Published in final edited form as:

J Psychiatr Res. 2018 November ; 106: 69–73. doi:10.1016/j.jpsychires.2018.09.011.

Views of the Importance of Psychiatric Genetic Research by Potential Volunteers from Stakeholder Groups

Laura Weiss Roberts, M.D., M.A.^a, Tenzin Tsungmey, M.P.H.^a, Jane Paik Kim, Ph.D.^a, and Melinda Hantke^a

^aDepartment of Psychiatry and Behavioral Sciences, Stanford University School of Medicine, 401 Quarry Road, Stanford, CA, USA, 94305-5717

Abstract

Few studies have explored potential volunteers' attitudes toward genetic research. To address this gap in the literature, we developed an empirical project to document views held by individuals who may wish to enroll in genetic studies involving mental disorders. People living with mental illness, family members of people with mental illness, and community comparison volunteers were queried regarding their views on the importance of genetic research generally, in comparison with medical research, and in relation to 12 health conditions categorized in four types. T-tests and univariate and multivariate analysis of variance were used as appropriate. Participants expressed support for the importance of genetic research (mean = 9.43, scale = 1 – 10) and more highly endorsed genetic research compared with non-genetic medical research (mean = 9.43 vs. 8.69, P value = <0.001). The most highly endorsed genetic research was for cognitive disorders, followed by mental illness disorders, physical illness disorders, and addiction disorders (means = 8.88, 8.26, 8.16 and 7.55, respectively, P value = <0.001). Overall, this study provides evidence of strong endorsement of genetic research over non-genetic research by potential volunteers.

Keywords

genetic research; non-genetic research; gender; race/ethnicity; community groups; disorder types

Four hundred and fifty million people live with mental illnesses, placing these conditions among the leading causes of premature death and disability worldwide (World Health Organization, 2001; Horton, 2017). People in every nation, community, and family are affected by the direct and indirect burdens of mental illness (World Health Organization, 2001). Even in economically- established countries, most individuals with mental disorders do not receive sufficient services and are left to cope as best they can on their own (World Health Organization, 2001). Adding to this tragedy, many living with mental disorders are

Corresponding author: Laura Weiss Roberts, LWRoberts.author@gmail.com.

Declarations Interest: None.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

victimized for their conditions and become targets of stigma and discrimination (World Health Organization, 2001).

Although effective treatments exist for mental disorders such as anxiety, depression, and psychosis, the burden of these conditions continues to grow (Whiteford et al., 2013). Innovative research into the origins of mental disorders could lead to new methods of prevention or treatment (Cuijpers, Van Straten, & Smit, 2005; Schoneveld, Lichtwarck-Aschoff, & Granic, 2017). The Human Genome Project has already been investigating the established genetic contributions to mental disorders (Cowan, Kopnisky, & Hyman, 2002). Genetic research over the past decade has significantly advanced the identification of associations between candidate genes and a number of disorders. Despite some promising findings with respect to copy number variants and single-gene mutations found in psychosis and autism, psychiatric genetic research has progressed more slowly than anticipated (Fiksinski et al., 2017; Burmeister, McInnis, & Zöllner, 2008). Additionally, relatively few resources have been invested into the development of novel therapeutics for psychiatric illnesses in recent decades (Saraceno et al., 2017). For this field to sustain continued advancement in identifying genetic associations and intermediate endophenotypes, deep and sustained engagement with individuals living with mental disorders, individuals at risk for mental disorders (such as close family members), and volunteers who can serve as appropriate comparison subjects in genetic studies is vitally important (Cuijpers, Van Straten, & Smit, 2005).

A large and diverse group of research participants is critical to the study of genetic variation, gene-environmental interaction, and disease expression (Henderson et al., 2008). DeLisi and Bertisch (2005) found that a majority of family members who had other (in some cases multiple) affected family members with schizophrenia would want to be tested if a genetic test were to become available. Since then, some have investigated public interest in predictive genetic testing (Wilde et al. 2010), while many more have examined the concerns, attitudes, and knowledge of health professionals in particular, who are tasked to use genetic information with their patients (Klitzman et al. 2014, Wilde et al. 2014, Salm et al. 2015). Fewer studies have assessed the concerns of at-risk individuals, including vulnerable populations such as youth and pregnant women (Inglis et al. 2018, Laegsgaard, Kristensen, & Mors, 2009), and even fewer have sought to compare potential participants' views of the societal importance of genetic research on mental disorders with those of their healthy counterparts (Laegsgaard and Mors 2008, Roberts and Kim 2017). Still, little empirical work has investigated the attitudes of potential participants in psychiatric genetics research and the views of those stakeholders who might choose to enroll in genetic studies (Laegsgaard, Kristensen, & Mors, 2009). For example, little research has explored potential participants' views of the societal importance of genetic research on mental disorders (Laegsgaard, Kristensen, & Mors, 2009).

To address these gaps in the literature, we developed an empirical project to document views held by stakeholders in psychiatric genetic research, namely, individuals who might volunteer to enroll in genetic studies or who might benefit, directly or indirectly, from such investigations. We focused on (1) individuals living with mental illness, (2) family members

of individuals living with mental illness, and (3) individuals who do not have a personal or family history of mental illness who might serve as appropriate comparison subjects.

METHODS

Study Design

For this NIH-funded, IRB-approved project, key stakeholders were surveyed via face-to-face interview to assess their: (a) understanding and attitudes toward ethical issues in psychiatric genetic research, (b) perceptions of participant-oriented safeguards, and (c) knowledge and intentions regarding use of genetic information in making significant decisions. Three groups of people who are potential psychiatric genetics research participants were surveyed and their responses compared: (1) people with mental illness, (2) first-degree family members of people with mental illness, and (3) community comparison volunteers with no personal or close family history of mental illness. These groups were identified as key stakeholders for psychiatric genetic research because such investigation has direct relevance for people with mental illness and their relatives and healthy people are indirect future and current societal beneficiaries.

Study Population and Procedures

One hundred and eighty two volunteers from the communities surrounding Milwaukee, WI, and Albuquerque, NM were surveyed. Participants learned of the study through advertisements on clinical research websites and postings at clinics. Participants provided written informed consent after a thorough discussion of the study and were compensated with a \$50 gift card. The interviews were approximately 2 hours long and included 344 survey questions and open-ended items on ethical, legal, and social issues regarding psychiatric genetic research.

Survey

A novel survey instrument was developed for this project based on published scientific and ethics literatures related to psychiatric genetic research, as well as findings from 12 focus groups. A total of 48 individuals participated in the focus groups, including members of each stakeholder group. In addition, several published instruments were considered for possible use in the survey/interview phase of the project. The Brief Symptom Inventory and SF-12 and REAL-G were included, along with new questions (e.g., knowledge of genetics, attitude measures). The survey was pre-piloted, revised, and piloted. The survey ultimately contained 344 items and was designed to assess 13 different aspects of ethical, legal, and social issues related to psychiatric genetic research.

For this analysis, perceptions of the importance of genetic research were assessed and compared with responses regarding the importance of medical research more broadly. The importance of genetic research was queried in relation to 12 health conditions: alcoholism, Alzheimer's disease, anxiety disorder, asthma, autism, bipolar disorder, colon cancer, drug addiction, heart disease, major depression, schizophrenia, and type 2 diabetes. In addition to being evaluated individually, the 12 health conditions were combined into 4 disorder types:

1. Cognitive disorder: Alzheimer's disease

2. Mental illness disorders: anxiety disorder, autism, bipolar disorder, major depression, and schizophrenia
3. Physical illness disorders: asthma, colon cancer, heart disease, and type 2 diabetes
4. Addiction disorders: alcoholism and drug addiction

Question responses were rated on a scale from 0 to 10 (0 = Not important at all, 5 = Somewhat important, 10 = Extremely important).

Ethics Safeguards

The study protocol was approved by the IRBs at the Medical College of Wisconsin and University of New Mexico. As part of the survey procedure, all participants were provided with background information about the study along with a printed hard-copy consent form. Collected data were encoded with numbers and analyzed with identifiers removed.

Data Analysis

The main covariates were gender (male or female), and race/ethnicity (white or other). Categories of full-time and part-time employed were pooled into one employed category. Categories of full-time and part-time student were pooled into one student category. Race/Ethnicity was pooled into two categories, White and Other (Other = American Indian or Alaska Native, Asian or Asian American, Black or African American, Hispanic, Latino or Spanish origin, Native Hawaiian or Pacific islander), to have a balanced group.

The importance of genetic research was analyzed using analysis of variance (ANOVA) tests, paired t-tests and multivariate analysis of variance (MANOVA) tests. The importance of genetic research for disorder types was analyzed using analysis of variance (ANOVA) tests, repeated measures ANOVA tests, multivariate analysis of variance (MANOVA) tests and independent t- tests. Multivariate linear regression analysis was performed to assess the association between the primary outcome controlling for potential confounders. We used generalized estimating equations (GEE), a method suitable correlated data that are observed in clusters. We included the background characteristics listed in Table 1 as potential confounders.

Software

We used SPSS Statistics (version 24) for all statistical analyses and R software (R version 3.0.0, GNU project).

RESULTS

Background characteristics of community members

Volunteers for this study included adults with a self-reported serious mental illness (n = 71); adults with a self-reported first or second-degree family member with serious mental illness (n = 54); and individuals with no diagnosed mental illness and no known first or second-degree relatives with mental illness (i.e., community comparison volunteers; n = 57).

Overall, majority of the respondents were female (57.1%), white (62.6%), not married or with a long-term partner (56.6%, statistically significant difference between the community groups - P value = 0.045), with a college degree (51.6%), and employed (47.7%, statistically significant difference between the community groups - P value = 0.042). The average age of participants was 42.3 years. Differences in mean ages were observed across the 3 community groups (means of individuals living with mental illness = 43.6 vs. means of family members of individuals living with mental illness = 45.5 vs. means of community comparison volunteers = 38.4, P value = 0.014). The overall average estimated annual income was \$41,564, the minimum estimated annual income was \$15,000.00 and the maximum estimated annual income was \$175,000.00. There was a statistically significant difference between the community groups (P value = <0.001) for estimated annual income (Table 1).

Importance of genetic research vs. non-genetic research

Overall, on a scale from 0 – 10, the average level of support for genetic research was higher (mean = 9.43, range = 5 to 10, SD = 1.0) than the average level of support for non-genetic research (mean = 8.69, range = 4 to 10, SD = 1.7), with a P value of <0.001. All three community groups backed genetic research more than non-genetic research (P value of individuals living with mental illness = 0.008, P value of family members of individuals living with mental illness = <0.001, P value of community comparison volunteers = 0.001). For both genetic research (P value = 0.388) and non-genetic research (P value = 0.212), no differences were found across the community groups (Table 2).

On average, participants expressed greater support for genetic research than non-genetic research (difference = .73, P value = <0.001). This finding was true with respect to education and gender. Even after adjusting for demographic variables in regression analyses, higher education was associated with greater levels of support for both genetic and non-genetic research (regression coefficient = 0.36, P value = 0.03) and healthy community volunteers were more supportive than family members of both genetic and non-genetic research (regression coefficient = 0.4, P value = 0.048).

Importance of genetic research by disorder types

The average levels of support for genetic research by disorder types, on a scale of 1–10, were as follows: cognitive disorder (mean = 8.88), mental illness disorders (mean = 8.26), physical illness disorders (mean = 8.16), and addiction disorders (mean = 7.55). Community members endorsed cognitive disorder (Alzheimer's disease) as the most important disorder and addiction disorders (alcoholism and drug addiction) as the least important disorders in which to conduct genetic research. There were statistically significant differences between the perceived importance of research on various disorder types (P value = <0.001), in that respondents on average supported the importance of cognitive disorders over physical disorders (difference = 0.72, P value <0.001) and physical disorders over addiction disorders (difference in means = 0.61, P value <0.001). No differences were found between community groups for cognitive disorder (P value = 0.446), mental illness disorders (P value = 0.241), physical illness disorders (P value = 0.770), and addiction disorders (P value = 0.481) (Table 3).

DISCUSSION

This study assesses the views of key stakeholders regarding the importance of psychiatric genetics research in relation to medical research more generally and compares attitudes toward genetic research related to specific mental health conditions. Our stakeholders included people with lived experience with significant health issues and self-reported diagnoses including schizophrenia, depression, anxiety, and others; family members of individuals with mental illness; and individuals without mental illness or family with mental illness who might serve as appropriate community volunteers in psychiatric genetics studies in academic settings like those where our project was conducted. Our data collection included gender and race/ethnicity, which allowed for rich analyses to clarify how these background characteristics may correlate with attitudes expressed by our participants.

A prominent finding of our study was that genetic research was enthusiastically embraced by people with mental illness, family members, and non-ill community volunteers; in fact, it was more highly endorsed for its importance than medical research generally. No differences were revealed across stakeholder groups. These results are consistent with the literature on the topic of attitudes toward genetic testing, innovation, and research. For instance, Gaskell et al. (2000) found in their study of 16,082 residents of the European Union that public attitudes toward genetic testing and cloning of human cells and tissues were more positive than expected. Similarly, and more specifically, Laegsgaard, Kristensen, and Mors (2009) reported positive attitudes toward psychiatric genetics research expressed by individuals diagnosed with major depression, bipolar disorder, schizophrenia, and anxiety disorder. A majority of participants with different psychiatric diagnoses expressed intention to test for genetics regardless of treatment possibilities (Laegsgaard, Kristensen, & Mors, 2009). Our prior work documented that individuals with and without a history of mental illness viewed genetic and medical research favorably and indicated that they would likely participate in genetic research now and even in the future (Roberts & Kim, 2017).

Contrary to past findings, women in our study more strongly endorsed the importance of genetic research compared with medical research more broadly. Other studies have reported that women, particularly women of reproductive age, were more knowledgeable about genetic testing than their male counterparts (Molster, Charles, Samanek, & O'Leary, 2009; Henneman, Timmermans, & Wal, 2004; Henneman et al., 2013), which could be one reason why women in our study more strongly supported genetic research. However, in some empirical studies in the literature, men seem to have more positive attitudes toward genetic testing (for example, Henneman, Timmermans, & Wal, 2006; Aro et al., 1997). Consequently, the role of gender in influencing attitudes toward genetic testing and genetic research remains unclear and warrants further inquiry.

Further investigation is also warranted for the role of race and ethnicity in views toward genetic research. Some past studies have found that respondents were more likely to be supportive of genetic research if they were white (Henderson et al., 2008; Alford et al., 2011; Dye, Demment, Groth, Fernandez, Dozier, & Chang, 2016; Murphy, Wickramaratne, & Weissman, 2009). Intriguingly, our study results showed that while both white and non-white groups were supportive of genetic research, respondents who identified as other than

white were more supportive of genetic research than white respondents. This finding may relate to the overall intent, method, and minimal risk nature of our project, and certainly merits additional investigation. Studies have shown that engaging minority communities in a manner that is transparent, meaningful, and collaborative, and including minority recruiters and investigators could potentially improve trust and mutualism in relationships with members of minority groups (Murphy, Wickramaratne & Weissman, 2009; Ngui, Warner, & Roberts, 2015).

The strengths of this study are its focus on psychiatric genetics, a neglected topic in the published literature on the ethical, social, and legal implications of the Human Genome Project, and its design, which involved engagement with three stakeholder groups (i.e., people living with mental illness, family members of people with mental illness, and non-ill community comparison volunteers without relatives with mental illness) that represent likely volunteers for genetic research studies. The limitations of this project include its reliance on self-report data, which may introduce bias, the relatively small numbers of volunteers drawn from two communities in the US, and the necessary development of a novel questionnaire.

In conclusion, we found that potential volunteers who are key stakeholders in psychiatric research expressed positive views toward genetic investigation at a time when the burden of mental disorders is increasingly recognized. Many hope that scientific discoveries following from the Human Genome Project will generate new desperately needed knowledge to inform prevention and therapeutic strategies for disorders of the brain, including cognitive disorders, major psychiatric conditions, and addiction. Public acceptance and broad stakeholder engagement are crucial to allow for such advances in genetic research. Continued efforts to understand influences on attitudes toward genetic research participation are warranted, especially in light of our novel finding of endorsement by women. Such efforts also serve to demonstrate our deep regard and respect for individuals who generously choose to volunteer in this important process of discovery.

Acknowledgments

Funding Information: This research study was supported by grant NIMH3RO1MH074080 from the National Institute of Mental Health and National Human Genome Research Institute and NIMH3RO1MH074080–03S1 (supplement) from the National Institute of Mental Health.

REFERENCES

1. Alford SH, McBride CM, Reid RJ, Larson EB, Baxeavanis AD, & Brody LC (2011). Participation in genetic testing research varies by social group. *Public health genomics*, 14(2), 85–93. [PubMed: 20299772]
2. Aro AR, Hakonen A, Hietala M, Lönnqvist J, Niemelä P, Peltonen L, & Aula P (1997). Acceptance of genetic testing in a general population: age, education and gender differences. *Patient education and counseling*, 32(1), 41–49. [PubMed: 9355571]
3. Burmeister M, McInnis MG, & Zöllner S (2008). Psychiatric genetics: progress amid controversy. *Nature Reviews Genetics*, 9(7), 527–540.
4. Bussey-Jones J, Garrett J, Henderson G, Moloney M, Blumenthal C, & Corbie-Smith G (2010). The role of race and trust in tissue/blood donation for genetic research. *Genetics in Medicine*, 12(2), 116–121. [PubMed: 20098329]

5. Cowan WM, Kopnisky KL, & Hyman SE (2002). The human genome project and its impact on psychiatry. *Annual Review of Neuroscience*, 25(1), 1–50.
6. Cuijpers P, Van Straten A, & Smit F (2005). Preventing the incidence of new cases of mental disorders: a meta-analytic review. *The Journal of nervous and mental disease*, 193(2), 119–125. [PubMed: 15684914]
7. DeLisi LE, & Bertisch H (2006). A preliminary comparison of the hopes of researchers, clinicians, and families for the future ethical use of genetic findings on schizophrenia. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, 141B(1), 110–115. 10.1002/ajmg.b.30249
8. Dye T, Li D, Demment M, Groth S, Fernandez D, Dozier A, & Chang J (2016). Sociocultural variation in attitudes toward use of genetic information and participation in genetic research by race in the United States: implications for precision medicine. *Journal of the American Medical Informatics Association*, 23(4), 782–786. [PubMed: 26984047]
9. Fiksinski AM, Breetvelt EJ, Duijff SN, Bassett AS, Kahn RS, & Vorstman JAS (2017). Autism Spectrum and psychosis risk in the 22q11. 2 deletion syndrome. Findings from a prospective longitudinal study. *Schizophrenia research*.
10. Gaskell G, Allum N, Bauer M, Durant J, Allansdottir A, Bonfadelli H, ... & Hampel xJ. (2000). Biotechnology and the European public. *Nature biotechnology*, 18(9), 935–938.
11. Henderson G, Garrett J, Bussey-Jones J, Moloney ME, Blumenthal C, & Corbie- Smith G (2008). Great expectations: views of genetic research participants regarding current and future genetic studies. *Genetics in Medicine*, 10(3), 193–200. [PubMed: 18344709]
12. Henneman L, Timmermans DR, & Wal GVD (2006). Public attitudes toward genetic testing: perceived benefits and objections. *Genetic testing*, 10(2), 139–145. [PubMed: 16792518]
13. Henneman L Timmermans DR, & Wal GVD. (2004). Public experiences, knowledge and expectations about medical genetics and the use of genetic information. *Public Health Genomics*, 7(1), 33–43.
14. Henneman L, Vermeulen E, Van El CG, Claassen L, Timmermans DR, & Cornel MC (2013). Public attitudes towards genetic testing revisited: comparing opinions between 2002 and 2010. *European Journal of Human Genetics*, 21(8), 793–799. [PubMed: 23249955]
15. Horton R (2017). Offline: The message of mental health. *The Lancet*, 359(10082), 1870.
16. Inglis A, Morris E, & Austin J (2017). Prenatal genetic counselling for psychiatric disorders. *Prenatal Diagnosis*, 37(1), 6–13. [PubMed: 27466037]
17. Klitzman R, Abbate KJ, Chung WK, Marder K, Ottman R, Taber KJ, ... Appelbaum PS. (2014). Psychiatrists' views of the genetic bases of mental disorders and behavioral traits and their use of genetic tests. *The Journal of Nervous and Mental Disease*, 202(7), 530–8. [PubMed: 24933415]
18. Laegsgaard MM, & Mors O (2008). Psychiatric genetic testing: Attitudes and intentions among future users and providers. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, 147B(3), 375–384.
19. Laegsgaard MM, Kristensen AS, & Mors O (2009). Potential consumers' attitudes toward psychiatric genetic research and testing and factors influencing their intentions to test. *Genetic testing and molecular biomarkers*, 13(1), 57–65. [PubMed: 19309275]
20. LaPorte JL, Ren-Patterson RF, Murphy DL, & Kalueff AV (2008). Refining psychiatric genetics: from 'mouse psychiatry' to understanding complex human disorders. *Behavioural pharmacology*, 19(5–6), 377. [PubMed: 18690099]
21. Lehner T, & Insel T (2010). Psychiatric education in the genomic era. *Academic Psychiatry*, 34(2), 87–89. [PubMed: 20224010]
22. McEwen JE, Boyer JT, Sun KY, Rothenberg KH, Lockhart NC, & Guyer MS (2014). The ethical, legal, and social implications program of the National Human Genome Research Institute: reflections on an ongoing experiment. *Annual Review of Genomics and Human Genetics*, 15.
23. Molster C, Charles T, Samanek A, & O'Leary P (2009). Australian study on public knowledge of human genetics and health. *Public Health Genomics*, 12(2), 84–91. [PubMed: 19039252]
24. Murphy E, & Thompson A (2009). An exploration of attitudes among black Americans towards psychiatric genetic research. *Psychiatry: Interpersonal and Biological Processes*, 72(2), 177–194.

25. Murphy EJ, Wickramaratne P, & Weissman MM (2009). Racial and ethnic differences in willingness to participate in psychiatric genetic research. *Psychiatric genetics*, 19(4), 186. [PubMed: 19593860]
26. Ngui EM, Warner TD, & Weiss Roberts L (2015). Ethical responsibilities and perceptions of stakeholders of genetic research involving racial/ethnic minority participants. *AJOB Empirical Bioethics*, 6(3), 15–27.
27. Roberts LW, & Kim JP (2017). Receptiveness to participation in genetic research: A pilot study comparing views of people with depression, diabetes, or no illness. *Journal of Psychiatric Research*, 94, 156–162. [PubMed: 28719815]
28. Salm M, Abbate K, Appelbaum P, Ottman R, Chung W, Marder K, ... Klitzman R. (2014). Use of genetic tests among neurologists and psychiatrists: knowledge, attitudes, behaviors, and needs for training. *Journal of Genetic Counseling*, 23(2), 156–63. 10.1007/s10897-013-9624-0 [PubMed: 23793969]
29. Saraceno B, van Ommeren M, Batniji R, Cohen A, Gureje O, Mahoney J, ... & Underhill C. (2007). Barriers to improvement of mental health services in low-income and middle-income countries. *The Lancet*, 370(9593), 1164–1174.
30. Schoneveld EA, Lichtwarck-Aschoff A, & Granic I (2017). Preventing Childhood Anxiety Disorders: Is an Applied Game as Effective as a Cognitive Behavioral Therapy- Based Program?. *Prevention Science*, 1–13. [PubMed: 27699620]
31. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, ... & Burstein R. (2013). Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet*, 382(9904), 1575–1586.
32. Wilde A, Meiser B, Mitchell PB, & Schofield PR (2010). Public interest in predictive genetic testing, including direct-to-consumer testing, for susceptibility to major depression: preliminary findings. *European Journal of Human Genetics*, 18(1), 47–51. [PubMed: 19690586]
33. World Health Organization. (2001). *The World Health Report 2001: Mental health: new understanding, new hope* World Health Organization.

Table 1.

Background characteristics

	Individuals living with mental illness (n = 71)	Family members of individuals living with mental illness (n = 54)	Community Comparison Volunteers (n = 57)	Overall (N = 182)	P-value ^a
Age					
Mean years (SD)	43.6 (11.2)	45.5 (15.5)	38.4 (13.2)	42.5 (13.4)	.014
Gender (%), n^d					
Female	57.7 (41)	59.3 (32)	54.4 (31)	57.1 (104)	.869
Male	42.3 (30)	40.7 (22)	45.6 (26)	42.9 (78)	
Race/Ethnicity (%), n^d					
Other	32.4 (23)	44.4 (24)	36.8 (21)	37.4 (68)	.388
White	67.6 (48)	55.6 (30)	63.2 (36)	62.6 (114)	
Married or Long-term partner (%), n^d					
Yes	32.4 (23)	53.7 (29)	52.6 (30)	43.4 (79)	.045
No	67.6 (48)	46.3 (25)	47.4 (27)	56.6 (103)	
Education (%), n^d					
No College Degree	57.7 (41)	48.1 (26)	36.8 (21)	48.4 (88)	.063
College Degree	42.3 (30)	51.9 (28)	63.2 (36)	51.6 (94)	
Occupational Status (%), n^b					
Employed	36.6 (26)	59.3 (32)	47.4 (27)	46.7 (85)	.042
Student	15.5 (11)	18.5 (10)	22.8 (13)	18.7 (34)	.577
Retired	4.2 (3)	13.0 (7)	10.5 (6)	8.8 (16)	.201
House-person	8.5 (6)	7.4 (4)	12.3 (7)	9.3 (17)	.646
Some other occupation	47.1 (33)	24.1 (13)	23.6 (13)	32.4 (59)	.005
Estimated Annual Income (\$)^c					

	Individuals living with mental illness (n = 71)	Family members of individuals living with mental illness (n = 54)	Community Comparison Volunteers (n = 57)	Overall (N = 182)	P-value ^a
Mean [Range]	28,285.7 [15,000, 175,000]	47,222.2 [15,000, 175,000]	52,909.1 [15,000, 175,000]	41,564.3 [15,000, 175,000]	<.001

^aP-values correspond to ANOVA tests

^bRespondents were asked to check all that apply

^c3 participants left this section blank

^dP-values correspond to Chi-square tests

Table 2.

Views of individuals living with mental illness, family members of individuals living with mental illness, and community comparison volunteers regarding the societal importance of genetic versus non-genetic research

	Individuals living with mental illness (n = 71)	Family members of individuals living with mental illness (n = 54)	Community Comparison Volunteers (n = 57)	Overall (N = 182)	P-value ^a
Genetic research*					
Mean (SD)	9.32 (1.2)	9.41 (1.0)	9.58 (0.9)	9.43 (1.0)	.388
Non-genetic research*					
Mean (SD)	8.80 (1.6)	8.35 (1.9)	8.88 (1.6)	8.69 (1.7)	.212
P-value^b	.008	<.001	.001	<.001	

^aP-values correspond to ANOVA tests

^bP-values correspond to Paired t-tests

* Scale from 0 – 10

Table 3.

Views of individuals living with mental illness, family members of individuals living with mental illness, and community comparison volunteers regarding the societal importance of genetic research by disorder types

	Individuals living with mental illness (n = 71)	Family members of individuals living with mental illness (n = 54)	Community Comparison Volunteers (n = 57)	Overall (N = 182)	P-value ^a
Cognitive Disorder[*]					
Mean (SD)	8.70 (1.87)	9.07 (1.37)	8.93 (1.57)	8.88 (1.64)	.446
Mental illness Disorders[*]					
Mean (SD)	8.48 (1.69)	8.29 (1.62)	7.95 (1.90)	8.26 (1.74)	.241
Physical illness Disorders[*]					
Mean (SD)	8.09 (1.82)	8.31 (1.83)	8.11 (1.76)	8.16 (1.80)	.770
Addiction Disorders[*]					
Mean (SD)	7.53 (2.80)	7.87 (2.28)	7.27 (2.64)	7.55 (2.60)	.481
P-value^b	<.001	<.001	<.001	<.001	

^a P-values correspond to ANOVA tests

^b P-values correspond to Repeated Measures ANOVA Tests

^{*} Scale: 0=Not Important at All, 5=Somewhat Important, 10=Extremely Important

Cognitive Disorder: Alzheimer's disease

Mental illness Disorders: Anxiety disorder, Autism, Bipolar disorder, Major depression and Schizophrenia

Addiction Disorders: Alcoholism and Addiction to drugs

Physical illness Disorders: Asthma, Colon cancer, Heart disease and Type 2 diabetes