



The Legacy of WEIRD Theory: Challenges for Health Impact Research with Underrepresented Populations

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Frameworks used in sociotechnical research were developed with participants from privileged communities

- Theoretical frameworks play a crucial role in **applied** social informatics research
- They were developed with individuals well-represented in research, we must **question the rote transferability** of this research to historically underrepresented populations (e.g., older adults, minorities, disabled, immigrants, refugees, indigenous groups around the world)
- This **asymmetry** of required use of existing frameworks with underrepresented populations presents a **persistent barrier** to velocity and relevance of applied social informatics research
- We outline barriers using **examples** from community health informatics research and **explore solutions** which will enhance the relevance while maintaining theoretical rigor in the field

We borrow *WEIRD* from anthropology and psychology to situate limitations in health research

- Limitations to studying people from **W**estern, **E**ducated, **I**ndustrialized, **R**ich, and **D**emocratic societies – burdens sociotechnical research, especially for health and wellness for marginalized communities (Henrich, Heine, & Norenzayan, 2010)

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OPINION

Most people are not WEIRD

To understand human psychology, behavioural scientists must stop doing most of their experiments on Westerners, argue **Joseph Henrich, Steven J. Heine and Ara Norenzayan**.

Much research on human behaviour and psychology assumes that everyone shares most fundamental cognitive and affective processes, and that findings from one population apply across the board. A growing body of evidence suggests that this is not the case.

Experimental findings from several disciplines indicate considerable variation among human populations in diverse domains, such as visual perception, analytic reasoning, fairness, cooperation, memory and the heritability of IQ^{1,2}. This is in line with what anthropologists have long suggested: that people from Western, educated, industrialized, rich and democratic (WEIRD) societies — and particularly American undergraduates — are some of the most psychologically unusual people on Earth¹.

So the fact that the vast majority of studies use WEIRD participants presents a challenge to the understanding of human psychology

decides how much of a fixed amount to offer a second player, who can then accept or reject this proposal. If the second player rejects it, neither player gets anything. Participants from industrialized societies tend to divide the money equally, and reject low offers. People from non-industrialized societies behave differently, especially in the smallest-scale non-market societies such as foragers in Africa and horticulturalists in South America, where people are neither inclined to make equal offers nor to punish those who make low offers³.

affect the way that experienced investors make decisions about the stock market⁶.

We offer four suggestions to help put theories of human behaviour and psychology on a firmer empirical footing. First, editors and reviewers should push researchers to support any generalizations with evidence. Second, granting agencies, reviewers and editors should give researchers credit for comparing diverse and inconvenient subject pools. Third, granting agencies should prioritize cross-disciplinary, cross-cultural research. Fourth, researchers

must strive to evaluate how their findings apply to other populations. There are several low-cost ways to approach this in the short term: one is to select a few judiciously chosen populations that provide a 'tough test' of universality in some domain, such as societies with limited counting systems for testing theories about numerical cognition^{1,2}.

A crucial longer-term goal is to establish a set of principles that researchers can use to distinguish



WEIRD Theory

WEIRD limitations in health research

- Lack of representation (e.g., gender, ethnicity, age) **contributes to health disparities** – inhibits development of equitable prevention and treatment strategies (Reifenstein & Asare, 2018)
- For example, African American men experience **persistent prostate cancer disparities**, also underrepresented in cancer research – from the bench, to the bedside, to communities (Ahaghotu, Tyler, & Sartor, 2016; Byrne, Tannenbaum, Glück, Hurley, & Antoni, 2013)

Multi-layered underrepresentation can exacerbate disparities

- Example: ethnic minorities underrepresented in **across every stage** of STEM education & science and engineering workforce (National Academy of Sciences, 2011)
 - Underrepresentation in technology development, acceptance and use **research** (Lupton, 2015) – >
 - tech-enabled health promotion which tends to **ignore sociocultural factors known to influence technology use** – >
 - intervention generated inequality (**IGI**) (Lorenc, Petticrew, Welch, & Tugwell, 2013; Veinot, Mitchell, & Ancker, 2018)

IGI occurs when interventions are less effective for marginalized populations thus can **exacerbate** disparities

Health behavior and technology acceptance models applied in health informatics research

Health Behavior Models

- Ecological Models
- The Health Belief Model (**HBM**)
- Stages of Change Model (Transtheoretical Model) (**TTM**)
- Social Cognitive Theory (**SCT**)
- Theory of Reasoned Action/Planned Behavior (**TRA/PB**)

(Glanz, Rimer, & Viswanath, 2008; Mullen, Hersey, & Iverson, 1987)

Technology Acceptance & Use

- Technology Acceptance Model (**TAM**) (Holden & Karsh, 2010)
- Health Information Technology Acceptance Model (**HITAM**) (Kim & Park, 2012)
- Unified Theory of Acceptance and Use of Technology (**UTAUT**) (Li, Talaei-Khoei, Seale, Ray, & MacIntyre, 2013; Shore, Power, de Eyto, & O'Sullivan, 2018; Venkatesh, Thong, & Xu, 2012)

Selected models and their development

| Model | Example | Original Population | Notes |
|--|-----------------------|---|---|
| Health Belief Model (HBM) | Kegeles 1963 | 881 factory employees seeking dental care. | “Demographics” rendered as modifiers of individual perception |
| Technology Acceptance Model (TAM) | Bagozzi et al. 1992 | 107 University of Michigan MBA Students | “MBA students may not be representative of the total population of potential computer users in terms of their experience and motivation” (p. 681) |
| Health Information Technology Acceptance Model (HITAM) | Kim and Park 2012 | 728 Korean health information portal users | Demographics construed as modifying variables, and primarily interpreted as, e.g. “age and disease”. Korean identity was reduced to a ‘variable’ in a TAM-like model. |
| Unified Theory of Acceptance and Use of Technology (UTAUT) | Venkatesh et al. 2003 | 215 workers undergoing software training in entertainment, telecom, banking, or public administration organizations | “To help ensure our results would be robust across contexts, we sampled for heterogeneity across technologies, organizations, industries, business functions, and nature of use (voluntary vs. mandatory).” (437) |

Tension in attempts to apply WEIRD theory to non-WEIRD populations

- For CBPAR (CBPR) and Participatory Design (PD) – reviewers suggest **existing technology use frameworks** instead of PD, and **question ability to recruit** underrepresented minorities
- Suggestions and challenges may stem from reviewer **preconceptions**, which may **discount** or **undervalue** investigator's record
- Pressure to use WEIRD theory is a **gatekeeping** device – albeit subtle and implicit – but in effect **funnels funding** and **opportunity away** from non-WEIRD research

Community Health Informatics examples are relevant to all translational research that seeks to understand, and potentially close, health and/or technology use disparities

Focus on 3 areas, and expand scope

1. **Health behavior** – identify models that may be **well-suited** for underrepresented populations
2. **Technology Acceptance and Use** – identify technology models **well-suited** for underrepresented populations: technical feasibility, utility, limitations based on partial or non-representative samples, risk of algorithmic bias
3. **Barriers and Facilitators to Developing New Models** – consider and address **unique challenges** of introducing new models in grants and manuscripts, identify approaches which have been used to get works “accepted”

Solidarity transcends cultural norms and should guide future work

- Solidarity as an **ethical principle** which can guide research, despite acknowledgment of ethics being culturally contingent (Hauser & Tennis, 2018)
- Principle demands that researchers seek to **expand** the rights and benefits of being human
- The (US) National Institute on Aging health equity framework includes imperative to ***build on past findings and aggressively pursue new approaches*** (Hill, Pérez-Stable, Anderson, & Bernard, 2015)

Focus discourse on confirming or refining existing models, share ideas for when they have not explained phenomena – exchange approaches for conducting work to develop new models

- Ahaghotu, C., Tyler, R., & Sartor, O. (2016). African American Participation in Oncology Clinical Trials—Focus on Prostate Cancer: Implications, Barriers, and Potential Solutions. *Clinical Genitourinary Cancer*, 14(2), 105-116. doi: <https://doi.org/10.1016/j.clgc.2015.12.003>
- Bagozzi, R. P., Davis, F. D., & Warshaw, P. R. (1992). Development and Test of a Theory of Technological Learning and Usage. *Human Relations; Studies towards the Integration of the Social Sciences*, 45(7), 659–686.
- Byrne, M. M., Tannenbaum, S. L., Glück, S., Hurley, J., & Antoni, M. (2013). Participation in Cancer Clinical Trials: Why Are Patients Not Participating? *Medical Decision Making*, 34(1), 116-126. doi: 10.1177/0272989X13497264
- Glanz, K., Rimer, B. K., & Viswanath, K. (2008). *Health Behavior and Health Education: Theory, Research, and Practice*: Wiley.
- Hauser, Elliott, and Joseph T. Tennis. "Ethics for Contingent Classifications: Rorty's Pragmatic Ethics and Postmodern Knowledge Organization." In *Proceedings from North American Symposium on Knowledge Organization*. Vol. 7. Seattle, WA: University of Washington Digital Library, 2019.
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature*, 466(29), 29. doi: 10.1038/466029a
- Hill, C. V., Pérez-Stable, E. J., Anderson, N. A., & Bernard, M. A. (2015). The National Institute on Aging Health Disparities Research Framework. *Ethnicity & Disease*, 25(3), 245-254. doi: 10.18865/ed.25.3.245
- Holden, R. J., & Karsh, B.-T. (2010). The technology acceptance model: its past and its future in health care. *J Biomed Inform*, 43(1), 159-172. doi: 10.1016/j.jbi.2009.07.002
- Kelley, M. S., Su, D., & Britigan, D. H. (2016). Disparities in Health Information Access: Results of a County-Wide Survey and Implications for Health Communication. *Health Communication*, 31(5), 575-582. doi: 10.1080/10410236.2014.979976
- Kim, J., & Park, H.-A. (2012). Development of a Health Information Technology Acceptance Model Using Consumers' Health Behavior Intention. *J Med Internet Res*, 14(5), e133. doi: 10.2196/jmir.2143
- Li, J., Talaei-Khoei, A., Seale, H., Ray, P., & MacIntyre, C. R. (2013). Health Care Provider Adoption of eHealth: Systematic Literature Review. *Interactive Journal of Medical Research*, 2(1), e7. doi: 10.2196/ijmr.2468
- Lorenc, T., Petticrew, M., Welch, V., & Tugwell, P. (2013). What types of interventions generate inequalities? Evidence from systematic reviews. *Journal of Epidemiology and Community Health*, 67(2), 190-193. doi: 10.1136/jech-2012-201257
- Lupton, D. (2015). Health promotion in the digital era: A critical commentary. *Health Promotion International*, 30(1), 174-183. doi: 10.1093/heapro/dau091
- Lyles, C. R., Ratanawongsa, N., Bolen, S. D., & Samal, L. (2017). mHealth and Health Information Technology Tools for Diverse Patients with Diabetes. *Journal of diabetes research*, 2017, 1704917. doi: 10.1155/2017/1704917
- Mullen, P. D., Hersey, J. C., & Iverson, D. C. (1987). Health behavior models compared. *Social Science & Medicine*, 24(11), 973-981. doi: 10.1016/0277-9536(87)90291-7
- National Academy of Sciences. (2011). *Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads*. Washington, DC: National Academies Press.
- Reifenshtein, K., & Asare, M. (2018). Will We Ever Get Enough? Strategies to Enhance Minority Participation in Research. [Meeting Abstract]. *Oncology Nursing Forum*, 45(2), 1.
- Rosenstock, I. M. (1974). The Health Belief Model and Preventive Health Behavior. *Health Education Monographs*, 2(4), 354–386.
- Senteio, C., Collins, S. W., Jackson, R., & Welk, S. (2010). Effective resources supporting healthy sexual behavior in formerly incarcerated persons. *American Journal of*. Retrieved from <https://www.tandfonline.com/doi/abs/10.1080/15546128.2010.527241>
- Senteio, C., Marshall, K. J., Ritzen, E. K., & Grant, J. (2009). Preventing homelessness: an examination of the transition resource action center. *Journal of Prevention & Intervention in the Community*, 37(2), 100–111
- Senteio, C. R., Yoon, D. B., Wang, Y., Jinka, S., Campbell, T., & Palena, E. (2018). The Impact of Being a Peer Sexual Health Educator: Lessons Learned from Mobilizing African American Adolescents Against HIV in Flint, Michigan. *American Journal of Sexuality Education*, 13(4), 425–451.
- Senteio, C., & Veinot, T. (2014). Trying to make things right: adherence work in high-poverty, African American neighborhoods. *Qualitative Health Research*, 24(12), 1745–1756.
- Shore, L., Power, V., de Eyto, A., & O'Sullivan, L. (2018). Technology Acceptance and User-Centred Design of Assistive Exoskeletons for Older Adults: A Commentary. *Robotics*, 7(1), 3. doi: 10.3390/robotics7010003
- Veinot, T. C., Mitchell, H., & Ancker, J. S. (2018). Good intentions are not enough: How informatics interventions can worsen inequality. *Journal of the American Medical Informatics Association*, 25(8), 1080-1088. doi: 10.1093/jamia/ocy052
- Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User Acceptance of Information Technology: Toward a Unified View. *The Mississippi Quarterly*, 27(3), 425.
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, 36(1), 157-178. 12

Questions and Answers

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