

Gender affirming imaging: the neuroethical considerations of corroborating brain imaging to transgender identity



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BACKGROUND

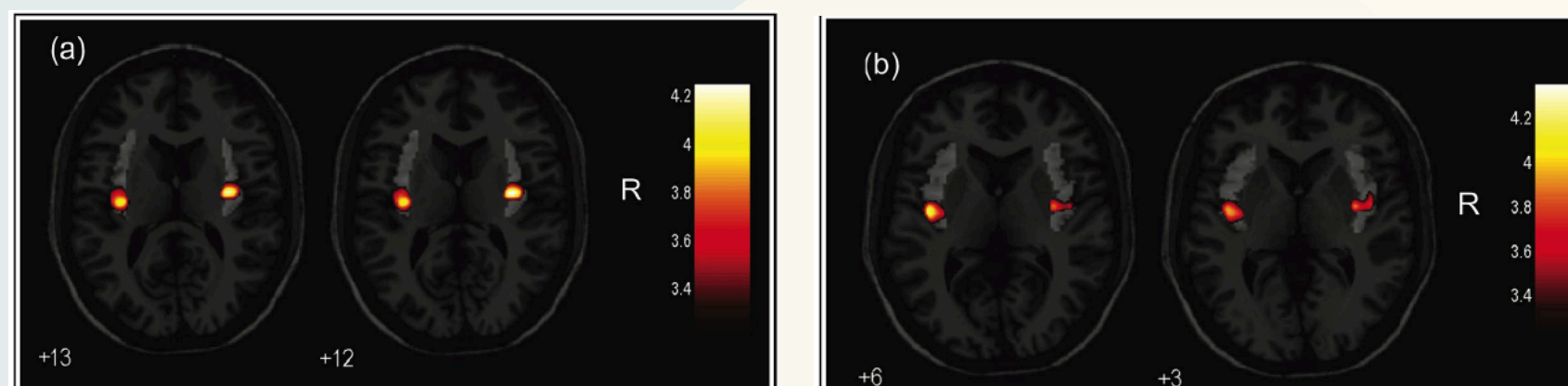
- Transgender (trans) identity is typically defined by the discordance between a person's gender identity/lived gender role and their sex assigned at birth^{1,2}
- Estimations of the prevalence of people who are transgender range from 0.5% to 1.2% of the global population¹
- The transgender community is a diverse part of the lesbian, gay, bisexual, transgender, queer, plus (LGBTQ+) community that is increasingly the primary focus of health and healthcare research²
- Advancements in neuroscience and neurotechnology have been utilized to further understand and characterize the connections between the brain and gender identity^{2,3}



NEUROIMAGING

- Studies have uncovered some neuroanatomical and neurophysiological differences and similarities between cisgender [congruence between a person's gender identity and sex assigned at birth] and transgender brains via neuroimaging modalities including:
 - Differences in hypothalamic physiological changes of transmen that more closely resemble cismen than ciswomen^{1,4}
 - Illustrating that the corpus callosum may demonstrate a pattern that is consistent with gender identity versus biological sex⁵
 - Grey matter variations altered in the insula of transgender women which one study suggests may be considered a neurological "transgender trait"⁵

• However, some studies have been in complete conflict to these results and have stated that sex differences were far more prominent than gender identity differences, and that gender identity seemed to have little effect on or basis within neurobiology as evidenced by transgender brain imaging resembling more closely that of their assigned sex at birth even with extended hormonal treatment^{1,6}



Images above from Figure 1 of Spizzirri G et al (2018) "Grey and white matter volumes either in treatment-naïve or hormone-treated transgender women: a voxel-based morphometry study"

ETHICAL CONSIDERATIONS

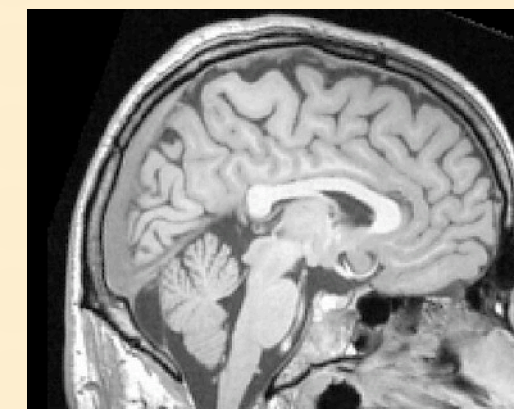
•How can these data help the transgender community?

- Much is still unknown regarding the effects of long term hormone treatment especially considering hormonal treatments used in cisgender patients (for example, ciswomen who are experiencing menopause and require symptom abatement) are usually prescribed at lower doses than that of trans folks⁷
- To understand the role of neurobiology in identity development and further understand potential feedback loops of brain functional networks and their role in gender and sex presentation and identity^{1,4-6,8}

•How can these data harm the transgender community?

- Do we believe neuroimaging and neurobiology over the lived experiences of a person who identifies as transgender if said person does not demonstrate objective biomarkers consistent with transgender identity?¹
- May reinforce and ultimately reduce nuanced discussions of sex as a spectrum into the simplistic binary of male versus female⁶
- Could inadvertently create a screening device using neuroimaging which would predict a person's gender identity and therefore remove not only the conscious embracement of identity through a person's own self-discovery, but potentially make the finding of trans identity an "incidental finding" on imaging

One must weigh a person's ability to self determine and discover their gender identity with the potential consequences of having what may be viewed as objective science determining gender identity on a person's behalf



Consider the analogy to the desire to find "the gay gene" and how the pursuit of science does not always improve the societal conditions of marginalized populations and in fact may be detrimental to said communities³

DISCUSSION

A person's gender identity should not be dependent upon neurobiology nor a diagnostic finding

•Studies that wish to investigate transgender identity as a result of neurobiology and/or gender affirming treatment's effects on neuroanatomy or neurophysiology should consider the following before pursuing a specific project

- Consider recruiting transgender and/or gender diverse community members be part of the Institutional Review Boards (IRBs) that are meant to approve trans-centered neurobiological studies OR have such community members be an active/consulting part of the research team²
- Examine how the results of a study could be analyzed from a non-scientific lens and what the practical, social, and politico-legal consequences may be as dependent on such results³
- Consultation with The World Professional Association for Transgender Health (WPATH) Standards of Care and Ethical Guidelines for Professionals materials which are available for free on the WPATH website⁹

REFERENCES

1. Winter S, Diamond M, Green J, Karasic D, Reed T, Whittle S, and Wylie K. Transgender people: health at the margins of society. *Lancet*, 2016;388:390-400.
2. Adams N, Pearce R, Veale J, Radix A, Castro D, Sarkar A, and Thom KC. Guidance and ethical considerations for undertaking transgender health research and institutional review boards adjudicating this research. *Transgender Health*, 2017;2:1.
3. Wolpe PR. Ethics and social policy in research on the neuroscience of human sexuality. *Nature Neuroscience*, 2004;7(10):1031-1033.
4. Kranz GS, Hahn A, Kaufmann U, Tik M, Ganger S, Seiger R, Hummer A, Windischberger C, Kasper S, and Lanzenberger R. Effects of testosterone treatment on hypothalamic neuroplasticity in female-to-male transgender individuals. *Brain Structure and Function*, 2018;223:321-328.
5. Spizzirri G, Duran FLS, Chaim-Avincini TM, Serpa MH, Cavallet M, Pereira CMA, Santos PP, Squarozzi P, de Costa NA, Busatto GF, and Abdo CHN. Grey and white matter volumes either in treatment-naïve or hormone-treated transgender women: a voxel-based morphometry study. *Scientific Reports*, 2018;8:736.
6. Baldinger-Melich P, Castro MFU, Seiger R, Ruef A, Dwyer DB, Kranz GS, Klöbl M, Kambeitz J, Kaufmann U, Windischberger C, Kasper S, Falkai P, Lanzenberger R, and Koutsouleris N. Sex matters: a multivariate pattern analysis of sex- and gender-related neuroanatomical differences in cis- and transgender individuals using structural magnetic resonance imaging. *Cerebral Cortex*, 2020;30:1345-1356.
7. Irwig MS. Testosterone therapy for transgender men. *The Lancet Diabetes and Endocrinology*, 2017;5:301-11.
8. Uribe C, Junque C, Gómez-Gil E, Abos A, Mueller SC, and Guillamon A. Brain network interactions in transgender individuals with gender incongruence. *NeuroImage*, 2020;116613.
9. Coleman E, Bockting W, Botzer M, Cohen-Kettenis P, DeCuypere G, Feldman J, Fraser L, Green J, Knudson G, Meyer WJ, Monstrey S, Adler RK, Brown GR, Devor AH, Ehrbar R, Ettner R, Eyster E, Garofalo R, Karasic DH, Lev AI, Mayer G, Meyer-Bahlburg H, Hall BP, Pfaefflin F, Rachlin K, Robinson B, Schechter LS, Tangpricha V, van Trotsenburg M, Vitale A, Winter S, Whittle S, Wylie KR, and Zucker K. Standards of care for the health of transsexual, transgender, and gender-nonconforming people, version 7. *International Journal of Transgenderism*, 2017;13(4):165-232.

CONFLICTS OF INTEREST: NONE