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Hopes and Expectations Regarding Genetic Testing for Schizophrenia Among Young Adults at Clinical High-Risk for Psychosis

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Abstract

Genetic tests for schizophrenia could introduce both risks and benefits. Little is known about the hopes and expectations of young adults at clinical high-risk for psychosis concerning genetic testing for schizophrenia, despite the fact that these youth could be among those highly affected by such tests. We conducted semi-structured interviews with 15 young adults at clinical high-risk for psychosis to ask about their interest, expectations, and hopes regarding genetic testing for schizophrenia. Most participants reported a high level of interest in genetic testing for schizophrenia, and the majority said they would take such a test immediately if it were available. Some expressed far-reaching expectations for a genetic test, such as predicting symptom severity and the timing of symptom onset. Several assumed that genetic testing would be accompanied by interventions to prevent schizophrenia. Participants anticipated mixed reactions to finding out they had a genetic risk for schizophrenia, suggesting that they might feel both a sense of relief and a sense of hopelessness. We suggest that genetic counseling could play an important role in counteracting a culture of genetic over-optimism and helping young adults at clinical high-risk for psychosis understand the limitations of genetic testing. Counseling sessions could also invite

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individuals to explore how receiving genetic risk information might impact their well-being, as early evidence suggests that some psychological factors help individuals cope, whereas others heighten distress related to genetic test results.

Keywords

schizophrenia; genetic testing; youth; genetic counseling; genetic essentialism

The literature on genetic testing in psychiatry reports widespread interest in such tests by individuals with psychiatric disorders, their family members, and clinicians.^{1–6} No genetic test is currently available to predict one's likelihood of developing schizophrenia, although it is widely accepted that heritability plays a causal role in the disorder.^{7,8} Although schizophrenia is probably not a single discrete illness, genetic tests may still be able to rule in or rule out some forms of schizophrenia, which could improve a person's understanding of his or her risk.⁹

A genetic test for schizophrenia could have several benefits. A test might predict one's level of risk, identify effective treatments, improve detection of symptoms, create opportunities for prompt diagnosis and early response, and reduce stigma.^{1,2,6,10–14} Potential drawbacks include misunderstanding of the test results, an increase in stigma, discrimination by employers and insurance companies, and a negative impact on one's mood and hope for the future.^{2,6,11–15}

In considering these issues, some populations, such as young adults at clinical high-risk for psychosis, merit special attention. The criteria defining clinical high-risk for psychosis include frank psychotic symptoms that are too brief or too intermittent to constitute a full psychotic syndrome; functional decline (a 30% decline in the Global Assessment of Functioning over 1 year) in the setting of genetic risk factors (a close biological relative with a psychotic disorder or a personal diagnosis of schizotypal personality disorder); or attenuated positive symptoms, such as unusual thought content, suspiciousness, grandiosity, perceptual abnormalities (eg, experiencing one's name being called when no one else is around), or disorganized communication.¹⁶ Data suggest that approximately 35% of individuals at clinical high-risk for psychosis will develop a psychotic disorder (eg, schizophrenia) within 2.5 years.¹⁷ Given their high risk of developing schizophrenia or another psychotic disorder, and their constellation of symptoms (eg, suspiciousness, grandiosity, disorganization, intermittent psychosis), this group has an increased likelihood of experiencing both the benefits and the harms that are potentially associated with genetic testing for schizophrenia.

Little is yet known about what young adults at clinical high-risk for psychosis think about genetic testing for schizophrenia. We therefore interviewed persons from this clinical population, asking a variety of questions about their perceptions of genetic testing, what they would want it to accomplish, and what the drawbacks might be. In another study drawing on the same dataset,¹⁸ we focused on young adults' fears and concerns about genetic testing, and we found that young adults were especially worried about test reliability, data interpretation, stigma, psychological harm, family planning, and privacy. In this study, we

report on young adults' hopes and expectations related to genetic testing, and we discuss these themes in relation to both genetic optimism and essentialism. This information can be of use to researchers, clinicians, and genetic counselors in illuminating the complexity of how this population understands and interprets genetic information in relation to schizophrenia, and how high-risk individuals might approach and respond to the possibility of determining their genetic risk for schizophrenia.

SUBJECTS AND METHODS

Participants

Participants were recruited from the Center of Prevention and Evaluation (COPE). This is a research clinic for young people, 14–30 years of age, who are considered to be at clinical high-risk for psychosis. It is located at the New York State Psychiatric Institute at Columbia University Medical Center, in New York. Patients at the clinic are referred from private and hospital-based mental health professionals, academic counseling centers, or through self-referral on COPE's website. All patients at the clinic meet criteria for 1 or more psychosis-risk syndromes, as defined by the Structured Interview for Psychosis-Risk Syndromes.¹⁶ The clinic has been enrolling patients since 2004, and patients are followed for up to 2.5 years. At any given time, there are approximately 25–30 active patients in the clinic.

Exclusion criteria for the clinic include past or current frank psychosis, significant risk of harm to self or others, which was deemed inappropriate for outpatient care, any major medical or neurological disorder known to affect the brain, and IQ < 70. Individuals are also excluded if attenuated positive symptoms have occurred only in the context of substance use or if they were clearly accounted for by another psychiatric disorder.

The study was approved by the Institutional Review Board at the New York State Psychiatric Institute at Columbia University, and participants provided written informed consent.

Recruitment

Throughout 2014, research staff identified clinic patients who might participate in this interview study. Invitations were limited to persons who were English speaking, 18 to 30 years of age (we excluded minors), in communication with staff and reachable by phone, and who resided close enough to allow in-person interviews. In addition, because early phases of the cohort study involved a series of clinical evaluations, questionnaires, and biological measurements (including neuroimaging), we only interviewed participants who were finished with data collection for these core elements of the study to minimize participant burnout.

Of the 17 individuals who were invited to participate, 15 scheduled and attended interviews. The demographic characteristics of the sample are summarized in Table 1.

Interviews

One author (REL) conducted in-person interviews lasting approximately 30 minutes at the New York State Psychiatric Institute. A semi-structured questionnaire asked about expectations, level of interest, perceived benefits, motivating factors, and anticipated life

changes as a result of genetic testing (see the Results section for the specific language used in each question). REL audio recorded and transcribed each interview. Participants received \$30 in cash for participating.

Analysis of Results

Two of the authors (REL and PF) read the transcripts multiple times, independently listing the answers to each interview question, and then grouped the answers together thematically. REL and PF generated a codebook to describe the range of answers and independently labelled each answer using the codebook. Coding discrepancies were discussed until consensus was reached. PF drafted the results, summarizing the range of answers for each question, and this document was then reviewed and edited by REL.

RESULTS

Expectations

We asked participants: “What would you want a genetic test to tell you? Would you expect it to tell you how severe your symptoms would be? Would you expect it to tell you when symptoms would emerge? How much certainty would you expect?”

The majority of subjects said they would want a genetic test to tell them what illnesses they are at risk of developing (interviews 1, 2, 3, 5, 6, 8, 12, 15). Several respondents wanted more information about their genes (interviews 1, 5, 10, 11, 14), which treatments might work best for them (interviews 1, 3, 13, 15), and risks of transmitting disorders to their children (interviews 5 and 9), and 1 was interested in preventive information (interview 8). One subject considered genetic testing undesirable because “it takes the choice out of being yourself” (interview 7).

Some participants said they did not expect a genetic test to give them information about symptom severity (interviews 3, 5, 7, 10, 12, 13), whereas others did (interviews 2, 4, 9, 14), and 1 was not sure (interview 11). Others specified that they would not expect such information, but that they would welcome it if it were available (interviews 1, 6, 8, 15).

Some respondents expected genetic testing to reveal when symptoms would emerge (interviews 2, 4, 9, 10, 14), whereas others did not expect this (interviews 3, 6, 7, 12, 13), or considered such information desirable but not expected (interviews 1, 5, 8). Subjects appropriately pointed out that symptom onset and severity depend on many factors in addition to genetics (interviews 1, 3, 5, 7, 13, 15).

I would see a lot of things as like a combination of nature and nurture. I don't know —I'm sure it could tell you something, but I don't know how specific or precise it could be. (Interview 3)

When we asked how much certainty participants expected from a genetic test, answers ranged from 20% (interview 7) to 90% (interview 2). In follow-up questioning, if asked about the lowest certainty they would accept and still get tested, answers ranged from 1% (interview 13) to “75%–80%” (interview 2).

Interest

We asked: “How much do you want to know your risk for developing schizophrenia? If a test existed, when would you want to get tested? If we offered a test today, would you want to get tested today?” Table 2 presents a quantitative summary of participants’ interest.

Of the 15 respondents, 11 wanted to know their genetic risk for schizophrenia (interviews 1, 2, 3, 4, 5, 6, 8, 9, 12, 13, 14), and 2 others indicated that they “might” want to know (interviews 11 and 15). Two respondents clearly said they would not want to know (interviews 7 and 10).

Most of the respondents wanted to get tested as soon as possible (interviews 3, 4, 5, 8, 9, 11, 12, 13, 14, 15), and many wanted the test “today” (interviews 1, 3, 4, 5, 6, 8, 9, 11, 12, 13, 14). Two participants wanted to wait, “because it’s just too fast. Like, I’d have to know more about it, and I’d have to talk about it with my family, my parents” (interview 2), or “just to kind of think about it” (interview 15).

Regarding the ideal times in life to get tested, responses included: “childhood” (interview 11), “as a pre-teen.... or as early as possible” (interview 6), and “when you’re a teenager... [because] you’re basically starting to find yourself essentially, so that would be kind of the best time to know something may be wrong” (interview 15). Another subject said, “It’d be better for me to wait a few more years.... I’d be more mature” (interview 2) and another said “between 21 and 25 would be optimal” (interview 12).

As noted above, 2 participants (interviews 7 and 10) said they would never want genetic testing. One explained, “why would they ever want to stigmatize themselves in that capacity?” (interview 7).

Even if there were no preventive measures available, many would still want to be tested (interviews 8, 9, 11, 12, 13, 15).

Actually I would. I would still want to be tested because the more information, the more possibility that you might get help sometime. Maybe if it’s not available now, but you never know in the future. (Interview 13)

However, some would not want testing if no preventive measures were available (interviews 6 and 10).

If there are absolutely no steps that I could take in lowering the risk, I would not want to know what it was. (Interview 6)

Perceived Benefits

We asked: “Can you think of any benefits of getting tested?”

Many participants thought it would be generally good to have more information about themselves, their bodies, and their risks (interviews 1, 2, 3, 9, 10, 11, 13, 14, 15).

I think the not knowing is very difficult, and, like I said I would feel more comfortable having a more solid grasp of what the risks really were. (Interview 1)

Some respondents thought genetic information might inform future decisions about having children (interviews 5, 6, 9). One thought it would be beneficial to be able to warn family members who might be at risk (interview 10).

Emotional benefits were also mentioned. Participants said, “it would take a lot of the fear of not knowing” (interview 1), and “if you were to get a low result when you expected a high one, it would be very reassuring” (interview 6). One participant noted that discovering a low risk “could make you feel better,” whereas discovering a high risk could be motivation to “try to enjoy my life as much as possible now, before it happens” (interview 8).

Participants frequently said that knowing their genetic risk would enable them to take preventive measures and seek treatment (interviews 1, 2, 5, 7, 8, 10, 12 15).

I think I said this earlier, but obviously the individual, me, my circumstance, I could try to find ways so that I could help those symptoms, so if I am having those symptoms I could start therapy, I could start getting the right meds, I could start, you know, taking the preventive actions. (Interview 5)

I suppose that would be one benefit, if you could prevent things from happening before they do. (Interview 10)

Participants noted that they would be careful to avoid risk factors or triggers if they knew they were at high risk (interviews 1, 2, 8). One respondent indicated that a high-risk result could provide motivation to seek help immediately after any trauma, to reduce the potential negative impact (interview 1).

I guess if you find out you have a high chance you could be more cautious and avoid things like drugs or avoid stress or make sure you always get enough sleep, things like that. (Interview 8)

Motivation

We asked: “What motivates you to know? What might cause other people to get tested?”

Most participants said that a family history of schizophrenia could motivate people to get genetic testing (interviews 2, 5, 6, 7, 9, 10, 11, 12, 15). Others desired more knowledge and understanding of themselves and their past experiences (interviews 1, 2, 3, 8, 10, 12, 13, 14, 15).

I guess, maybe, it would kind of help me with past experiences with people, especially from growing up, when maybe something was wrong but you didn't know and the people around you didn't know. So now you kind of have an answer. (Interview 15)

Experiencing symptoms would motivate some to learn their genetic risk of schizophrenia (interviews 4, 7, 11, 12, 13, 14).

Probably because they have something happen and they don't know why it's happening, or things that are—maybe seem odd to them. (Interview 13)

Fear and worry were also important motivators (interviews 1, 5, 8).

Well, this has been worrying me for the better part of like 2 or 3 years. I've been constantly worried that I'm going to develop schizophrenia. So I would really like to know my chances, because, I don't know, I want to know how my life is going to turn out I guess. (Interview 8)

Knowing their genetic risk for schizophrenia could help some plan for the future (interviews 1, 8, 9), especially when thinking about having children (interviews 9 and 15).

Two participants wanted to get tested specifically so that they could prevent the onset of schizophrenia (interviews 5 and 9).

If you found out that you had schizophrenia tomorrow, wouldn't you want to prepare for that? So that you'd avoid all those symptoms, and all that nonsense. (Interview 9)

One subject noted how avoiding risk factors, like marijuana use, would be easier if one's risk were known (interview 6).

Without knowledge of how at risk I am, the guidelines that I'm given on how to prevent it, like drug use, are not easily followed, because I don't understand, because there's no "if-then" statement given to me, it's very hard to really conceptualize for myself what the effects could be, if that makes sense. (Interview 6)

Life Changes

We asked: "If a test showed you have a 25% risk of developing schizophrenia, how would that affect the way you live your life? How would it affect your life plans? How would it affect the way you take care of yourself?"

Several said that discovering a 25% risk of schizophrenia would not lead to any life changes, would not affect life plans, or would not affect how they take care of themselves (interviews 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15). One person would "blow it off" (interview 7).

When active changes were considered, persons said they would watch carefully for symptoms (interviews 5, 12, 13), continue taking medication(s) (interviews 5, 9, 12, 14), live in a healthier way (interviews 2, 8, 12), seek help quicker (interview 1), "have a contingency plan" (interview 1), "try not to get immersed in stress" (interview 9), and "rethink career goals" (interview 12). One respondent thought a 25% risk would lead to trying harder in several aspects of life.

I think if I found that out, I would try harder in school, I'd try harder in my relationships with people, I'd try harder at work. If I knew that everything was going to be OK in the end, then, you know, because I feel like today, and just more recently, I don't try as hard as I should because I just think "Well what's the point of it all?" (Interview 8)

Emotional reactions were mixed. Discovering a 25% risk of schizophrenia might increase anxiety and fear (interviews 2, 6, 14) or it could lead persons to "feel better, or happier, or

more hopeful for the future” (interview 8). Some thought it might motivate them to enjoy life more fully (interviews 3 and 6).

I think it could go two ways for me. I could try and beat the statistic, try to fulfill my life with great things, and keep telling myself that nothing would happen, and like a bucket list sort of view on things... and then the other view on it that I could potentially take is like the existential standpoint, where I would just lose all hope and be sort of crushed by that fear and that would be the complete opposite.

(Interview 6)

Two respondents said it might affect how they form relationships (interviews 7 and 14).

It would probably give you either a sense of security or insecurity when forming relationships, so if you have insecurity when forming relationships then it festers that, then when you go in to have a relationship like, it's probably not going to go so well because all of a sudden you're like schizo about being schizo. But if you dust it off and you think it doesn't mean very much, it's not that valid, then it might not affect your ability to form and maintain relationships. (Interview 7)

DISCUSSION

In this study, we conducted interviews with young adults at clinical high-risk for psychosis, seeking to understand their level of interest, expectations, motivations, and perceptions of the benefits of genetic testing for schizophrenia. Overall, participants reported a high level of interest in genetic testing for schizophrenia, which is consistent with the existing literature on genetic testing for other psychiatric conditions.^{3–6}

One concern that emerged from our results relates to the expectations that many of our participants voiced regarding a genetic test for schizophrenia. This may be related to a widespread genetic optimism promoted by media portrayals of research in genetics, which leads to an abundance of both “hype and hope” surrounding genetic information.¹⁹ As others have emphasized,²⁰ it is important that the expectations of individuals seeking a genetic test be moderated if they are found to be overly optimistic. In particular, several of our participants expected a genetic test for schizophrenia to produce specific information about age of onset or symptom severity, which genetic tests may never be able to predict. Furthermore, the majority of our participants reported that a benefit that a genetic test for schizophrenia would lead to is the ability to take preventive measures to avoid the onset of the disorder. This is particularly worrisome because there are currently no known measures that can prevent the development of schizophrenia. However, several of our participants listed preventive measures they would take, including eating a healthy diet, getting enough sleep, starting therapy, taking medications, being aware of symptoms, avoiding marijuana use, seeking help after a traumatic event, and having a contingency plan. If we conceive of preventive measures in a broad sense, these actions may well be included and in most cases, would only serve to benefit individuals who undertook them. In particular, seeking help from a mental health professional and avoiding marijuana use could have a significant impact on one's mental health.²¹ It is important, then, that if a genetic test for schizophrenia were available, genetic counseling with an individual interested in determining risk should aim to

strike a balance between honestly informing patients of the lack of preventive measures available for those at risk and emphasizing the important role that patients themselves can play in relation to their mental well-being.

An interesting contrast appeared in the data concerning how participants anticipated that a genetic test result of a 25% risk would impact them. On the one hand, participants reported that such a test result might lead to positive experiences such as relief of worry, a reduction in blame, feelings of empowerment, and the comfort of an explanation. On the other hand, the same participants often reported concerns that finding out they had a genetic risk for schizophrenia could lead to experiences of anxiety and fear, might generate a self-fulfilling prophecy, and could increase both stigma and discrimination in others. This suggests that genetic information regarding one's risk for schizophrenia may be a kind of double-edged sword, with the power to provide comfort and do harm at the same time. This highlights an interesting aspect of a debate in the literature concerning whether or not genetic or other biomechanistic (often called "essentialist") explanations for psychiatric disorders lead to an increase or decrease in blame and stigma. Some researchers have suggested that stigma and blame are reduced when a genetic or biological explanation becomes available for a disorder,^{2,6,15,22} whereas others maintain that such explanations can lead to an increase in stigma and paternalistic care.^{23–25} The insights of our participants into their expectations of incorporating test results into their self-image suggest that perhaps both sides of this debate are right, so that essentialist explanations for one's experience can lead to both an exculpatory sentiment and a sense of helplessness.

If a genetic test for schizophrenia were to become available, this double-edged sword of genetic explanations for one's disorder should be taken into account during genetic counseling sessions. Those interested in a genetic test should be encouraged to explore whether they see genetic information regarding their risk as likely to instill or reduce hope in themselves. With regard to other predictive tests, factors that have been associated with maladaptive psychological reactions to negative test results are high levels of depression, anxiety, catastrophizing, neuroticism, or hopelessness about one's health.^{26–28} Because individuals at risk for schizophrenia are more likely than the general population to experience depression, anxiety, and high rates of neuroticism, it could be that negative psychological reactions to receiving information involving a high risk would be more common in this population.^{29,30} In contrast, high levels of ego-strength are associated with psychological well-being 1 year after testing positive for Huntington's disease, and thus they may act as a protective factor.³¹ In terms of coping styles, Peay et al. found that individuals who use monitoring to cope are likely to benefit from genetic counseling, especially with regard to early illness identification, whereas those who rely on cognitive distancing might have a difficult time processing the information provided during a session.³² Additional research regarding how psychological measures and coping styles may impact psychological well-being after genetic counseling is needed, particularly with regard to individuals seeking quantitative risk assessments for mental disorders. This would allow genetic counselors to better predict how individuals might respond to different kinds of information, including genetic risks, and offer appropriate support.

This study had a number of strengths. The participants were ethnically diverse and represented a narrowly defined clinical sample that was identified using a structured scale. This study also had several limitations. The sample was small. Although the gender ratio was representative of this population, the sample was too small to allow us to detect any gender differences. Several questions were based on a hypothetical 25% risk for schizophrenia, and questions based on other hypothetical levels of genetic risk might have generated different responses. Finally, all participants were enrolled in a program that offers support to individuals at high risk for psychosis, which may have led to a different array of responses than if we had interviewed high-risk individuals who were not enrolled in such a program.

CONCLUSIONS

This study examined hopes, expectations, and perceived benefits regarding genetic testing for schizophrenia among young adults at clinical high-risk for psychosis. Participants showed considerable interest in such tests and named many benefits they hoped would accompany genetic testing. Participants also suggested that they might experience mixed reactions in terms of how they might incorporate a genetic risk into their self-image, so that it could lead to both a reduction in stigma and an increase in hopelessness. This finding should be taken into account in genetic counseling sessions. Counselors should also explore psychological factors that might help individuals to cope or that might increase distress related to genetic test results. In addition, some participants voiced expectations of genetic testing that could be very difficult to attain if genetic tests for schizophrenia were developed, such as details regarding time of symptom onset and symptom severity, or information about preventive measures that could counter the development of schizophrenia. It is important that genetic counselors explore the expectations of individuals seeking genetic information at the outset and correct any misconceptions they encounter.

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References

1. Trippitelli CL, Jamison KR, Folstein MF, et al. Pilot study on patients' and spouses' attitudes toward potential genetic testing for bipolar disorder. *Am J Psychiatry*. 1998; 155:899–904. [PubMed: 9659854]
2. Meiser B, Mitchell PB, McGirr H, et al. Implications of genetic risk information in families with a high density of bipolar disorder: an exploratory study. *Soc Sci Med*. 2005; 60:109–118. [PubMed: 15482871]
3. Coors M. Genes in families: attitudes toward genetic testing for schizophrenia. *Schizophr Res*. 2005; 72:271–273. [PubMed: 15560972]
4. DeLisi LE, Bertisch HA. A preliminary comparison of the hopes of researchers, clinicians, and families for the future ethical use of genetic findings on schizophrenia. *Am J Med Genet B Neuropsychiatr Genet*. 2006; 141B:110–115. [PubMed: 16287043]
5. Laegsgaard MM, Mors O. Psychiatric genetic testing: attitudes and intentions among future users and providers. *Am J Med Genet B Neuropsychiatr Genet*. 2008; 147B:375–384.

6. Potokar DN, Stein CH, Darrah OA, et al. Knowledge and attitudes about personalized mental health genomics: narratives from individuals coping with serious mental illness. *Community Ment Health J.* 2012; 48:584–591. [PubMed: 21394471]
7. Barondes SH. Report of the National Institute of Mental Health's Genetics Workgroup. *Biol Psychiatry.* 1999; 45:559. Note to copyeditor: Citation correct as shown. [PubMed: 10088046]
8. Neale MC, Sullivan PF, Kendler KS. Schizophrenia as a complex trait: evidence from a meta-analysis of twin studies. *Arch Gen Psychiatry.* 2003; 60:1187–1192. [PubMed: 14662550]
9. Chen J, Cao F, Liu L, et al. Genetic studies of schizophrenia: an update. *Neurosci Bull.* 2015; 31:87–98. [PubMed: 25652814]
10. Austin JC, Smith GN, Honer WG. The genomic era and perceptions of psychotic disorders: genetic risk estimation, associations with reproductive decisions and views about predictive testing. *Am J Med Genet B Neuropsychiatr Genet.* 2006; 141B:926–928. [PubMed: 16958030]
11. Meiser B, Kasparian NA, Mitchell PB, et al. Attitudes to genetic testing in families with multiple cases of bipolar disorder. *Genet Test.* 2008; 12:233–243. [PubMed: 18554164]
12. Wilhelm K, Meiser B, Mitchell PB, et al. Issues concerning feedback about genetic testing and risk of depression. *Br J Psychiatry.* 2009; 194:404–410. [PubMed: 19407269]
13. Murphy E, Thompson A. An exploration of attitudes among black Americans toward psychiatric genetic research. *Psychiatry.* 2009; 72:177–194. [PubMed: 19614555]
14. Parker, M. *Ethical problems and genetics practice.* New York: Cambridge University Press; 2012.
15. Finn CT, Smoller JW. Genetic counseling in psychiatry. *Harv Rev Psychiatry.* 2006; 14:109–121. [PubMed: 16603476]
16. Miller TJ, McGlashan TH, Rosen JL, et al. Prodromal assessment with the structured interview for prodromal syndromes and the scale of prodromal symptoms: predictive validity, interrater reliability, and training to reliability. *Schizophr Bull.* 2003; 29:703–715. [PubMed: 14989408]
17. Cannon TD, Cadenhead K, Cornblatt B, et al. Prediction of psychosis in youth at high clinical risk: a multisite longitudinal study in North America. *Arch Gen Psychiatry.* 2008; 65:28–37. [PubMed: 18180426]
18. Lawrence RE, Friesen P, Brucato G, et al. Concerns about genetic testing for schizophrenia among young adults at clinical high risk for psychosis. *AJOB Empirical Bioethics.* 2016; 7:193–198. [PubMed: 27529075]
19. Conrad P. Genetic optimism: framing genes and mental illness in the news. *Cult Med Psychiatry.* 2001; 25:225–247. [PubMed: 11453260]
20. Biesecker BB, Peay HL. Genomic sequencing for psychiatric disorders: promise and challenge. *Int J Neuropsychopharmacol.* 2013; 16:1667–1672. [PubMed: 23575420]
21. Manrique-Garcia E, Zammit S, Dalmon C, et al. Cannabis, schizophrenia and other non-affective psychoses: 35 years of follow-up of a population-based cohort. *Psychol Med.* 2012; 42:1321–1328. [PubMed: 21999906]
22. Aspinwall LG, Brown TR, Tabery J. The double-edged sword: does biomechanism increase or decrease judges' sentencing of psychopaths? *Science.* 2012; 337:846–849. [PubMed: 22904010]
23. Kent H, Read J. Measuring consumer participation in mental health services: are attitudes related to professional orientation? *Int J Soc Psychiatry.* 1998; 44:295–310. [PubMed: 10459513]
24. Lam DCK, Salkovskis PM, Warwick HMC. An experimental investigation of the impact of biological versus psychological explanations of the cause of "mental illness". *Journal of Mental Health.* 2005; 14:453–464.
25. Lam DCK, Salkovskis PM. An experimental investigation of the impact of biological and psychological causal explanations on anxious and depressed patients' perception of a person with panic disorder. *Behav Res Ther.* 2007; 45:405–411. [PubMed: 16684503]
26. Bennett P, Wilkinson C, Turner J, et al. Psychological factors associated with emotional responses to receiving genetic risk information. *J Genet Couns.* 2008; 17:234–241. [PubMed: 18259848]
27. Dufrasne S, Roy M, Galvez M, et al. Experience over fifteen years with a protocol for predictive testing for Huntington Disease. *Mol Genet Metab.* 2011; 102:494–504. [PubMed: 21220204]

28. van der Meer LB, van Duijn E, Giltay EJ, et al. Do attachment style and emotion regulation strategies indicate distress in predictive testing? *J Genet Couns*. 2015; 24:862–871. [PubMed: 25641254]
29. Buckley PF, Miller BJ, Lehrer DS, et al. Psychiatric comorbidities and schizophrenia. *Schizophr Bull*. 2009; 35:383–402. [PubMed: 19011234]
30. Camisa KM, Bockbrader MA, Lysaker P, et al. Personality traits in schizophrenia and related personality disorders. *Psychiatry Res*. 2005; 133:23–33. [PubMed: 15698674]
31. Codori AM, Slavney R, Young C, et al. Predictors of psychological adjustment to genetic testing for Huntington's disease. *Health Psychol*. 1997; 16:36–50. [PubMed: 9028814]
32. Peay HL, Hooker GW, Kassem L, et al. Family risk and related education and counseling needs: perceptions of adults with bipolar disorder and siblings of adults with bipolar disorder. *Am J Med Genet A*. 2009; 149A:364–371. [PubMed: 19215049]

TABLE 1

Demographic Characteristics of Participants

Sex	n
Female	4
Male	11
Self-Reported Race or Ethnicity	
White	5
African American	4
Hispanic	3
Arabic	1
Chinese	1
South Asian	1
Education	
Did not complete high school	2
Completed high school	1
Attended some college	9
Completed college	2
Completed graduate degree	1

Mean age, 22.2 yr; age range, 18–29 yr

TABLE 2

Participant Interest

Do you want to know your genetic risk for developing schizophrenia?	n
Yes	11
Maybe	2
No	2
Would you want to get tested today?	
Yes	11
Maybe	0
No	4