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Modern Advances in Genetic Testing: Ethical Challenges and Training Implications for Current and Future Psychologists

Leah S. Richmond-Rakerd

Department of Psychological Sciences, University of Missouri-Columbia

Abstract

The ethical implications for psychological practice of genetic testing are largely unexplored. Predictive testing can have a significant impact on health and well-being, and increasing numbers of individuals with knowledge of their risk for various disorders are likely to present for psychotherapy. In addition, more people will struggle with the decision of whether to obtain information regarding their genetic material. Psychologists will need to have the appropriate knowledge and clinical skills to effectively counsel this population. This article highlights the relevant ethical issues surrounding psychological treatment of individuals pursuing or considering undergoing genetic testing. These issues are extended to psychologists working in research, education, and policy domains. Recommendations for graduate training programs to facilitate current and future practitioner competence are also discussed.

Keywords

ethics; genetic testing; psychology; training

Modern advances in genome sequencing and genetic testing pose new ethical challenges for psychologists. Specifically, increasing numbers of individuals with knowledge of their genetic risk for various disorders will present for psychological treatment—in particular, psychotherapeutic interventions. Learning of one's potential to develop often life-threatening diseases can induce great stress and have a significant impact on well-being. Such knowledge affects not only the individuals being tested but also their friends and family (Peterson, 2005). A growing population of people faced with unique and impactful knowledge about their health and future will be in need of therapy. Psychologists must be prepared, therefore, to ethically and effectively treat these individuals. This article addresses the ethical issues surrounding psychologists' work with people undergoing predictive testing. These issues include (a) values conflicts and value system disparity, (b) confidentiality, privilege, and record keeping, (c) informed consent, and (d) competence and training concerns. The relevance and importance of these topic areas are addressed for therapists practicing both within and outside medical settings, as well as individuals involved in research, education, and policy.

PSYCHOLOGICAL IMPACT OF GENETIC TESTING

As increasing numbers of people learn about or consider pursuing genetic testing, the population of individuals presenting for psychological treatment will grow. Obtaining information about one's genetic risk for a disorder can have a significant and lasting impact

on quality of life and can promote significant stress (Peterson, 2005). In particular, individuals who learn of their risk for potentially terminal illnesses, such as cancer, are at very high risk for negative medical outcomes. For instance, carriers of the BRCA1 mutation (which confers increased risk for breast and ovarian cancers) experience high levels of psychological distress following testing (Hamilton, Lobel, & Moyer, 2009). Other disorders for which testing has been shown to confer stress, depression, and anxiety include prostate and thyroid cancers (Shaw & Bassi, 2001) and Alzheimer's disease (Gooding, Organista, Burack, & Biesecker, 2006). Individuals faced with degenerative and fatal disorders, such as Huntington's disease, are at high risk for suicidal ideation and attempts (Walker, 2007). Although not all people who undergo genetic testing suffer these effects, many individuals may face significant negative outcomes if they fail to seek psychological treatment.

WHY AND HOW IS THIS RELEVANT FOR CLINICAL PSYCHOLOGISTS?

Given the significant impact of genetic testing on mental health and well-being, individuals who have undergone or are contemplating receiving genetic testing are likely to be in need of psychological services. It should be noted that the profession of genetic counseling strives to provide this assistance. Although some genetic counselors work in research or policy domains, the majority provide services to individuals seeking genetic testing. The National Society of Genetic Counselors defines genetic counseling as "the process of helping people understand and adapt to the medical, psychological and familial implications of genetic contributions to disease" (Resta et al., 2006, p. 77). Genetic counseling integrates interpretation of familial risk and medical history, education about resources, management, prevention, and research, and counseling to promote informed decision making (Resta et al., 2006).

Individuals typically attend only a few sessions of genetic counseling. Growing concerns over limited personnel, coupled with a desire to provide services to the broader public, have led to efforts to limit counseling to just one session (Wang, Gonzalez, & Merajver, 2004). Genetic counseling is not meant, therefore, to serve as a longer term resource. Attending genetic counseling is an essential part of the testing process; it can provide individuals with necessary information, support, and guidance. For some people, this is sufficient. Others, however, may find that they encounter persistent distress as they consider the meaning of their genetic risk for themselves and their families. It is this population of individuals that practicing psychologists can and should aim to help.

As previously mentioned, individuals suffering from persistent distress may experience depressive and anxiety symptoms. In addition, they may encounter internal conflict related to the decision to pursue genetic testing and whether to share their genetic risk with friends and family. Psychological treatment for this population will therefore likely consist of psychotherapeutic interventions aimed at (a) alleviating symptom severity, and (b) helping clients consider the merits and risks of genetic testing and clarify their decision-making process.

VALUES CONFLICTS AND VALUE SYSTEM DISPARITY

The merits and implications (both positive and negative) of genetic testing have generated much debate. Although the ethics of genetic testing are not the focus of this article, controversy over potential outcomes of genome sequencing is likely to influence both patients' and therapists' viewpoints. The values and biases of the psychologist, and whether and how they align with those of the patient, have the potential to impact therapists' objectivity and limit respect for clients' autonomy. This can substantially influence the nature and outcome of the therapeutic relationship. Some areas of debate include fears that genetic testing will potentiate new forms of discrimination, such as limitations on health

insurance coverage and rejection by potential employers (Hodge, 2004). Others argue that it will result in a modern “eugenics,” with efforts to “purify” the gene pool (Lemke, 2002). Further concerns center on the patenting and ownership of genetic material (Caulfield & Gold, 2000) and the ability of children to consent to genetic testing (Geller, Tambor, Bernhardt, Fraser, & Wissow, 2003). The debate over genome sequencing is both politically and ethically charged, and clients and psychologists are likely to have strong viewpoints about the merits and psychological costs of predictive testing.

Although practitioners should not prevent themselves from forming perspectives on the debate over genetic testing, they need to be aware of how their values may influence the therapeutic relationship. Several principles of the American Psychological Association (APA) *Ethical Principles of Psychologists and Code of Conduct* specify the ethical responsibility practitioners have to both understand and minimize the role of their biases in the therapeutic process. Principle D (Justice) states that psychologists must “take precautions to ensure that their potential biases ... do not lead to or condone unjust practices” (APA, 2002). In addition, Principle E (Respect for People’s Rights and Dignity) mandates that psychologists “respect the dignity and worth of all people, and the rights of individuals to ... self-determination” (APA, 2002). Specifically, to facilitate and honor clients’ autonomy, psychologists must try to “eliminate the effect on their work of biases” (APA, 2002). Psychologists have an ethical responsibility to be conscientious of their potential to possess biases against individuals who differ from them in a variety of ways, to acknowledge when they have these biases, and to work to minimize the influence of these attitudes on the therapeutic relationship (see Ali, Liu, & Humedian, 2004; Brinson & Cervantes, 2003; Cornish et al., 2008; and Lasser & Gottlieb, 2004, for case examples addressing therapist biases in relation to client characteristics). Psychologists are likely to have different views from their clients regarding the importance, benefits, and risks of genetic testing. Clinicians are ethically bound, however, to respect clients’ right to pursue their own goals, free from imposition of their therapists’ (often opposing) ideals.

Although therapist ideals about genetic testing are largely unexplored, the role of value systems and biases in therapy has been the subject of extensive research (Ackerman & Hilsenroth, 2001; Hersoug, Høglend, Monsen, & Havik, 2001; Williams & Levitt, 2007). A direct infliction of therapist values is particularly harmful when it involves the individual and role differences that define and distinguish clients (e.g., ethnicity, culture, religion, and sexual orientation; APA, 2002). For ethical and informed practice to occur, ideals regarding genetic testing should be considered alongside other individual difference variables. Only then will practitioners be able to (a) acknowledge their own ideals and biases (either conscious or unconscious), (b) evaluate how they may affect the therapy process and client outcomes, and (c) work to change and/or minimize the influence of their values on the therapeutic relationship.

Special populations and individual differences such as ethnicity, culture, and sexual orientation represent an important area for investigation and present a challenge for researchers and educators. These characteristics influence decision making and outcomes surrounding genetic testing and may function as important moderators of the relationship between testing and future behaviors. Researchers as well as practitioners must be aware of the effect that their values and ideals may have on their work. Both overt and covert stereotypes about or preconceived notions against certain populations may motivate biased research. Investigators may consciously or unconsciously aim to achieve certain outcomes. Educators may find that their values color their choice of course materials and their course goals. Although policymakers have a vested interest in particular outcomes and regulations, they must be careful to base their recommendations in empirical research as opposed to solely their value systems. Psychologists working in a variety of domains, therefore, must

attend to the potential influence of their biases on the therapeutic relationship and work to change and/or minimize these ideals.

CONFIDENTIALITY, PRIVILEGE, AND RECORD KEEPING

Three issues pertaining to confidentiality and client privilege arise when considering the implications of genetic testing for psychology: (a) disclosure of genetic information to family members, (b) disclosure of genetic information to other treatment professionals, and (c) documentation and record-keeping procedures.

Protecting client confidentiality is essential to successful treatment. Ensuring confidentiality helps promote client openness and trust with the therapist and facilitates a strong working alliance and positive treatment outcomes (Fisher, 2008). The importance of psychologists' commitment to confidentiality is well outlined in Principle E of the APA Code, which requires that psychologists "respect ... the rights of individuals to privacy, confidentiality, and self-determination" (APA, 2002). In addition, Standard 4.01 (Maintaining Confidentiality) requires that psychologists "take reasonable precautions to protect confidential information" (APA, 2002). Related to confidentiality is a client's right to privilege, which prevents their mental health and/or medical information from being released in a court of law without their written consent (Koocher & Keith-Speigel, 2008).

Disclosure of Genetic Information to Family Members

Issues surrounding disclosure of clients' genetic information may present challenges to the protection of individuals' privilege. Therapists may, for instance, have strong feelings about family members' right to know about their potential genetic risk for various disorders. They may worry that clients who do not inform their offspring and siblings about their risk status are preventing them from engaging in protective behaviors. For instance, people who learn that they are at increased risk for various cancers may stave off future illness by making changes to their diet, exercise habits, and other lifestyle factors. Therapists may also feel that their clients are disrespecting their relatives' autonomy by preventing them from having the opportunity to make their own choices about pursuing predictive testing. These concerns are likely to vary by context and disorder. For instance, individuals with the BRCA1 mutation are at significantly increased risk for developing breast or ovarian cancer, but they are not fated to develop the disease (Walsh, et al., 2006). By contrast, people with the *HD* gene are guaranteed to develop Huntington's disease (Walker, 2007).

Although psychologists' concerns about their clients' actions are natural, clinicians must recognize that their personal values do not afford them the right to disclose their clients' genetic information. Standard 4.05 (Disclosures) of the APA Code requires that psychologists "disclose confidential information without the consent of the individual only as mandated by law, or ... for a valid purpose such as to ... protect the client/patient, psychologist, or others from harm" (APA, 2002). Guidelines developed for professionals in the United Kingdom and the United States have generally agreed that, in all circumstances, medical professionals' primary duty is to protect confidentiality, except in "exceptional circumstances [i.e., refusal to inform family members of serious genetic risk to health]" (American Society of Human Genetics, 1998; Royal College of Physicians, 1991). These recommendations for clinical geneticists can be extended to psychologists struggling with whether to disclose their clients' genetic risk to family members. Although preserving confidentiality in the face of potential harm to others may be difficult, psychologists must recognize that their first and foremost responsibility is to their client. Although practitioners must respect this duty, they should, as recommended for genetics counselors and clinical geneticists, educate their clients about the benefits of informing their families. In addition to enabling family members to engage in healthful behaviors, communicating one's risk status

to others can garner needed emotional support (Clarke et al., 2005). Psychologists should also be aware of potential harms that may come from sharing one's risk status. Children and siblings may not want to know that they may develop a disorder, or they may have values that differ from those of their family members regarding predictive testing. Discussing these issues with clients can help them (a) make informed decisions regarding whether to disclose their risk status, and (b) prepare for the potential outcomes (both positive and negative) of their actions. Maintaining confidentiality while educating clients about possible outcomes of disclosure can enable psychologists to honor their commitment to the APA Code, preserve the trust and confidence of the therapeutic relationship, and honor clients' rights to autonomy and self-determination (APA, 2002).

Issues of disclosure may also arise if multiple parties are involved in the therapy process. For example, individuals involved in marital, family, and group therapy must be mindful of their responsibilities to the individuals involved and the types of information that will be shared with each person. Standard 10.02 (Therapy Involving Couples or Families) of the APA Code states that psychologists must clarify at the beginning of therapy "(1) which of the individuals are clients/patients and (2) the relationship the psychologist will have with each person. This clarification includes the psychologist's role and the probable uses of the ... information obtained" (APA, 2002). Standard 10.03 (Group Therapy) requires that psychologists providing therapy in a group setting "describe at the outset the roles and responsibilities of all parties and the limits of confidentiality" (APA, 2002). For instance, a client who has not shared their genetic risk status with their spouse may attend couples therapy for unrelated marital issues. Psychologists must be mindful of their responsibility to their client and respectful of issues such as the individual's risk status that they wish to remain confidential. Clinicians must attend to those ethical issues unique to therapy settings in which multiple individuals with varying knowledge of their client's genetic risk become involved.

Disclosure of Genetic Information to Other Treatment Professionals

When sharing treatment records with other professionals, psychologists must be aware that their client may not want their genetic profile sent to others. Before releasing mental health or medical records, psychologists must obtain consent from their clients. Standard 4.05 (Disclosures) of the APA Code states that psychologists should only disclose confidential information "with the appropriate consent of ... the individual client/patient" (APA, 2002). Before psychologists disseminate prior treatment records, they must fully inform their clients about the types of information to be disclosed, which may include genetic data. Psychologists must allow them the opportunity to decline to consent to transfer of this information. Standard 3.10 (Informed Consent) of the APA Code requires that "when psychologists ... provide ... therapy, counseling, or consulting services ... they obtain the informed consent of the individual" (APA, 2002). Informed consent must take place as part of record disclosures, allowing clients to decide the types of information they are comfortable having released.

Documentation and Record-Keeping Procedures

Other related record-keeping concerns have implications for confidentiality. Some issues are particularly relevant for psychologists working in medical settings, where medical and psychological documentation may become part of a combined record. Standard 6.01 (Documentation of Professional and Scientific Work and Maintenance of Records) of the APA Code requires that psychologists "disseminate ... records and data relating to their professional and scientific work in order to facilitate provision of services later by them or other professionals" (APA, 2002). Although records are frequently shared to aid in treatment, client information must be protected throughout the transfer process. Standard

6.02 (Maintenance, Dissemination, and Disposal of Confidential Records of Professional and Scientific Work) requires that psychologists “maintain confidentiality in ... transferring ... records under their control” (APA, 2002).

With the advent of genetic testing, new types of personal information will be collected. Data on individuals’ genetic material will be transferred within and between medical settings and other health care centers. Psychologists will have to be prepared to both understand genetic information and maintain confidentiality when transferring genetic data. Genetic information is considered particularly sensitive due to the fact that just a few genetic variants can identify an individual. In addition, distributed health environments, in which individuals provide genomic data and other information across hospitals and research centers, can allow for “trait re-identification” (Malin & Sweeney, 2004). Transferring genetic data requires that samples have been securely coded and deidentified and that proper technical and organizational measures prevent against unauthorized access, alteration, loss, and accidental or illegal data destruction (Godard, Schmidtke, Cassiman, & Aymé, 2003). In addition to issues of data transfer, organizations may have legal ownership of clients’ genetic material (Caulfield & Gold, 2000). Such ownership is likely to entail more detailed descriptions from practitioners of how and why genetic data will be used.

Record-keeping issues extend to psychologists working outside of medical settings. Practitioners must attend to the interest third parties may have in their records and be mindful of the types of information their client may not want shared. Legal action may threaten client privilege. In particular, if a client’s mental state is in question, the right to privilege may be waived. Such an “implied waiver” of privilege may occur during child custody and personal injury cases and workers’ compensation claims (Lane, 2006). Therefore, therapists must be mindful that information about their clients’ genetic risk may be revealed in a court of law. Practitioners are often careful to limit information in the treatment record regarding such sensitive information as sexual orientation. Genetic information and risk status represents additional types of sensitive information that individuals may want to remain private. Psychologists must, therefore, consider how third parties might come to access their records and make efforts to honor their clients’ privilege.

Issues of confidentiality are also relevant to psychologists involved in research. Individuals must have the necessary tools and training to ensure that genetic data are not shared with others, and proper security in data maintenance and transfer must be established. Maintaining confidentiality of genetic information will likely entail significant advancement of skill sets and technology.

INFORMED CONSENT

As mentioned previously, issues of informed consent relate to the disclosure of individuals’ genetic information. Psychologists researching genetic testing and collecting genetic material must also adhere to a comprehensive informed consent process. Standard 8.02 (Informed Consent to Research) outlines the necessary aspects of informed consent for individuals conducting a research study: “When obtaining informed consent ... psychologists inform participants about ... the purpose of the research, expected duration, and procedures ... limits of confidentiality” (APA, 2002). Aside from informed consent, researchers may consider obtaining a certificate of confidentiality to further protect their participants’ information. Indeed, many funding agencies and Institutional Review Boards can and should determine whether studies should proceed based on whether principal investigators have obtained a certificate of confidentiality (U.S. Department of Health and Human Services, 2003).

COMPETENCE AND TRAINING CONCERNS

People from a range of helping professions have the capacity to broaden the impact of genetic testing and its uses for treatment planning and patient decision making. To do so, however, professionals aside from genetic counselors (such as psychotherapists) must become “genetically literate” (Guttmacher, 2001). Some efforts have been made to both promote and define necessary aspects of competence for treatment of individuals undergoing genetic testing in a variety of health care domains. The National Coalition for Health Professional Education in Genetics, consisting of a diverse range of specialty organizations (including the APA), published a set of “Core Competencies in Genetics Essential for All Health Care Professionals” (Jenkins et al., 2001). A revised edition of these competencies became available in 2007. They are two-tiered and are composed of a basic level for all health care providers and a more specialized level for individuals who provide genetic counseling services. Core competencies consist of necessary knowledge, skills, and attitudes related to the science of genetics and the impact of genetics on the individual and society (Guttmacher, 2001; Jenkins et al., 2001). For instance, it is recommended that health professionals (a) understand the potential physical and/or psychosocial benefits, limitations, and risks of genetic information for individuals, family members, and communities, and (b) appreciate the importance of sensitivity in tailoring information and services to clients’ culture, knowledge, and language level. Applying and modifying these competencies to be relevant for psychologists will be an essential part of furthering current and future practitioners’ preparedness for working with people pursuing genetic testing.

As outlined previously, individuals presenting to treatment with knowledge of their genetic risk for a disorder represent a population with unique characteristics and concerns. These population-specific factors require that practitioners evaluate their ability to effectively treat individuals undergoing testing. The acquisition of competence does not happen naturally. Individuals may possess characteristics such as empathy and warmth that promote a strong therapeutic alliance (Ackerman & Hilsenroth, 2001). However, knowledge of the population under consideration and appropriate interventions, and possession of skills to implement efficacious treatment, comes about through appropriate training. Standard 2.01 (Boundaries of Competence) of the APA Code mandates that psychologists “provide services, teach, and conduct research within populations and in areas only within the boundaries of their competence, based on their education, training, supervised experience, consultation, study, or professional experience” (APA, 2002). In addition, it requires that in areas of psychology where an understanding of the individual difference factors that define people is necessary for research or treatment, psychologists must “have or obtain the training, experience, consultation, or supervision necessary to ensure the competence of their services” (APA, 2002). Finally, psychologists who plan to work with new populations and topic areas must “undertake relevant education, training, supervised experience, consultation, or study” (APA, 2002). Given the unique characteristics and psychological outcomes of individuals undertaking genetic testing, psychologists will need to obtain appropriate, population-specific training.

Competence is a multidimensional construct, given that it requires more than just a mastery of relevant issues and problems. Rather, it entails the acquisition of foundational, core, and specialized competencies. These involve the development of critical thinking, analytic judgment, reflection, and self-modification. These skills are performed in accord with ethical principles, standards, and guidelines (Kaslow, 2004; Rodolfa et al., 2005). Competence is therefore both based on aspects inherent to the therapist and tied to his or her training. It is also highly context dependent. In relation to genetic testing, practitioner competence will involve not just acquisition of fundamental clinical skills but also adaptation of these skills to population-specific concerns. Knowledge of test-related

psychological outcomes must be combined with and grounded in ethical principles and an understanding of the impact of value systems, adherence to confidentiality, and more.

Psychologists providing treatment to and researching individuals who are undergoing or considering undergoing genetic testing must also be aware of how their pursuits contribute to health psychology. Health psychology represents “the scientific study of psychological processes related to health and health care,” in which individuals “use findings from basic psychological theory and peer-reviewed research to understand and encourage thoughts, feelings, and behaviors that promote health” (Friedman & Silver, 2007, p. 15). Health psychologists focus strongly on core psychological processes related to health, which include social support, stress tolerance, and treatment adherence (Friedman & Silver, 2007). All of these issues contribute to individuals’ choice to pursue psychotherapy when considering pursuing genetic testing and have implications for their decisions regarding medical care and lifestyle changes.

It has been noted that both current and anticipated changes in population demographics are likely to dramatically impact health psychology. Increasing numbers of individuals are elderly, have a disability, are ethnic minorities, claim a sexual minority status, and live below the poverty line. These changing demographics are likely to alter definitions of health and approaches to treatment. Obtaining an understanding of these changes, and becoming knowledgeable and skilled to serve an evolving population, has been proposed as a broader version of cultural competence (Yali & Revenson, 2004). Increasing numbers of people with knowledge of their genetic risk should be included in assessments of population changes and in considerations of competence. It is only when these individuals are included as a unique and important population of focus that psychologists will acknowledge the limits of their abilities in this domain and make efforts to broaden their knowledge and skill set.

Increased knowledge of the psychological outcomes of predictive testing can also motivate and inform empirical investigation (Patenaude, Guttmacher, & Collins, 2002). Psychologists interested in process research, treatment outcomes, and health promotion and prevention will need to gain a greater understanding of the psychological impact of genetic advances. In addition, educators and individuals involved in policy and the law must inform themselves about the short- and long-term psychosocial impacts of predictive testing. Particularly within university settings, individuals may find that clients presenting with issues related to genetic testing, and both their own and their psychologists’ experiences, may inform research aims. Psychologists involved in the justice system, or those interested in protecting aspects of human functioning such as autonomy and self-determination, must become aware of how genetic testing truly impacts individuals. Research with a focus on the psychosocial outcomes of genetic testing can significantly inform future practice, patient behaviors, and treatment outcomes.

WHAT CAN WE DO?

To facilitate informed, educated practice and promote comprehensive knowledge of the population at hand, efforts must be made to increase practitioner competence. Given the relative newness of the field, perhaps the greatest challenge is in understanding how to educate both current and future psychologists. Indeed, students will receive comprehensive training only if (a) they have access to appropriate courses, (b) their supervisors and educators are sufficiently trained in treating individuals undergoing genetic testing, and (c) trainees who want to specialize in treating individuals undertaking genetic testing gain experience with the population where possible. Fostering practitioner competence therefore entails examining current deficits in knowledge and training and working to facilitate future opportunities. Committing to fostering one’s own competence and that of future

psychologists requires that we think forward. Some practitioners may have an immediate need to increase their skill set to work with individuals pursuing or considering undergoing genetic testing. For others, this may seem unnecessary.

Psychologists are called upon not only to recognize the boundaries of their competence but also to educate themselves in fields where general standards for education and practice do not yet exist. Standard 2.01 (Boundaries of Competence) of the APA Code states, "In those emerging areas in which generally recognized standards for preparatory training do not yet exist, psychologists nevertheless take reasonable steps to ensure the competence of their work and to protect clients/patients ... from harm" (APA, 2002). Although developing training guidelines in an emerging field may seem daunting, advances in psychology and other domains outline concrete steps that can be taken to advance both current and future practitioners' competence.

GUIDELINES AND RECOMMENDATIONS FOR TRAINING PROGRAMS

Given that genetic testing is an emerging field, changes to training programs should entail the establishment of clear competency benchmarks. Essential to successful training, student evaluation, and assessment of problems with expertise is recognition of specific competence achievements. Indeed, benchmarks not only must delineate attainment of necessary goals in relation to a subject area but also help establish students' readiness for various stages of the educational process (Fouad et al., 2009). To truly integrate core competencies with clear benchmarks, training programs and supervisors must work within the guidelines proposed for competency measurement. Specifically, an APA Board of Educational Affairs task force proposed a series of guiding principles for the assessment of competence. Such principles included adoption of a developmental perspective and gradations of competence over levels of education, use of formative evaluations, and use of multiple methods for assessment (Kaslow et al., 2007). Employing such guidelines for the assessment of competence will allow for better assessment of trainee mastery of specific competencies relevant to genetic testing.

Achieving competencies relevant to genetic testing could require integrating applicable coursework. Patenaude et al. (2002) reviewed the various principles of genetics with which psychologists must become increasingly knowledgeable. These include Mendelian genetics, differential health risks conferred by various genes, and advances in testing technology. APA-accredited training institutions require that their students engage in a breadth of training across the discipline of psychology (APA, 2007). Included in studies of biological bases of psychopathology could be courses on behavior and molecular genetics. Instructors in courses across topic areas could integrate genetically informed research into their curriculum. Twin and family studies providing information about genetic and environmental contributions to disease can inform instruction across a variety of domains. In addition, training in cultural competence should incorporate an understanding of how factors such as gender, sexual orientation, religion, and ethnicity influence attitudes toward genetic testing. Women have been shown to exhibit greater knowledge of genetics than men (Henneman, Timmermans, & Van der Wal, 2004), and African Americans and Latinos are more likely than Whites to pursue genetic testing. However, African Americans also possess concerns about misuses of genetic information that may interfere with their desire to pursue genetic testing (Singer, Antonucci, & Van Hoewyk, 2004). In addition, lesbian and bisexual women are more likely than heterosexual women to endorse negative beliefs about breast cancer screening and to report lower perceived risk of breast cancer, which influences the degree to which they plan to pursue screening (Hart & Bowen, 2009). Finally, high religiosity is associated with more negative attitudes and increased resistance toward genetic testing (Botoseneanu, Alexander, & Banaszak-Holl, 2011). These and other studies demonstrate

that a variety of individual differences contribute to attitudes toward and psychological responses to genetic testing.

Graduate-level ethics courses must also make an effort to address the issues presented here, as well as other ethical problems inherent in the treatment of individuals involved with genetic testing. Students should be asked to apply their understanding of the APA Code and other ethical standards of the profession to treatment of individuals pursuing genetic testing. Fostering more comprehensive course coverage can provide a necessary and helpful educational foundation for trainees who do not plan to specialize in treating individuals pursuing genetic testing, or students who are not able to work with this population (i.e., do not have access to a medical school). Promoting a genetically sensitive knowledge base in courses will inform individuals' development in settings both with and without access to the population of interest.

Trainees and supervisors aiming to specialize should refer to concrete competencies that have been proposed for professionals working in genetics. Practitioners must become knowledgeable of both tiers of competencies proposed by the National Coalition for Health Professional Education in Genetics (2007); the set of skills proposed for all health providers should serve as a foundation, and some aspects of the skill sets for individuals serving as genetic counselors should be incorporated. Such basic competencies include an understanding of genetics terminology, factors that influence individuals to pursue testing, and legal and social issues related to genetic testing. Skills involve knowledge of referral opportunities and the ability to identify individuals who might benefit from genetic services. Finally, professionals' attitude-related competencies should involve appreciating the sensitivity of genetic information and the need for privacy and confidentiality, and the ability and motivation to collaborate with other health professionals. Psychologists planning to work more in depth can refer to higher tier competencies to inform their postdoctoral coursework pursuits and clinical training opportunities. Revisions to training program curricula and clinical opportunities, and the use of previously established competencies, can help professionals acquire necessary skills across a variety of practice settings and specialty levels.

Psychologists engaged in practice, research, policy, or a combination of endeavors all face ethical issues regarding this topic. Issues of competence and program development have implications not just for individuals planning to pursue psychotherapy but for all professionals interested in addressing how genetic testing will affect the field. Attention to program development, course requirements, the use of genetic science in both research and practice, and other aspects of education and traineeship are essential for professionals pursuing a variety of psychological careers. True integration of ethical standards and principles with knowledge of genetics and genetic testing will occur through comprehensive training and collaborative, interdisciplinary work. For the field to progress and meet the needs generated by advancements in genetics, professionals must commit to integrating research and practice, working with professionals from multiple domains, and using such information to foster both personal competence and the competence of future psychologists.

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