. N., Lohr, J. M., & Elwood, L. S. (2007). The Disgust Scale: Item analysis, factor structure, and suggestions for refinement. Psychological Assessment, 19(3), 281–297. https://doi.org/10.1037/1040-3590.19.3.281

Pachankis, J. E., Rendina, H. J., Restar, A., Ventuneac, A., Grov, C., & Parsons, J. T. (2015). A minority stress–emotion regulation model of sexual compulsivity among highly sexually active gay and bisexual men. Health Psychology, 34(8), 829–840. https://doi.org/10.1037/hea0000180

Pachankis, J. E., Mahon, C. P., Jackson, S. D., Fetzner, B. K., & Bränström, R. (2020). Sexual orientation concealment and mental health: A conceptual and meta-analytic review. Psychological Bulletin, 146(10), 831–871. https://doi.org/10.1037/bul0000271

Price, C. J., & Hooven, C. (2018). Interoceptive awareness skills for emotion regulation: Theory and approach of mindful awareness in body-oriented therapy (MABT). Frontiers in Psychology, 9, 798. https://doi.org/10.3389/fpsyg.2018.00798

Rahman, Q., Wilson, G. D., & Abrahams, S. (2003). Sexual orientation related differences in spatial memory. Journal of the International Neuropsychological Society, 9(3), 376–383. https://doi.org/10.1017/S1355617703930037

Rameson, L. T., Morelli, S. A., & Lieberman, M. D. (2012). The neural correlates of empathy: Experience, automaticity, and prosocial behavior. Journal of Cognitive Neuroscience, 24(1), 235-245. https://doi.org/10.1162/jocn_a_00045

Reniers, R. L., Corcoran, R., Drake, R., Shryane, N. M., & Völlm, B. A. (2011). The QCAE: A Questionnaire of Cognitive and Affective Empathy. Journal of Personality Assessment, 93(1), 84–95. https://doi.org/10.1080/00223891.2010.528484

Roberts, R. L., Ledermann, K., & Garland, E. L. (2021). Mindfulness-oriented recovery enhancement improves negative emotion regulation among opioid-treated chronic pain patients by increasing interoceptive awareness. Psychosomatic Medicine, 83(1), 110-677. https://doi.org/10.1097/PSY.0000000000000740

Ruisch, B. C., Mohr, M. V., Naber, M., Tsakiris, M., Fazio, R. H., & Scheepers, D. T. (2023). Sensitive liberals and unfeeling conservatives? Interoceptive sensitivity predicts political liberalism. Politics and the Life Sciences, 41(2), 256-275. https://doi.org/10.1017/pls.2023.5

Salais, D., & Fischer, R. B. (1995). Sexual preference and altruism. Journal of Homosexuality, 28(1-2), 185-196. https://doi.org/10.1300/J082v28n01_08

Safron, A., Barch, B., Bailey, J. M., Gitelman, D. R., Parrish, T. B., & Reber, P. J. (2007). Neural correlates of sexual arousal in homosexual and heterosexual men. Behavioral Neuroscience, 121(2), 237–248. https://doi.org/10.1037/0735-7044.121.2.237

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

Safron, A., Sylva, D., Klimaj, V., et al. (2017). Neural correlates of sexual orientation in heterosexual, bisexual, and homosexual men. Scientific Reports, 7, 41314. https://doi.org/10.1038/srep41314

Sevi, B. (2023). Sex differences: Disgust response. In T. K. Shackelford (Ed.), Encyclopedia of Sexual Psychology and Behavior. Springer. https://doi.org/10.1007/978-3-031-08956-5_80-14

Schulz, A., & Vögele, C. (2015). Interoception and stress. Frontiers in Psychology, 6, 993. https://doi.org/10.3389/fpsyg.2015.00993

Söylemez, S., & Kapucu, A. (2024). Disgust as a basic, sexual, and moral emotion. Cognitive Processing, 25(2), 193-204. https://doi.org/10.1007/s10339-024-00155-4

Sylva, D., Safron, A., Rosenthal, A. M., Reber, P. J., Parrish, T. B., & Bailey, J. M. (2013). Neural correlates of sexual arousal in heterosexual and homosexual women and men. Hormones and Behavior, 64(4), 673–684. https://doi.org/10.1016/j.yhbeh.2013.08.003

Swaab, D. F., Wolff, S. E. C., & Bao, A. M. (2021). Sexual differentiation of the human hypothalamus: Relationship to gender identity and sexual orientation. Handbook of Clinical Neurology, 181, 427-443. https://doi.org/10.1016/B978-0-12-804810-6.00034-8

Tskhay, K. O., & Rule, N. O. (2015). Sexual orientation across culture and time. In S. Safdar & N. Kosakowska-Berezecka (Eds.), Psychology of Gender through the Lens of Culture: Theories and Applications (pp. 55–73). Springer International Publishing/Springer Nature. https://doi.org/10.1007/978-3-319-06986-5_4

Tian, H. H., Aziz, A. R., Png, W., Wahid, M. F., Yeo, D., & Png, A. L. C. (2011). Effects of fasting during Ramadan month on cognitive function in Muslim athletes. Asian Journal of Sports Medicine, 2(3), 145-153. https://doi.org/10.5812/asjsm.34613

Vicario, C. M. (2013). Altered insula response to sweet taste processing in recovered anorexia and bulimia nervosa: A matter of disgust sensitivity? American Journal of Psychiatry, 170(12), 1497. https://doi.org/10.1176/appi.ajp.2013.13070861

Vicario, C. M., Martino, G., Marcuzzo, A., & Craparo, G. (2021). No evidence of perceptual pseudoneglect in alexithymia. Brain Sciences, 11(3), 376. https://doi.org/10.3390/brainsci11030376

Vicario, C. M., Scavone, V., Lucifora, C., Falzone, A., Pioggia, G., Gangemi, S., Craparo, G., & Martino, G. (2023). Evidence of abnormal scalar timing property in alexithymia. PLOS ONE, 18(1), e0278881. https://doi.org/10.1371/journal.pone.0278881

Vicario, C. M., Rafal, R. D., Martino, D., & Avenanti, A. (2017). Core, social and moral disgust are bounded: A review on behavioral and neural bases of repugnance in clinical disorders. Neuroscience & Biobehavioral Reviews, 80, 185-200. https://doi.org/10.1016/j.neubiorev.2017.04.022

Vicario, C. M., Kuran, K. A., Rogers, R., & Rafal, R. D. (2018). The effect of hunger and satiety in the judgment of ethical violations. Brain and Cognition, 125, 32-36. https://doi.org/10.1016/j.bandc.2018.05.001

Vicario, C. M., Nitsche, M. A., Salehinejad, M. A., Avanzino, L., & Martino, G. (2020). Time processing, interoception, and insula activation: A mini-review on clinical disorders. Frontiers in Psychology, 11, 1893. https://doi.org/10.3389/fpsyg.2020.01893

Vicario, C. M., Kuran, K. A., & Urgesi, C. (2019). Does hunger sharpen senses? A psychophysics investigation on the effects of appetite in the timing of reinforcement-oriented actions. Psychological Research, 83(3), 395-405. https://doi.org/10.1007/s00426-018-1019-8

ISSN: 3035-062X
2024, 1(2)
Preliminary Reports and Negative Results in Life Science and Humanities

Vicario, C. M., & Rafal, R. D. (2017). Relationship between body mass index and moral disapproval rating for ethical violations. Personality and Individual Differences, 104, 8–11. https://doi.org/10.1016/j.paid.2016.07.007

Wang, R., Yang, Q., Huang, P., Sai, L., & Gong, Y. (2019). The association between disgust sensitivity and negative attitudes toward homosexuality: The mediating role of moral foundations. Frontiers in Psychology, 10, 1229. https://doi.org/10.3389/fpsyg.2019.01229

Wang, X. X., Gan, Q., Zhou, J., Cosquer, M., Falissard, B., Corruble, E., Jousselme, C., & Gressier, F. (2023). A systematic review of the factors associated with suicide attempts among sexual-minority youth. The European Journal of Psychiatry. https://doi.org/10.1016/j.ejpsy.2023.05.005

Yu, Z., Bali, P., Tsikandilakis, M., & Tong, E. M. W. (2022). 'Look not at what is contrary to propriety': A meta-analytic exploration of the association between religiosity and sensitivity to disgust. British Journal of Social Psychology, 61(1), 276-299. https://doi.org/10.1111/bjso.12516

Zhang, M., Hu, S., Xu, L., Wang, Q., Xu, X., Wei, E., Yan, L., Hu, J., Wei, N., Zhou, W., Huang, M., & Xu, Y. (2011). Neural circuits of disgust induced by sexual stimuli in homosexual and heterosexual men: An fMRI study. European Journal of Radiology, 80(2), 418–425. https://doi.org/10.1016/j.ejrad.2010.05.021

Online on the November 2024