



CHAPTER 15

Nature, Importance, and Assessment of Interests

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Research has provided substantial information about the properties of interests, but has not provided an answer to the basic question: What *are* interests? Identifying the essence and origin of interests and developing precise definitions of interests have been elusive tasks. Extant theories of career development and vocational interests, that describe the function of interests, hint at but do not directly address the more fundamental question of what interests are. Early interest theories generally included both *components* and *determinants* in their definitions of interests. Although many components of interests have been proposed, three major components have been identified most often: personality, motivation and drive, and self-concept. The two most widely cited determinants of interests are nature, which emphasizes the heritability of interests, and nurture, which emphasizes socialization and learning and includes numerous environmental and psychological influences hypothesized to shape interests. Nonetheless, the construct of interests has become, in many ways, synonymous with scores presented on interest inventory profiles. Interests, in other words, frequently are regarded simply as “what the test measures.” Within the context of this chapter, interests are defined as a preference for activities expressed as likes and dislikes (e.g., “I like dancing” or “I dislike text messaging”).



INTERESTS AND VOCATIONAL THEORIES

Vocational interests are one of many variables included in most theories of career development. Interests also are candidates for inclusion in emerging perspectives on the biological bases of behavior.

INTERESTS IN MAJOR THEORIES OF CAREER DEVELOPMENT

Among all vocational theories, Holland's (1997) theory of vocational personality types focuses most explicitly on interests (Nauta, Chapter 3, this volume). Holland proposed that vocational personalities can be summarized as six types—Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC). He also postulated that the relationship among these six types can be illustrated as an irregular hexagon, with the types adjacent to one another on the hexagon having more characteristics in common than types farther apart on the hexagon. Holland's theory features interests as a reflection of personality. The notion that interests and personality share common variance (i.e., are correlated) has been a popular hypothesis for decades. Holland's (1997) theory of vocational personality types, which provides a comprehensive model of vocational interests and their relationship to career decision-making, satisfaction, and performance, has driven much of the research that examines the relationship between interests and personality. His theory also has been used to organize the profiles of all major interest inventories and to develop interpretive materials to accompany the profiles; to provide a framework for integrating higher-order abilities, personality, values, interests, and needs; and to describe interests relative to people, work environments, and job tasks.

The extent to which interests play a role in other theories of career development varies. For example, as described by Swanson and Schneider (Chapter 2, this volume), the theory of work adjustment (TWA; Dawis & Lofquist, 1984) focuses on the way in which abilities and values and their correspondence with an environment's requirements and reinforcers predict work outcomes (e.g., satisfaction, performance, tenure). Although TWA postulates do not specify the role of interests in work adjustment, Dawis and Lofquist, the primary architects of TWA, do acknowledge that vocational interests also predict satisfaction, performance, and tenure.

Super's theory of vocational development, as described by Hartung (Chapter 4, this volume), includes interests among those constructs that "form a personality" and "yield an occupational or vocational identity." Super's life-span, life-space theory includes interests, as a substage in the growth life stage, as one of several constructs he recommended assessing to help clients explore their life roles. Super's theory assumes that readiness to make decisions must be established before the assessment of interests,



abilities, or values can contribute to the career exploration process. Super's career-development assessment and counseling model (C-DAC; Super, Osborne, Walsh, Brown, & Niles, 1992) provides guidelines for implementing Super's life-span, life-space theory in developmental career counseling interventions. Within C-DAC, interests are included along with role salience, developmental concerns, career maturity, and work values as constructs to be included in the C-DAC test battery.

In career construction theory, interests play a role in the development of children's reputations in their families, neighborhood, and schools. Career construction theory acknowledges Holland's typology as an operational definition of vocational personality and views RIASEC types as self-constructing strategies. In career construction theory, interests are not assessed with the help of an interest inventory. Rather, interests are explored and identified when "counselors ask clients about manifest interests ... Interests manifest themselves in conjunction with such things as favorite magazines, television shows, or websites" (Savickas, 2013).

Social cognitive career theory (SCCT; Lent, Chapter 5, this volume) also emphasizes the impact that external forces (e.g., home, schools, peers) have on the development of interests. However, SCCT places more emphasis on the mechanisms involved in shaping or molding interests than does Super's theory of career development or career construction theory. According to SCCT, as individuals try activities and receive feedback on their performance, they develop both self-efficacy and outcome expectations about the activities. If as a result of feedback or self-evaluation they view themselves as becoming competent, and also expect to receive positive outcomes (e.g., monetary, social, or self-evaluative gains) through their participation, then the interest in the activity is likely to blossom and endure. Meta-analyses have demonstrated empirical support for the relations between self-efficacy and interests and between outcome expectations and interests (Lent et al., 2018; Lent & Brown, 2019), and research shows that both interests and self-efficacy contribute to decisions to pursue activities.

EMERGING PERSPECTIVES: ROLE OF NATURE IN INTEREST DEVELOPMENT

Most career theories focus on the role that nurture plays in shaping and developing interests. Although none of the career theories explicitly denies that nature (i.e., genes) plays a role in the origin of a person's interests, they also do not directly address the degree to which interests are determined by heritability of interests. Behavior genetics studies, using twins as well as participants with other kinships, allow research designs that tease apart genetic and nongenetic effects. Especially, informative research using twins reared together and apart supports a combination of nature and nurture



determinants of interests. One study that controlled for gender and age and used a large sample that included eight kinships showed a genetic effect of 36% (Betsworth et al., 1994). This same study identified 9% shared environmental effects (e.g., living in the same home) and an additional 55% nonshared environmental effects (e.g., having different friends) and measurement error. This proportion of genetic and environmental effects is typical of the results reported in other studies. Such findings are consistent with the early appearance of interest choices in young children and the great stability of interests over the life span.

A social neuroscientific model of the processes underlying interests is an approach that offers some promise for a biological understanding of the basis for interests (Hansen, Sullivan, & Luciana, 2011). This model is based on individual differences in the tendency to exhibit positive emotions as described in the behavioral approach systems research. Personality research has linked the approach system with various individual differences such as motivation, positive emotionality, and affiliation–communion. In this stream of research (e.g., Depue & Collins, 1999), approach motivation is conceptualized as having two components: *agency* (e.g., gregariousness, dominance in social hierarchies, potency, assertiveness, achievement, activity) and *affiliative/communal* tendencies (e.g., warmth, affection, and social bonding). Agency (e.g., pleasure from Enterprising activities such as leading, persuading, and selling) and communion (e.g., enjoyment from activities such as helping and teaching) have been shown to reflect distinct neurobiological processes and have been theorized to shape personality. Given the relations between interests and personality, agency and communion also may shape vocational and leisure interests.

The neuroscientific model can be interpreted in the context of work that (a) has examined the relations between interests, personality, and abilities, and (b) has shown that Social and Enterprising interests and personality areas are not clearly associated with abilities. Taken together, these two lines of research (Ackerman & Heggestad, 1997; Baker, Larson, & Seipel, 2019; Hansen et al., 2011) suggest that people with low approach motivation (and consequently less interest in Social and Enterprising activities) are likely to have interests associated with specific abilities (e.g., visual perception and math reasoning with Realistic and Investigative interests, perceptual speed with Conventional interests, ideational fluency with Artistic interests). By contrast, people with high approach motivation are more likely to have interests that involve working with people. In both instances, the likelihood of positive reinforcement increases as individuals identify meaningful patterns and consistencies in types of activities, and these patterns coalesce into vocational interests. Pursuing research that integrates the approach



motivation system and interests may contribute to understanding the neurobiology that predisposes people to pursue or avoid vocational and leisure activities.

INTERESTS, PERSONALITY, AND ABILITIES

The relations between interests and personality and abilities have been studied extensively. The broad-brush conclusion from this line of research is that the three constructs share a small amount of variance but are not redundant.

INTERESTS AND PERSONALITY

Many attempts have been made to understand the relation of interests and personality. Much of this research has focused on Holland's six types and the five-factor model (FFM) of personality, also known as the Big Five (Hansen, 2013; Hansen & Wiernik, 2018). Some research also has examined the relationship between either Holland types or basic interests and the 11 personality traits of Tellegen's big three (Staggs, Larson, & Borgen, 2007; Tellegen, 2000). The general conclusion that can be drawn from these lines of research is that two or three personality and interest variables share a modest amount of variance—Openness and Holland's Investigative and Artistic interests; Extraversion and Enterprising and Social interests; and to a lesser extent Agreeableness and Holland's Social interests. However, research examining the relations among lower-order personality facets (i.e., 30 NEO-PI-R facets), Holland's six personality types, and lower-order interests (i.e., basic interest scales (BIS) of the Strong Interest Inventory (SII)) suggests that, once the associations between interests and personality facets are accounted for, correlations between higher-order personality factors, such as the Big Five, and interest types are negligible (Sullivan & Hansen, 2004b).

As complex approaches to studying statistical relations emerge (e.g., multivariate meta-analytic regression analysis), researchers continue to look for relations between interests and personality factors. However, to date the new approaches have not revealed previously hidden relations (Hurtado Rúa, Stead, & Poklar, 2019). Thus, the vast majority of the relations between interests and personality that have been examined, at both higher-order levels (e.g., Holland types and the Big Five) and lower-order levels (e.g., BIS and the 30 NEO Personality Inventory facets), are relatively weak, and the evidence leads to the conclusion that, for prediction and career counseling purposes, interests and personality should not be treated as interchangeable constructs (Šverko & Babarović, 2016). Research that has



explored the incremental increase in prediction when personality, interests, and self-efficacy are allowed to make independent contributions supports this contention (Brown & Hirschi, 2013; Hansen & Wiernik, 2018).

INTERESTS AND COGNITIVE ABILITIES

Early models of career counseling typically attempted to match the abilities of the client with the requirements of the job. Later, vocational assessment was expanded from concentrating on the measurement of abilities to include assessment of interests. E. K. Strong Jr. (1943), one of the early proponents of assessing interests in addition to abilities, suggested that “the relationship among abilities, interests, and achievements may be likened to a boat with a motor and a rudder. The motor (abilities) determines how fast the boat can go, the rudder (interests) determines which way the boat goes” (p. 17). Research supports Strong’s contention that interests add incremental validity, beyond what abilities contribute, to the prediction of educational and occupational choices and other outcomes such as career success (Su, 2012). As Strong (1927a) noted: “The majority of [people] are practically equally fitted to enter a considerable number of occupations” (p. 297). He later concluded:

“Interests supply something that is not disclosed by ability and achievement ... Counseling that considers both abilities and interests is distinctly superior to that based on either alone, for it is in a position to establish both what the [person] can do and what [she or he] wants to do.” (Strong, 1943, p. 19)

INTEGRATIVE MODELS

Research examining the overlap of interests, personality, and cognitive abilities has led to integrative models of the role of individual differences in career counseling. Four trait complexes appear in several integrative models: (a) science/math, which includes Realistic and Investigative interests, and math reasoning and visual perception abilities; (b) Intellectual/Cultural, which includes Investigative and Artistic interests, general mental ability, ideational fluency, and intellectual engagement and openness to experience; (c) Social, which includes Social and Enterprising interests, and extroversion, social potency, and well-being; and (d) Clerical/Conventional, which includes Conventional interests, perceptual speed, and control, conscientiousness, and traditionalism (Ackerman & Beier, 2003; Ackerman & Heggstad, 1997).

Although current integrative models primarily focus on the relations among interests, abilities, and personality, some recent research has examined interests and values as well as interests and personality, abilities, and



values. Social interests have moderate correlations with relationship and altruistic values, and Enterprising interests have moderate correlations with prestige and influence values (Berings & Adriaenssens, 2012; Leuty & Hansen, 2013). Another study (Jordan & Hansen, 2015) added values to the mix of interests and abilities, using latent profile analysis, and found that five person-centered profiles emerged—a low-interest group, (i.e., no high scores on any of Holland's interest types), a creative group, a hands-on-pragmatic group, and a high-interest group (i.e., high scores on all of Holland's interest types). These groups did not differ on the achievement or autonomy values, but did differ on comfort (low-interest group scored high on comfort and high-interest group scored low), status (hands-on-pragmatic group scored low on status and high-interest group scored high on comfort), and altruism values (hands-on-pragmatic group scored low on altruism and the high-interest group scored high). The groups also had significant differences on all ability measures with the low-interest group scoring lowest on all ability scales; and creatives scoring highest on clerical, verbal ability, motor coordination, and finger dexterity; and hands-on-pragmatics scoring highest on general cognitive, numerical, and spatial abilities.

STABILITY OF INTERESTS

Construct stability is an important prerequisite for any variable incorporated into decision-making exercises such as those used in career counseling. This is especially true for interests, since the stability of the construct is intertwined with the reliability of the scores on the tests used to assess interests. If interests are not stable, then interest inventories have no chance of predicting occupational or educational choices even over short time spans. Based on the early work of E. K. Strong Jr. (1935, 1943) and on decades of research since Strong's early work (Hoff, Bailey, Wee, & Rounds, 2018), we know that interests are very stable over time. In fact, interests may be the most stable of all psychological constructs. We also know that the stability of interests depends on the age at Time 1 testing (the younger the participants, the less stable the interests) and the length of the interval between Time 1 and Time 2 testing (the longer the interval, the less stable the interests). On average, for example, the stability coefficients for individuals tested at age 18 and again at age 22 (4 years) and age 30 (12 years) are about .80 and .70, respectively (Hansen & Swanson, 1983; Swanson & Hansen, 1988). Thus, by age 20, interests are quite stable, even over periods of 5–10 years, and by age 25, interests are very stable. This evidence of the stability of interests for individuals, combined with evidence of test–retest reliability for an instrument, allows test users to have confidence in test scores that are used to predict future behaviors such as job or college major choice.



Occasionally, efforts also are made to look at the stability of an *individual's* interests. This approach typically correlates an individual's profile scores for Time 1 with profile scores for Time 2. Generally, about 50% of individuals have Time 1 and Time 2 interest profiles that are substantially similar, and for many individuals the rank order correlations are in the high .90s over relatively long time periods (e.g., 15 years) (Hansen & Swanson, 1983; Swanson & Hansen, 1988). However, these same studies illustrate that individual differences in interest stability do occur. The intraperson correlations for a sample often range from lows in the $-.20$ s to highs in the $+.90$ s, illustrating that for some individuals, dramatic changes in interests do occur over time.

Research also has explored the extent to which the interests of people in specific occupations or people in general change or remain stable over the decades. Even in times of a quickly changing society and technology, studies show that interests of people within a particular occupation (e.g., bankers, lawyers, foresters, psychologists, engineers, reporters) are virtually identical over 40 or 50 years (Hansen, 1988). Nonetheless, a cross-temporal meta-analysis covering the time periods of 1976–2004, which used a birth cohort design, showed a statistically significant increase in Enterprising interests for female college students and smaller yet still significant decreases in Realistic, Investigative, and Artistic interests for male college students. Gender differences in Conventional and Investigative interests also decreased significantly from older to younger cohorts (Bubany & Hansen, 2011). A study that considered both age and generational experience (i.e., birth year) found that neither age nor birth year, which were related, predicted interests with the exception that declining Realistic interests were predicted by both age and birth year (Leuty & Hansen, 2014). This study also examined gender which predicted several areas of interests historically related to gender (e.g., women reported stronger interests in Artistic and Social areas than did men, and men reported stronger interest in the Realistic area). Finally, neither gender nor age was a moderator of the relations between birth year and interests.

WHY MEASURE INTERESTS?

Within the counseling intervention framework, interests may be assessed for a number of reasons with the goal of helping individuals make informed occupational and educational choices. First and foremost, measured interests can be used by counselors to guide the development of hypotheses about clients. These hypotheses, in turn, may be used to guide career exploration and to provide clients with a fresh perspective and new information. For clients, the profile scores promote self-understanding by various means: identifying previously unknown interests; broadening occupational



possibilities for some people and narrowing choices for others; or simply confirming career choices. Although expressed and inventoried interests show similar evidence of predictive validity for occupation and college major choices, many individuals who must make career and educational choices are undecided. For these clients, the scores on interest inventories can serve as powerful stimuli to jump-start the exploration process and to develop career ideas and possibilities.

Social media and the Internet have led to work arrangements that are attractive for their flexible work schedules, job sharing, and the opportunity to work from remote locations; on the other hand, these positions often result in modest incomes and few benefits (e.g., health or disability insurance or retirement plans) that are financed by employers. The Society for Industrial and Organizational Psychology (SIOP) annually conducts a member survey to identify workplace trends. The changing nature of work, especially advances in information technology that require new employee skills and that allow jobs to be performed anywhere and anytime, has made the SIOP Top 10 Workplace Trends list for the past several years. Automation of jobs and tasks, another top trend in this list, also reshapes jobs and requires new skills. In this year's SIOP survey, the "gig economy" (i.e., contract work) moved from number 10 in 2018 to number 4 (Rebar, 2019; www.siop.org). Negative economic trends intersecting with workplace trends like these have the potential to disrupt career paths, and career counseling that incorporates interest assessment is an intervention that can help clients manage their careers in environments that require flexibility and continuing education (Lent, 2018).

Interest inventories also are used in employment settings for selection to help employers determine those job candidates who will be most likely to complete training, stay with the company, and be successful. Some employers also use interest inventories for placement to help workers find the right position within the company especially when exceptional employees have become dissatisfied with their current positions but wish to remain with the company in another role. Conversely, career counseling that incorporates the use of an interest inventory can be very helpful with displaced employees who have been downsized, terminated, or disabled. In sum, exploration that includes interest assessment can be valuable throughout the life span: first for educational and job decisions, then again as people seek more challenging work, then perhaps at some point if they question an initial decision, and once again, if they experience career plateaus or job loss. As people approach retirement, they may repeat the process of exploring their interests, focusing on ways to make the transition from actualizing their vocational interests to engaging in activities that reflect their leisure interests (Hansen, 2013; Hansen & Scullard, 2002).



P–E INTEREST CONGRUENCE AND SATISFACTION AND PERFORMANCE

Research on job satisfaction has shown that a plethora of variables contribute to the prediction of a satisfied outcome (Lent & Brown, Chapter 23, this volume). The role that interests play in job satisfaction usually is studied by examining the congruence or match between an individual's measured interests and the interest requirements of the environment in which she or he works. Typically, these studies look at higher-order interests such as Holland's six types. The results from these studies, even those using meta-analysis, are mixed, but generally the correlation between person–environment interest congruence and satisfaction is about .25–.30 (Hansen, 2013) and between interests and performance the correlation is about the same (Nye, Su, Rounds, & Drasgow, 2012).

Intuitively, one expects the correlations between P–E interest congruence and satisfaction to be larger. One popular explanation for the smaller than expected relation is the restricted range (which can decrease correlations) in people's job satisfaction (Dik & Hansen, 2008). That is, because most people express at least moderate satisfaction with their work, scores on satisfaction measures do not cover the entire range of possible scores (few scores occur in the unsatisfied range). Another explanation is that moderator variables, such as occupational level, career stage, Holland type, personality type, values, group importance, job involvement, and career salience, play a role in reducing the correlation (Dik & Hansen, 2011). Moderation occurs when a relationship between two variables is affected by a third variable. For example, Dik and Hansen (2011) found high congruence between interests and vocation predicted intrinsic satisfaction for people with low intrinsic motivation, but for those scoring high on intrinsic motivation, congruence between interests and job did not predict satisfaction. In this case, the relationship between congruence and satisfaction was moderated (i.e., affected) by the third variable, intrinsic motivation.

A third explanation for lower than expected correlations between P–E interest congruence and satisfaction focuses on the measurement of the satisfaction criterion. Multifactor or facet measures of job satisfaction seem better suited to tease apart the relation between P–E congruence than are global measures. For example, correlations around .40 have been found between congruence and satisfaction with more specific job facets, such as pay, coworkers, and promotions (Hansen, 2013).

A fourth explanation centers on the level at which interests are assessed in most congruence–satisfaction studies. Often in studies showing relatively modest correlations, interests are measured and work environments are coded using Holland's six types, which represent higher-order interests. However, studies conducted at a lower-order level of interest assessment



(e.g., Occupational Scales (OS)) suggest that a large proportion of people (e.g., 70–80%) who are satisfied with their jobs score high on OS that match their chosen occupations or college majors (Hansen & Dik, 2005; Pendergrass, Hansen, Neuman, & Nutter, 2003). Finally, the way in which congruence is operationalized also may affect the congruence–satisfaction relation (Bai & Liao, 2019; Dik, Hu, & Hansen, 2007; Earl, 2014).

Well-being criteria, other than work satisfaction, shown to be positively related to P–E congruence include life satisfaction, meaningfulness, happiness, self-image, and self-esteem (Dik & Hansen, 2008; Hansen & Ton, 2001). Criteria negatively related to P–E congruence include somatic complaints, burnout, and anxiety. P–E congruence also is related to persistence (i.e., tenure), educational and vocational stability, adjustment, and achievement (Harms, Roberts, & Winter, 2006; Porter & Umbach, 2006). However, combining interests and abilities or aptitudes appears to improve predictions of achievement in work and academic settings beyond the levels that can be achieved using either construct alone (Wise, McHenry, & Campbell, 1990). The data support Strong's early contention that people will do well in an occupation if they have both the necessary interest and ability, but that people with only ability and no interest can do well but may not (Strong, 1943). In the same way that the combination of interests and abilities predicts success and performance better than either does alone, incorporating values also can improve the prediction of work outcomes, for example, job satisfaction (Rounds, 1990), organizational commitment (Kristof-Brown, Zimmerman, & Johnson, 2005), ethical behavior (Suar & Khuntia, 2010), and team performance (Chou, Wang, Wang, Huang, & Cheng, 2008).

METHODS OF INTEREST INVENTORY SCALE CONSTRUCTION

Historically, three methods have dominated the development of interest inventories: rational–theoretical, the empirical method of contrast groups, and item clustering. In the course of interest inventory development, all three methods or combinations of these methods ultimately may be employed. The rational–theoretical approach begins with a well-defined construct. Ideally, this approach relies on theory for the definition of the construct to be measured and for item development and selection. The definition of the measured construct, the item content, and the use of psychometric data to relate scores to measures of other theoretical constructs contribute to the interpretation of the scales. The empirical method of contrast groups is based on the assumption that individuals postulated to differ on the construct also will differ in their responses to test items. Items are selected for inclusion in the test because they discriminate significantly between two or more groups hypothesized to differ on a criterion or construct.



The empirical method of clustering relies most heavily on statistical analyses (e.g., factor or cluster analysis) to identify underlying dimensions in a large pool of items. The dimensions then become the basis for the scales used to measure the constructs which, in turn, contribute to the interpretation of the scores. In practice, the various approaches to test development often are used in a logical sequence. Theory is used initially to generate potential items for each interest scale. Then, empirical relationships (i.e., from factor analysis or clustering) may be used to retain, reject, or modify items. Interpretation of scores from the scales derived by this process has the advantage of a theoretical and empirical foundation for the underlying dimensions represented by the test.

ASSESSMENT OF INTERESTS

Three of the most frequently used interest inventories are the Self-Directed Search (SDS; Holland & Messer, 2013a), SII (Donnay et al., 2005), and the Campbell Interest and Skill Survey (CISS; Campbell, Hyne, & Nilsen, 1992). All three of these instruments include scales to measure Holland's six types. However, the SII and the CISS measure interests at three levels of specificity, whereas the SDS only focuses on the broad Holland types. Although the SII and the CISS profiles include sets of scales that resemble one another, their approaches to norming and standardizing the instruments differ. Another notable difference between the SII and the CISS is the inclusion of Skill scales on the CISS that parallel the Interest scales. The Skill scales are designed to provide an estimate of the individual's ability to do tasks related to the interests measured by the Orientations scales, BIS, and OS. The SII does have a companion instrument, the Skills Confidence Inventory (Betz, Borgen, & Harmon, 1996), that provides skill estimates for the six Holland types, but the CISS has Skill scales that match all of the Interest scales reported on the CISS profile.

SELF-DIRECTED SEARCH

Holland developed the SDS, first published in 1971, as a vehicle for assessing a person's resemblance to each of his six vocational personality types (Holland, 1997). Holland selected items for the SDS using his theoretical model, which is based on "voluminous data about people in different jobs" (Holland, 1985, p. 3). The six scales are Realistic (works with things, practical and concrete), Investigative (works with ideas, analytical and scientific), Artistic (works with ideas, creative and imaginative), Social (works with people, empathetic and warm), Enterprising (works with people, ambitious and domineering), and Conventional (works with data, detail-oriented and



conscientious). Although any combination of types is possible, the closer the types are on the hexagon, the more likely they are to appear together as a person's pattern of interests or as the pattern of activities that occur in a work environment (Nauta, Chapter 3, this volume).

The SDS item pool is composed of 139 items dispersed over four sections: work activities, self-estimated competencies, occupations, and self-estimates of abilities that represent each of the six types. The fifth edition of the SDS is recommended for clients who are 11 years of age or older and who have a 7th-grade reading level. Form Easy (E) is available for individuals who read at about the 4th-grade level (Holland & Messer, 2013a). PAR, Inc., the publisher of the SDS, notes that 35 million administrations of the SDS have been done, and the SDS has been translated into 25 languages. The SDS most often is given as a self-administered, self-scored, and even self-interpreted interest inventory. However, a computer-administered and scored version is available through the publisher's SDS-dedicated website (<http://www.Self-Directed Search.com>) and through PARi Connect, an online assessment system. A scoring key is used to compute raw scores on the six scales that can be interpreted directly for a client, or scores can be compared to various norm groups provided in the manual (e.g., high school girls and boys, college women and men). The three highest raw scores are used to form a summary code, which is used to identify vocational and educational opportunities that incorporate similar interests represented in the individual's summary code.

Holland and his colleagues developed an array of interpretive materials to be used with the inventory results, including the *Occupations Finder* (Holland & Messer, 2013b) and the *Educational Opportunities Finder* (Messer & Holland, 2013), which provide Holland codes for occupations and educational programs. In addition, *The Veterans and Military Occupations Finder* (Messer, Greene, & Holland, 2013) links the *Military Occupational Classification* (MOC) to Holland types with two-letter codes. The *Leisure Activities Finder* (Messer, Greene, Kovacs, & Holland, 2013) matches 840 leisure activities to the six Holland types. These resources are very useful for matching scores on the six broad types to possible occupations, majors, and activities for a client to consider.

The SDS has been used extensively in vocational psychology research for the past 40 years. As a result, a wealth of evidence for the validity and reliability of the SDS has been aggregated. Over 2-week to 2-month to 4-month test-retest intervals, the median scale score reliability coefficients range from .95 to .88, respectively. Studies examining evidence of the concurrent validity of the SDS suggest that adults enter occupations that match their high point code about 60% of the time. The evidence for predictive validity for SDS scores is more variable and depends on the length of time between initial testing and the follow-up assessment, age at initial testing, and educational



level. Generally, studies show that between 35 and 66% of college students and adults are in majors and occupations that match their summary code's first letter (Holland & Messer, 2013a).

STRONG INTEREST INVENTORY

The SII was first published in 1927 under the title Vocational Interest Blank (Strong, 1927b). The item pool for the SII (Consulting Psychologists Press, 2004) currently includes 291 items divided into six content areas: occupational titles, school subjects, work activities, leisure activities, self-characteristics, and preferences in the world of work. The reading level is estimated to be at about the 8th grade. The SII is a comprehensive survey that provides several levels of analysis of an individual's interests. At the highest order and broadest level are the six general occupational themes (GOTs) developed to measure the six RIASEC vocational types proposed by Holland. Within career counseling, these scales address the question, "What am I like?"

The original GOTs were developed using a sequential method of scale construction. First, items were selected that represent the definitions and descriptions that Holland proposed for each of the six types. Then, item statistics (i.e., intercorrelations) were used to select those items that contributed to the homogeneity of the scales. The GOTs were modified as part of the 2004 revision of the SII; Cronbach's alphas range from .90 to .95. Test-retest stability over intervals less than 8 months range from .84 (Artistic) to .89 (Realistic). Over intervals of 8–23 months, the stability coefficients range from .80 (Artistic) to .92 (Realistic). Evidence of validity for the GOT scores includes (a) large correlations between same-named scales on Holland's Vocational Preference Inventory (VPI; Holland, 1975) and the SII, and (b) evidence of the power of the GOTs to separate occupational groups over about three standard deviations of scores in a logical way (e.g., engineers and electricians score high, and mental health workers and reporters score low on the Realistic theme) (Hansen & Campbell, 1985). The GOTs are standardized on a combined-gender sample with the mean for this groups set at 50 and a standard deviation of 10. Thus, a score of 50, based on the combined-gender norms, is considered average. In addition, an interpretive comment (very little interest to very high interest), based on the test taker's declared gender, is provided for each scale.

The 30 BISs represent the next level of specificity, and scores on these scales help the client to answer the question, "What do I like?" They include scales such as Mechanics and Construction, Medical Science, Visual Arts & Design, Counseling & Helping, Entrepreneurship, and Office Management. The original BISs were developed using the empirical method of clustering.



Subsequent versions of the BIS have relied on factor analysis. As one would expect based on these methods of scale construction, the item content of each scale is homogeneous, with alpha coefficients ranging from .80 (social services) to .92 (computer hardware and electronics). Similar to the GOT, evidence of validity for the BIS scores consists of studies examining the extent to which the scales differentiate occupations in a logical manner (e.g., auto dealers and life insurance agents score high, and psychologists and physicists score low on the sales BIS) (Hansen & Campbell, 1985). Like the GOT profile report, the BISs are presented on the profile with standard scores, based on a combined-gender sample, and interpretive comments based on the person's declared gender.

The OSs provide the greatest level of specificity of interest measurement on the SII and answer the question, "Who am I like?" They compare the interests of the respondent directly to those of people employed in the occupation who are satisfied with their work. A total of 130 occupations are represented on the profile; about 25% of the scales represent occupations that typically can be entered without a college degree (e.g., carpenter, cosmetologist, florist, optician, respiratory therapist), and the remainder represent occupations of a more professional nature (e.g., architect, registered nurse, psychologist, social science teacher, executive). Standard scores of 40 or higher, for a respondent, on the OS indicate similarity to workers employed in the occupation.

The OSs are constructed using the empirical method of contrast groups. The technique used with the 2012 revision of the SII identified 12–45 items for each OS that differentiate the likes and dislikes of women or men in the occupation from women-in-general or men-in-general (called the *general representative sample*). The item content of the OS is heterogeneous and, therefore, internal consistency measures of reliability are not meaningful. However, because the scales are used to make decisions about college majors and careers, the concept of scale score stability is very important for this set of scales. The median test–retest correlation for the OS is .86 with a range of .71–.93 over an interval of 2–23 months (Donnay et al., 2005; Herk & Thompson, 2012). Evidence of the validity of the OS was a major research focus of early authors of the SII (e.g., Hansen & Campbell, 1985; Strong, 1943). One study has shown evidence of concurrent validity for the GOT, BIS, and Personal Styles Scales (PSS) on the 2004 SII (Gasser, Larson, & Borgen, 2007). However, no predictive validity evidence has been reported for the 1994, 2004, or 2012 editions of the OS. Therefore, much of the evidence of validity for the 2012 version of the SII relies on generalizing from earlier studies.

Two studies (Savickas, Tabor, & Spokane, 2002; Sullivan & Hansen, 2004a) have demonstrated that scores on the SII correlate substantially with scores



on same-named scales on other interest inventories (e.g., the CISS, the SDS, the Kuder Occupational Interest Survey, and the Unisex Edition of the ACT Interest Inventory). These same studies have shown that SII scale scores have small correlations with scores on other interest inventory scales that are unrelated. For example, the median correlations reported for same-named scale scores for the SII and CISS were .62 and .66 for samples of women and men college students, respectively. For the same samples, the median correlations between nonmatching scales (e.g., conventional and creating) were .05 and .06.

The extent to which the OS predict educational and occupational choices is a line of evidence of validity for SII scores that has been developed throughout the history of the inventory. The typical method for examining concurrent and predictive validity (collectively labeled *criterion validity*) involves comparing scores on the OS to declared choices. In the case of concurrent validity, the research participants complete the SII and provide information about their current occupations or educational choices at the same time. In the case of predictive validity, the research participants complete the SII at Time 1; then, at some time in the future (usually after several years have passed), they are contacted to participate in a follow-up study to determine their educational choice or occupation at Time 2.

The summary statistic reported in these studies simply provides the percent of participants who scored high on OS that match their choices (e.g., a participant who scored high on the Reporter Scale and is majoring in journalism or who scored high on financial analyst and works in that field). The results from these studies are quite stable from one study to the next and from one version of the SII to another. Generally, the concurrent studies show matches for about 75% of the sample and the predictive studies show matches of about 70–75% over Time 1–Time 2 intervals of 4 years and about 60–65% over Time 1–Time 2 intervals of 12 years (Hansen & Dik, 2005; Hansen & Swanson, 1983).

The fourth set of scales presented on the SII profile is five PSS. The Learning Environment (LE) Scale measures the extent to which an individual has interests similar to others who persist in academic environments. People who score high on the scale often are interested in learning for learning's sake and often aspire to complete graduate degrees. People with average scores on the LE Scale have academic interests similar to people who have completed undergraduate college degrees, and people with low scores are similar to those who do not pursue college degrees. Studies examining evidence of validity for the LE Scale indicate that the scores are not related to ability. Rather, interests of those who score low on the scale tend to reflect an interest in education for the practical knowledge that can be gained and directly applied to the work setting. The Cronbach's alpha for the LE Scale is .76 and test-retest stability over 2–23 months is .88 (Donnay et al., 2005).



The Work Style (WS) Scale on the current SII reflects interests of those who enjoy spending time with and working with people (high scores), as well as those interested in activities that allow them to work with ideas, data, and things (low scores). For example, childcare providers, flight attendants, and life insurance agents score high, and biologists, computer programmers, and physicists score low on WS. Cronbach's alpha for the WS Scale is .86 and test-retest over 2–23 months is .91. The third scale is the Risk-Taking (RT) Scale, which measures a willingness to try new things and to take social, financial, and physical risks (high scores). Electricians and police officers score high, and dental assistants and mathematicians score low. Cronbach's alpha for the RT Scale is .82 and test-retest over 2–23 months is .86.

The Leadership Style (LS) Scale correlates with introversion–extroversion. High scores reflect an interest in leading and managing others, whereas low scores reflect the interests of people who prefer to work alone. Corporate trainers and public administrators score high, while auto mechanics and farmers score low on LS. Cronbach's alpha for the LS Scale is .87, and test-retest over 2–23 months is .86. The most recently developed Personal Style Scale is the Team Orientation (TO) Scale, which correlates .55 with the LS Scale (Donney et al., 2005). The TO Scale has two poles that range from an interest in accomplishing tasks independently to an interest in accomplishing tasks collectively. The Cronbach's alpha for TO is .86 and the test-retest coefficient over 2–23 months is .74.

The five PSS are normed on a sample of adult women and men drawn from a large number of occupations. The mean for this people-in-general sample is set equal to 50, and the standard deviation is set at 10. Generally, scores on the PSS that are above 55 are considered high and scores below 45 are considered low.

CAMPBELL INTEREST AND SKILL SURVEY

The CISS (Campbell et al., 1992) is a 320-item instrument that assesses vocational interests (200 items) and self-estimates of skills (120 items) in parallel fashion. Thus, the profile reports two scores (i.e., interest and skill) for each of the 98 scales. Combining self-estimates of interests and skills into one inventory was a unique approach at the time of publication of the CISS in 1992. The reading level is estimated at the 6th-grade level. All of the scales on the CISS are normed and standardized on combined samples of women and men drawn from a large variety of occupations. The mean for this sample is set equal to 50 with a standard deviation of 10. The profile provides interpretive comments, based on the respondent's interest and skill scores on each scale, that advise a course of action for the individual to consider: "pursue" (high interest and high skill); "develop" (high interest and low skill); "explore" (low interest and high skill), and "avoid" (low interest and low skill).



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The types of scales presented on the CISS profile are similar to those on the SII. At the most general level, the CISS features seven Orientation Scales. Six of the seven scales measure Holland's six types: the Producing, Analyzing, Creating, Helping, Influencing, and Organizing scales measure, respectively, RIASEC interests. The seventh Orientation Scale is Adventuring, which measures an interest in physical and competitive activities and risk-taking. Evidence of construct validity for the Orientation Scales suggests that, with the exception of the Adventuring Scale, the Orientation Scales are good representatives of Holland's six types (Sullivan & Hansen, 2004a). The median correlation between matching CISS and SII GOT scales is about .70. For nonmatching scales, the median correlation is about .16. The correlation between CISS Adventuring and SII Risk-Taking Scale scores is large ($r = .65$), indicating that the CISS Scale, similar to the SII Scale, is a measure of willingness to take risks, to try new activities, and to be spontaneous. Like the SII GOTs, the CISS Orientation Scales have homogenous item content, large alpha coefficients (ranging from .82 to .93), and robust test-retest correlations (median $r = .87$ for interests and .81 for skills over 90 days) (Campbell et al., 1992).

The 29 BISs measure more specific interests than do the Orientation Scales and include some interests not represented among the BIS on the SII, including adult development, child development, international activities, fashion, woodworking, and animal care. Conversely, the SII includes BISs that measure interests not represented on the CISS profile: health care services, and programing & information systems. The alpha coefficients for the BISs range from .69 to .92, with a median of .86 for the Interest scales, and from .62 to .87 with a median of .79 on the Skill scales. The median test-retest coefficient over a period of 90 days is .83 for the Interest scales and .79 for the Skill scales (Campbell et al., 1992).

Evidence of validity for the BIS includes (a) large correlations with SII scales that measure similar interests (e.g., correlations of .86 between SII and CISS Science scales and .77 between SII teaching and CISS adult development) (Sullivan & Hansen, 2004a), and (b) the ability of the Interest and Skill scales to differentiate samples of people from various occupations in a meaningful way. For example, occupations that have high mean interest scores on CISS mechanical crafts include airline mechanics, test pilots, and carpenters; occupations that have low mean scores on this scale include secretaries, social workers, and nursing administrators (Campbell et al., 1992).

The 60 OSs on the CISS were constructed using the empirical method of contrast groups that also is used to construct SII OSs. The CISS and SII OSs do differ in several important ways, however. First, the SII OSs are separate-sex scales; in other words, for each occupation one scale was developed based on women in the occupation contrasted with women in general, and another



scale was developed based on men in the occupation contrasted with men in general. The CISS scales, by contrast, are combined-sex scales that used criterion (i.e., occupations) and contrast (i.e., people in general) samples composed of women and men to develop the scales. Another difference is the way in which the scales are normed and standardized. The SII scales are normed on the occupational criterion sample with the mean set equal to 50. Therefore, a score of 50 on the SII OS indicates strong similarity in interests between the individual taking the inventory and the people in the occupation. However, the OSs on the CISS are normed on people in general sample such that a score of 50 indicates little similarity with people in the occupation; rather, scores on the CISS suggesting strong similarity in interests between the individual and the people in a particular occupation are in the range of 65–70.

The *CISS Manual* (Campbell et al., 1992) reports the power of each Interest and Skill scale to discriminate between people in the general population and those in specific occupations using Tilton's overlap statistic. Generally, the mean score for people in general on the Skill scales is about 1.8 standard deviations below the mean score for the occupational criterion samples (range from .9 to 3.5 standard deviations). For the Interest scales, the mean for the people in general is about 2 standard deviations below the mean for people in the occupation (range from 1.2 to 2.9 standard deviations). In addition, two studies demonstrated evidence of convergent and discriminant validity of scores on the Interest scales with Kuder and SII OS scores (Savickas et al., 2002; Sullivan & Hansen, 2004a).

Evidence of validity for the Skill Scale scores shows convergence and discrimination for the Skill Scale scores and the CISS Interest Scales, SII, and self-reported Minnesota Ability Estimates Questionnaire (MAEQ) scores (Hansen & Leuty, 2007). The relations between same-named CISS Interest and Skill Scale scores range from .46 (helping) to .71 (analyzing) for females and from .62 (advertising) to .72 (helping) for males. Relations between the CISS Skill Scale scores and MAEQ scores were in the expected directions. For example, influencing scores correlated .40 with verbal aptitude, and the correlation between analyzing and numerical aptitude was .49. The correlations between CISS Interest Scale scores and the MAEQ scores were lower. For example, the correlation between influencing interest scores and verbal aptitude scores was .25, and between analyzing and numerical scores was .41.

Three studies have looked at the concurrent validity of the CISS to predict college majors. The first two studies examined the use of the Interest and Skill scales with college students from a variety of majors (Hansen & Neuman, 1999; Hansen & Leuty, 2007). The results of these studies showed that 69–72% of the women and 76–80% of the men scored high on Interest scales that matched their declared college majors. The hit rates for the Skill Scale scores were slightly lower; 58–61% of the women and 61–69% of the



men scored high on Skill scales that matched their majors. The third study (Pendergrass et al., 2003) examined the extent to which men student athletes chose college majors that agreed with their measured interests. Among the student athletes in nonrevenue sports (e.g., tennis, golf, cross-country, swimming), 74% scored high on Interest scales matching their declared majors. Seventy-one percent of the comparison sample of non-student athletes and 63% of the athletes participating in revenue sports (e.g., basketball, football) scored high on Interest scales matching their declared majors.

Another set of scales on the CISS includes the Academic Focus (AF) Scale, which measures interests and skills related to academic pursuits, and the Extraversion Scale (ES), which measures interests and skills related to social interactions. The Academic Focus Scale was constructed using the empirical method of contrast groups that selected items that differentiated people in general from individuals with high levels of education. The items on the Extraversion Scale are ones that have large correlations with a composite extraversion scale from the Campbell Leadership Index (CLI; Campbell, 1991). The 90-day test-retest coefficients for the AF Interest and Skill scales are .87 and .77, respectively. For the ES, the stability coefficients are .85 for the Interest Scale and .82 for the Skill Scale (Campbell et al., 1992).

As expected, high-scoring occupations on the Academic Focus Interest and Skill scales include those that require college and graduate degrees and have an interest in science and academic topics, such as medical researchers, physicians, and math/science teachers. Low-scoring occupations include those in business fields, such as financial planners, insurance agents, and realtors. High-scoring occupations on the Extraversion Interest and Skill scales include those who work closely with others, such as guidance counselors and corporate trainers; occupations scoring low include those who tend to work alone or with things rather than people, such as chemists and carpenters (Campbell et al., 1992).

USING INTEREST INVENTORIES IN CAREER COUNSELING

The use of interest inventories in career counseling evolved out of career guidance programs that emerged in the 1930s to ease unemployment during the Great Depression. World War II served as another catalyst, as programs were developed, especially through the Veterans Administration, to help returning veterans take advantage of educational opportunities offered through the G. I. Bill to choose new occupations. The University of Minnesota's Department of Psychology, with its emphasis on individual differences, assessment, and applied psychology, became a major research and counseling center with close ties to the Minneapolis VA Hospital.



From this work emerged the trait-and-factor Minnesota point of view of counseling, a model that is very directive and involves providing clients with information and suggestions to guide their decision-making. The assessment of abilities and interests was an important ingredient in early applications of trait-and-factor counseling; later the assessment of needs, values, and personality also was incorporated into the model. Most current models of career counseling still include assessment of interests as an important component. However, fewer models emphasize the need to objectively measure abilities, values, and personality.

ASSESSMENT AS AN INTERVENTION

Finn and his colleagues (Finn & Martin, 2013) promote therapeutic assessment (TA), the use of assessment as an intervention. Therapeutic assessment has been shown to meet standards of evidence-based interventions (Morey, Lowmaster, & Hopwood, 2010), and to result in positive personal change (Ougrin, Ng, Low, 2008; Poston & Hanson, 2010). Much of the empirical work in this area has been done with clients whose diagnoses include anxiety disorders, oppositional defiant disorder, and borderline personality disorder. Many of the 17 studies included in one meta-analysis (Poston & Hanson, 2010) involved only test administration and feedback, in other words as little as two sessions, as the therapeutic intervention. Yet, the results indicated an overall effect size of .42. The ingredients in TA that may explain why brief interventions that include assessment can have therapeutic effects include using test results to change the client's self-narrative or the way in which people view themselves, using TA techniques to involve clients in setting goals for the assessment process, and the power of psychological tests to be "empathy magnifiers" (Finn, 2007).

Although TA may conjure images of the Minnesota point of view, models of career counseling have expanded beyond the old "test 'em and tell 'em approach." As counselors needed better intervention skills to deal with both personal and vocational concerns, they turned to Carl Rogers's nondirective approach. Currently, counselors often augment trait-and-factor interpretation methods with attention to (a) the working alliance, (b) contextual and cultural factors and individual differences that have an impact on decision-making, (c) developmental stages, (d) economic and social realities, and (e) personal issues. Although career counseling has evolved and changed, the philosophy of the Minnesota point of view—assessment of client strengths and weaknesses and the use of test results to make predictions that will garner satisfaction and success for the client—remains relevant.



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Research that combines cognitive abilities, interests, and personality offers a more complete understanding of a client's potential career choices and also suggests that the resulting trait complexes may be more predictive of individual's choices than is any one construct used in isolation (Armstrong & Rounds, 2008). Integrative models (e.g., trait complexes by Ackerman and Heggstad) also provide an empirical foundation to guide the counselor's development of hypotheses about the client and a framework for interpreting results from vocational and psychological tests (Armstrong & Rounds, 2010).

Thus, career counseling approaches that incorporate assessment of multiple constructs allow counselors to more fully understand the client than do approaches that incorporate only interest assessment. Comparing results from ability and personality tests with results from interest and value/needs measures allows the counselor to better understand what motivates the client (interests and values), how the client interacts with others (personality), and the level of complexity at which the client is able to function (abilities). Also, once clients have examined their scores on an interest inventory, they may have difficulty making a decision because the possibilities, based on interests alone, are many and varied. Clients often find additional information helpful at this point to begin to narrow their choices. Having data on abilities, personality, and values provides information that is useful to determine the best P-E fit for the client (Hansen, 2017).

In terms of refining choices, a consideration of abilities helps to determine the level of occupational and educational complexity that the individual will be able to successfully pursue. Understanding personality can provide direction within an organization. For example, a person who scores low on measures of responsibility and assertiveness probably will not make a good manager. In the same way, understanding needs and values can help a person understand how they fit into a work environment. A person scoring high on the need for independence may not appreciate a job with close supervision from a superior. Likewise, those who value achievement will probably want to work in a challenging job.

Unfortunately, financial and time constraints often limit assessment to vocational interests. In those instances, counselors can use past behaviors to help them understand the client more fully. For example, counselors can gather information on performance in coursework and on achievement tests to estimate abilities. They can inquire about what is important for an individual to have in a job, an employer, a work setting, and coworkers to estimate values; and they can ask clients to describe how they interact with others on the job, within their family, and with friends and strangers to better understand their clients' personality and the environments in which they excel.



SELECTING AN INTEREST INVENTORY

Which inventory to use in career counseling depends to some extent on the age of the client and the resources of the counseling agency? Younger clients' (e.g., freshmen and sophomores in high school) interests may not be developed sufficiently to have differentiated scores on occupation-specific scales such as those that appear on the SII or CISS. For younger clients, then, the most useful information probably will come from higher-order scales such as those found on Holland's SDS, the Orientation and Basic Interest Scales of the CISS, or GOT and BIS of the SII. For older high school students, college students, and adults, scales that measure interests relative to specific occupations (i.e., OS) are useful.

The SDS is one of the more economical interest inventories available to consumers primarily because the instrument can be self-scored. Instruments like the CISS and SII, which have a multitude of scores as well as interpretive comments presented on the profile, must be machine-scored, which increases the price of these instruments. The trade-off, then, is the reasonable cost of the SDS versus the more detailed information provided by the CISS and SII. Where cost and access are important considerations, the Interest Profiler, available for free on the O*NET website (www.onetonline.org) is another possibility. The Interest Profiler is a relatively brief, rudimentary interest measure that provides a summary of the test taker's Holland types. Alpha coefficients for the scales assessing Holland's six types range from .82 (realistic) to .86 (conventional), and test-retest coefficients range from .79 (realistic) to .86 (conventional) (Warlick, Ingram IV, Ternes, & Krieschok, 2018).

PREPARING TO USE INTEREST INVENTORIES

To prepare to use interest inventories, counselors should study the inventory's manual. Typically, test manuals include information on the purpose of the inventory and provide an overview of the testing materials. Most manuals describe the way in which the scales were constructed, normed, and standardized; report evidence of reliability and validity; note inventory limitations; and offer suggestions for the use and interpretation of the scale scores. The manual also will provide information that helps the counselor to know what the scale names mean and what scores are considered high, average, or low.

ADMINISTERING AN INTEREST INVENTORY

Interest inventories may be administered either individually or in group settings. Computer-administered versions are increasingly popular and, in



some cases, the traditional paper-and-pencil interest inventory format is no longer available (e.g., SII). Regardless of the administration format or setting, a standardized introduction should be given to orient the client to the testing expectations. Also, for clients who may have difficulty understanding the items, generally providing them with definitions or explanations is permissible to ensure that they understand the items.

PREPARING TO INTERPRET AN INTEREST INVENTORY

Prior to meeting with the client to interpret the test results, counselors should review the profile. This review should include checking validity indices that may indicate some problem with the test administration or client's response, and examining the profile for patterns of interests that emerge across various sets of scales. In addition to providing an assessment of work-related interests, interest inventories also often tap leisure interests and preferences for various types of work, recreational activities, and living environments. Therefore, as counselors prepare for the interpretation session, they should think broadly about the ways in which a client may satisfy the interests that are reported on the interest inventory profile. During the session, clients then can be encouraged to think about ways in which they can satisfy their interests across the many roles in their lives (e.g., worker, family member, leisurite, friend, volunteer) (Hansen, 2000; Hansen, 2013).

INTERPRETING AN INTEREST INVENTORY

Interest inventories help clients to identify their interests in an efficient manner, and during the interpretation session, the scores are used to stimulate discussion about occupations and activities that match their interests. The results also provide a framework for stimulating discussion about options that clients may not have considered in the past and about ways in which some interests may be better satisfied through leisure or volunteer activities than through the world of work. The client-counselor exchange, in turn, is used to verify working hypotheses.

Although viewing test interpretation as a discrete activity within career counseling may be tempting, research has shown that college student clients tend to recall very little about the specific profile results reported to them 1 year earlier (Hansen, Kozberg, & Goranson, 1994). Therefore, the interpretation of test results should be integrated into the overall counseling process. Also, regardless of the interest inventory that has been administered, the exploration of occupational and educational options can be enhanced by using materials tied to Holland's RIASEC coding scheme (e.g., Holland



& Messer, 2013b; Messer & Holland, 2013; Messer, Greene, & Holland, 2013; Messer, Greene, Kovacs, & Holland, 2013). A set of specific steps for interpreting interest inventories appears at the end of this chapter.

The counselor needs to be knowledgeable about the meaning of scale scores to provide the client with accurate information about the results and to convey the nuances of the results. Understanding the nuts and bolts of test construction, as well as knowing the reliability and validity evidence for an instrument, provides a necessary foundation for proper test interpretation. However, counseling skills also are required for interpreting test results, and common intervention techniques such as establishing rapport, developing a positive working alliance, and providing a safe and supportive atmosphere are just as important during test interpretation as during any other counseling session (Hansen, 2017). Communication skills also are important. Throughout the process, the counselor is striving to facilitate the client's active involvement in understanding the results and relating them to the goals of counseling. In subsequent counseling sessions, clients often find it useful to return to their profiles to refresh their memory, clarify results, and integrate the test scores with the exploration process and their counseling goals.

RESPONSIBLE USE OF TESTS

Most test publishers require test purchasers to verify their educational background, training, and experience, and will sell interest inventories only to those who are qualified. Generally, a master's degree, including coursework in psychological testing and measurement, is the minimum requirement. Effective use and interpretation of interest inventories also require training in current testing issues such as the effect of gender differences on interest scores and interpretation and the fair use of interest inventories with diverse racial, ethnic, and cultural groups. Most test publishers have made concerted efforts to insure the basic elements of interest inventories—the items—are relevant for most test takers. These efforts include revising items so that the wording does not suggest in any way that some activities or occupations are not appropriate for all groups and constructing scales that reflect activities that appeal to multiple groups. Also, efforts have been made to collect evidence of validity for test scores for diverse populations and to better understand the nature of differences in interests between women and men and among various cultural groups. Nonetheless, counselors still need to be aware that cultural background and contextual variables may have an impact on test results.



GENDER DIFFERENCES IN INTERESTS

Gender differences in interests have been studied throughout the history of interest measurement, and the results of these studies have guided inventory development. Women and men do report differential levels of interests in some areas—most notably, women express more artistic and social interests and men express more realistic and investigative interests (Morris, 2016; Su & Rounds, 2015). Numerous studies have pointed to these gender differences in interests as an explanation for the underrepresentation of girls and women in STEM (science, technology, engineering, and mathematics) fields (Ceci, Williams, & Barnett, 2009; Schmidt, 2011; Su & Rounds, 2015).

Some have suggested that the differences in interests between women and men will disappear, as the barriers to occupational entry in nontraditional occupations fall. Yet, studies that have examined gender differences in interests at both the item and scale score levels over a 50-year period suggest that gender differences in interests are quite stable and robust (Hansen, 1988). However, a study (Bubany & Hansen, 2011) that used cross-temporal meta-analysis to examine interest stability across birth cohorts suggests some convergence in the interests of female and male college students over the past 30 years. Specifically, gender differences in Investigative, Enterprising, and Conventional interests decreased significantly. However, gender differences in Realistic, Artistic, and Social interests did not decrease. E. K. Strong (1943) was among the first to attempt to develop combined-gender occupational scales. However, he concluded (as have many researchers following in his footsteps) that separate-gender scales were more effective for counseling. This conclusion is especially true for the use of interest inventories with women or men who have interests that are nontraditional for their gender (e.g., women who are farmers and men who are dental hygienists) (Hansen, 1982). Nonetheless, some interest inventories do report scores that are based only on combined-gender samples.

Another strategy used by test publishers to reduce gender bias in interest inventories occurs at the item level. Language that infers that a job or activity is appropriate for only one gender or the other has been eliminated from extant inventory items (as well as interpretive materials). For some interest inventories, new items have been developed that have similar appeal to women and men to replace items that were more stereotypic for one gender or the other. In spite of efforts to develop gender-fair interest inventories, within the broad career counseling context, women and men still may feel restricted in their occupational and educational choices, and, therefore, may need support and encouragement from their counselors to explore more broadly (Hansen, 2017).



CULTURAL DIFFERENCES IN INTERESTS

The relevance of interests across cultures has been examined most often by looking statistically at the relations among Holland's interest types across racial or ethnic groups. Although models have been developed to incorporate social class into career counseling (Juntunen, Ali, & Pietrantonio, Chapter 11, this volume; Perry & Wallace, 2013), relatively little work has focused specifically on the relations between interests and social class. Several large-scale studies using the SII and the UNIACT show that the intercorrelations among the six types fit Holland's circular model for African American, Asian American, Native American, Mexican American, and Caucasian participants (Fouad, Harmon, & Borgen, 1997). This suggests that inventories based on Holland's RIASEC model have validity for diverse populations. Nonetheless, the use of interest inventories with racial, ethnic, and culturally diverse clients may be enhanced if counselors strive to understand the values and attitudes of other cultures and also are aware of their own values and possible biases and stereotypes.

Most of the research exploring the usefulness of interest inventories with ethnic and racial groups has been concurrent validity studies used to assess the extent to which scores on the profiles predict occupational entry or choice of a college major. Generally, American Indian, African American, Asian American, and Latina/Latino students score high on scales representing the occupations or college majors they have chosen at about the same rate as Anglo American students (about 55 to 75%), and the hit rates substantially exceed chance hit rates (about 20 to 25%) (Hansen & Lee, 2007; Haviland & Hansen, 1987). Studies using multiple regression (Diemer, Wang, & Smith, 2010) and multidimensional scaling also have shown that interests significantly predict college major choices for American Indian/Alaska Native, Asian Hawaiian/Pacific Islander, Black/African American, and Latina/Latino youth who attended high school in low-income neighborhoods and for students from the northeast areas of China.

One concern with most interest inventories is that the scales are constructed using samples composed primarily of Anglo Americans. Ideally, then, normative data would be made available by the publisher for various racial, ethnic, and cultural groups. The reality, however, is that this goal is rarely achieved. In lieu of these data, good counseling practice is essential. Another concern is that most interest inventories are administered in English. Clients who do not speak English, or for whom English may be a second language, may not understand the meanings or nuances of some items or the labels for some scales.



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A small number of studies have examined the vocational interests of sexual minority and gender identity individuals. Lesbian women tend to have more Realistic interests than do straight women, and gay men tend to have more Artistic interests than do straight men (Lippa, 2008). Interest scores for bisexual individuals fall between those of gay and straight individuals for each gender (Hansen & Wiernik, 2018). Transgender men (F-to-M transgender individuals) resemble cisgender (non-transgender) men more than cisgender women in interest scores, and transgender women (M-to-F transgender individuals) resemble cisgender women (Lippa, 2001). Although the literature on interests and sexual minority clients is sparse, efforts have been made to articulate guidelines for using career assessments with lesbian, gay, bisexual, and transgender clients (Lyons, Prince, & Brenner, Chapter 12, this volume).

The best practice for counselors, in all settings and with all populations, is to collaborate with clients to gain an understanding of cultural influences, and at the same time to be aware of individual differences that may have an impact on the career decision-making process (see Fouad & Kantamneni, Chapter 10, this volume). These recommendations often are highlighted in the diversity literature, but attending to cultural influences and individual differences for all clients should prove efficacious (Hansen, 2016).

TAKE-HOME MESSAGE: STEPS FOR INTERPRETING INTEREST INVENTORIES

Although counselors will want to develop their own style for interpreting interest inventories—one that blends test interpretation with their theoretical approach to counseling interventions and to career development and decision-making—several basic steps can be incorporated into most interpretations. The order certainly can be changed to individualize the counseling process, but the steps outlined in the following text offer one format frequently used by counselors.

- Review the purpose for taking the inventory and looking at the results.
- Ask for any reactions the client may have had to taking the inventory.
- Remind the client that interest inventories do not measure abilities.
- Ask if the client can predict two or three high scores—usually for the scales that measure the Holland types.
- Briefly describe how the scale scores were derived.
- Explain the way in which the scales are normed and standardized and describe the sample to which the client is being compared.
- Explain the meaning of numerical scores and interpretive comments.
- Describe what the scale name means and give an example of one or two items on the scale.



- Ask the client for reactions to the scores (i.e., how accurate is the picture that the scores paint for the client).
- Ask the client to clarify how they satisfy each of their interests (e.g., work, recreation, social activities) and encourage integration of the results with past and current activities to help understand the results.
- Look for patterns across the profile and ponder ways in which interests in various activities might be combined into a job or career.
- Identify additional related educational or occupational possibilities not reported on the profile that might also satisfy the client's interests.
- Develop a plan with the client for the next steps to take in the career exploration process.
- Ask the client to summarize the results at the end of the session and allow time to discuss any misunderstandings.

CONCLUSIONS

Longitudinal outcome research has shown that students who receive a basic interest inventory interpretation tend to participate more in career exploration activities than do students who have not taken an interest inventory and had it interpreted (Randahl, Hansen, & Haverkamp, 1993). Incorporating interest inventories into career counseling models will provide clients and counselors with information that will assist clients to develop their potential (Hansen, 2017). This is true in career counseling as well as in selection and placement uses of interest inventories (Hansen & Wiernik, 2018). Whether the goal is to enhance an individual's satisfaction with the job or the organization's satisfaction with the individual, knowledge of interests is one component in career counseling that can help meet both of these goals.

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