

## Interest change and continuity from early adolescence to middle adulthood

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**Abstract** The present paper discusses the continuity and change of individuals' vocational interests by reviewing recent research on interest development across the life course. Five forms of change and continuity were proposed to adequately describe interest development. The developmental trajectory of interests based on a recent meta-analysis by Low, Yoon, Roberts, and Rounds (2005) was presented. Mechanisms resulting in change and continuity are discussed within a biopsychosocial context. Implications for understanding the way interests can simultaneously change and become stable were presented.

**Résumé** **Modification et permanence des intérêts du début de l'adolescence au milieu de l'âge adulte.** Le présent article discute la permanence et la modification des intérêts professionnels individuels en faisant la revue de la recherche récente sur le développement des intérêts au cours de la vie. Cinq formes de modification et de permanence sont proposées pour décrire adéquatement le développement des intérêts. On présente la trajectoire développementale des intérêts basée sur une récente méta-analyse de Low, Yoon, Roberts et Rounds (2005). On discute les mécanismes aboutissant à une modification et à une permanence dans un contexte biopsychosocial. On présente les implications pour la compréhension de la manière dont les intérêts peuvent simultanément se modifier et demeurer stables.

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**Zusammenfassung Veränderung und Kontinuität von Interessen zwischen früher Jugendzeit und mittlerem Erwachsenenalter.** Dieser Artikel diskutiert die Kontinuität und die Veränderung von individuellen beruflichen Interessen, indem er aktuelle Forschungsergebnisse zur Entwicklung von Interessen im Lebensverlauf analysiert. Fünf Formen von Veränderung bzw. Kontinuität werden vorgeschlagen, um so die Entwicklung von Interessen angemessen zu beschreiben. Die entwicklungsorientierte Trajektion von Interessen auf der Grundlage einer aktuellen Meta-Analyse von Low, Yoon, Roberts und Rounds (2005) wird vorgestellt. Mechanismen, die zu Veränderung bzw. Kontinuität führen, werden in einem biopsychologischen Zusammenhang diskutiert. Es werden Ansätze für das Verständnis vorgestellt, in welcher Weise Interessen sich gleichzeitig verändern und stabilisieren können.

**Resumen Cambio y continuidad de los intereses desde la Adolescencia Temprana a la Adulthood Media.** Este artículo estudia la continuidad y el cambio en los intereses vocacionales de los individuos a través de la revisión de las investigaciones recientes sobre el desarrollo de los intereses a lo largo del ciclo vital. Se propusieron cinco modalidades de cambio y continuidad para describir adecuadamente el desarrollo de los intereses. Se presentó la trayectoria evolutiva de los intereses basada en un reciente meta-análisis realizado por Low, Yoon, Roberts, Round (2005). Se discuten los mecanismos que conducen al cambio y a la continuidad dentro de un contexto biopsico-social. Se presentan las implicaciones para comprender la forma en que los intereses pueden cambiar y volverse estables de manera simultánea.

Work is central to most individuals' lives: a large proportion of our waking time is spent at work or in preparation for work; work settings constitute in most countries and cultures a substantial and influential part of our daily lives. Vocational interests are a major determinant of career choice and entry (Fouad, 1999), playing an important role in most, if not all, contemporary theories of career development from both U.S.-based (e.g., Holland, 1997; Lent, Brown, & Hackett, 1994) and international (e.g., Guichard, 2005) perspectives. Knowledge of the development of interests can inform important questions in the conceptualisation of career preparation, entry and change and educational and vocational counselling. Vocational interests determine to a large extent the range and the type of roles we undertake, as well as our social interactions.

The idea that interests are stable dispositional attributes is central to all considerations of the construct, especially in its primary purpose in facilitating the fit between people and their environments. After all, "extreme fluctuations in interest areas of young persons over a period of time would defeat any predictions based on them" (Herzberg, Bouton, & Steiner, 1954, p. 90). In line

with the general psychological suppositions about trait development, vocational interests are believed to be in a state of flux during adolescence as the individual undergoes a period of identity formation, cognitive and socio-emotional development, hormonal, physiological and somatic changes as well as shifts in roles within the family, at school and with peers. Interests subsequently become increasingly crystallised and stable until such a time past early adulthood. By age 30, traits, including vocational interests, are assumed to become “set like plaster,” with little if any changes expected for the remainder of the life course (Campbell, 1971; Costa & McCrae, 1997). But what does the longitudinal data on the stability of vocational interest actually show? At what points in the life course do interests become stable? And is there room for continued change throughout development? The purposes of the present paper were to: (a) review the five different methods of understanding continuity and change in interests across time; (b) review the meta-analytic evidence related to the most popular ways of indexing change, as well as empirical studies on the less studied methods; and (c) discuss the mechanisms that appear to govern interest change and continuity during adolescence and adulthood.

### **Types of longitudinal change and continuity**

To draw conclusions about the continuity and change of vocational interests across the life course, we must distinguish among the different ways interest stability can be studied. Five forms appear to be needed to adequately describe the development of interests: rank-order stability, profile stability, mean-level stability, structural stability, and congruence (or interest-fit) stability.

*Rank-order stability.* Continuity and change in vocational interests are most commonly studied in the context of correlations between scale scores between two time-points. These rank-order correlations represent the changes in the relative placement of individuals within a group on a particular interest dimension between two or more time points and are typified by test–retest reliabilities of scale scores.

*Profile stability.* Whereas rank-order stability indexes longitudinal change in one interest domain, profile (or ipsative) stability is evaluated through the correlations of configurations (or profiles) of salient interest dimensions for the same individual at different time points, averaged across all members of a group.

*Mean-level stability.* Mean-level changes in vocational interests are dependent on whether groups of people increase or decrease on different interest dimensions over time. If groups of people show consistent mean-level changes over a certain age period, then it can be argued that interests undergo normative growth or decline that are consequences of maturational or historical processes shared by most of the members of a population.

*Structural stability.* There is robust empirical support demonstrating that Holland's circular RIASEC model fits data developed to measure the six RIASEC types (e.g., Day & Rounds, 1998). Structural stability using Holland's interest measures can be assessed by change in the RIASEC structure at different time points. A frequent method of testing Holland's circular structure is the Correspondence Index (CI, Hubert & Arabie, 1987) which provides a normalised descriptive index of the extent to which the hypothesized ordering of RIASEC types is met by a correlation matrix among RIASEC scales (Rounds, Tracey, & Hubert, 1992). Changes in structure can then be described as differences in the CI at different time points. The CI does not, however, provide a spatial representation of the correlation matrix, and it is possible for a matrix with a high CI value to produce a spatial representation that does not resemble Holland's circular model (Rounds, 1995). A method that has advantages over the CI is Circular Unidimensional Scaling (CUS, Hubert, Arabie, & Meulman, 2006). CUS addresses many of the limitations of previous techniques. CUS provides a more effective strategy for addressing the two essential elements of Holland's circular structure: The ordering and spacing of RIASEC types around a circle. With CUS, the fit of the circular model is determined using a variance-accounted-for (VAF) measure comparing the original data to the fit distances obtained in the CUS analysis and comparisons can be made across time. A final approach is to model change using longitudinal structural equation modelling procedures. Using Holland's RIASEC model as a basis, individual items, basic interest or occupational interest scale scores can be used as latent variable indicators (Armstrong, 2005). By incorporating latent growth factors (i.e., intercept and slope) into the model, it allows the answer to such crucial questions as whether individuals with higher interest scores on certain interest dimensions demonstrate greater/less change over time than those with lower scores.

*Congruence stability.* As one of the most popular means for characterising, comparing and matching persons and environments, there has been extensive research on the goodness of fit between one's interests and the environment (Low & Rounds, 2006; Spokane, Meir, & Catalano, 2000). Fit or congruence can be operationalised through a number of algorithms of varying complexities, all of which are simply psychometric derivations of the degree of commensurability between the person's interests and his or her occupation. Although the most widely-used congruence indices are based upon person-environment comparisons as described by Holland's RIASEC typology (see Young, Tokar, & Subich, 1998 for a review), there are other ways of quantifying degree of fit. For example, the occupational scales of the Strong interest inventories are empirically derived scales composed of items that maximally differentiated specific occupational groups from the general public. A person's score on an occupational scale is an index of how similar (i.e., congruent) he or she is with members of that occupation. A study of changes of an individual's scores on occupational scales over time is thus a study of changes in congruence as well. Nonetheless, there is surprisingly little research on changes in congruence over time; the more popular approach has been to

match vocational interests of individuals assessed at the one time-point with their occupations or academic majors at the second time point.

It should be noted that the existence of one form of stability does not rule out the possibilities of other types of change. For example, as an 16-year-old girl proceeds through the end stages of puberty and adolescence, normative neurological development resulting from puberty may lead to increases in motivational drives for novel adult experiences (Chambers, Taylor, & Potenza, 2003), resulting in mean-level increases across all her interests compared to when she was 10. If she becomes more interested in systematic observation and investigation of phenomena compared to working with people, the configuration (or profile) of her interests has changed across time. However, if she maintains her ordinal position within a group of her peers (e.g., she retains her interest in helping others), her rank-order in terms of social service interests remains unchanged. During the same period, she remains committed to her aspirations of working in the medical field, she continues to take classes in biological sciences and be involved with activities in her school's biology club. In other words, there is little change in the congruence between her interests and her academic environment. In the meanwhile, she realises that she wants to be a doctor rather than a nurse—the relations of her different interests as they relate to each other in two-dimensional Euclidean space progressively resemble the circumplex structure of adult vocational interests. This example demonstrates that the various types of change are not always statistically or conceptually related. Therefore, when evaluating the continuity and change in vocational interests across a certain age period, it is important to consider and differentiate between the various ways of studying stability.

### **Development of vocational interests**

Given the historical emphasis of vocational interest research on facilitating fit between person and environment, most of the research on interest development has centred primarily on students between middle adolescence (ages 15–16) and emerging adulthood (ages 21–22). A small body of literature on children's interests focuses largely on aspirations. Research indicates that children are able to articulate their aspirations from as young as age four (Trice & Rush, 1995), although these aspirations tended to reflect children's perceptions of the masculinity–femininity of specific job titles.

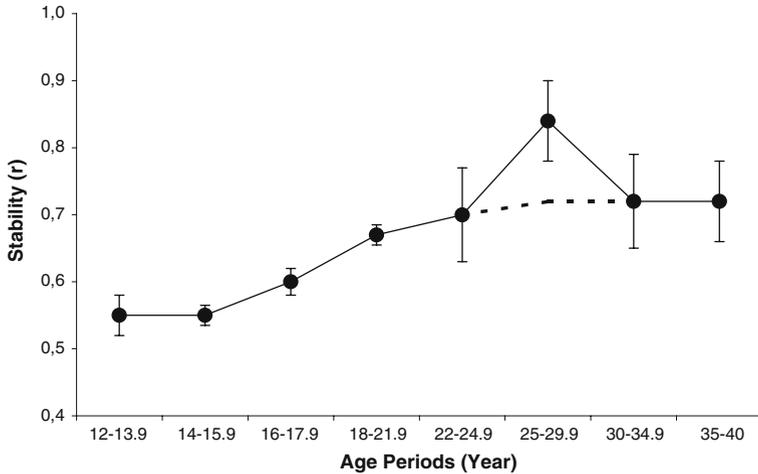
There is a paucity of research regarding changes in structural and congruence stability across time. Most of the studies on structural stability focus on middle school and high school students, and are dependent on comparing correspondence indices at different time points (e.g., Tracey, Robbins, & Hofsess, 2005). In general, these studies have found an increased adherence to Holland's circumplex structure as individuals progressed through early adolescence to middle adolescence, after which interest structure appears to change very little, if at all, during the remainder of adolescence. Similarly, overt empirical research on congruence change is fairly limited. In a notable

example, Tracey and Robbins (in press) examined the changes in interest-academic major congruence of a national sample of college students whose interests were assessed through the UNIACT during their junior/senior year in high school. Their results indicate that interest congruence underwent small amounts of change during the college years, and that these changes were moderated by how congruence is measured.

Qualitative (Campbell, 1971; Swanson, 1999) and quantitative (Low, Yoon, Roberts, & Rounds, 2005) reviews of longitudinal studies indicate an impressive consistency in the direction of adults' interests over time. Results of test-retest studies using various versions of the *Strong Interest Inventory* (SII; Donnay, Morris, Schaubhut, & Thompson, 2005) demonstrated robustness in stability across long time periods, both in individuals' interest configurations (profile stability; Swanson & Hansen, 1988) and in their relative placement within a group (rank-order stability; Strong, 1951).

In a meta-analytic review of 66 longitudinal studies on rank-order and profile stability, Low et al. (2005) estimated the stability of vocational interests at different life stages. Interests were observed to be relatively stable, even at early adolescence. Stability estimates for the age periods (i.e., ages 12–13.9, ages 14–15.9 and ages 16–17.9) prior to graduation from high school, remained unchanged during the period (see Fig. 1) as evidenced from 95% confidence intervals that overlapped each other to large degrees. During the college years, interest stability increased dramatically from its previous estimates of about .55 to .67. Although estimates continued to fluctuate after the college years, the apparent peak at ages 25–29.9 is by a comparatively smaller sample and a 95% confidence interval with overlaps with the intervals of the preceding and subsequent age categories. Results thus suggest that contrary to popular notions about interest development, rank-order and profile stabilities of vocational interests change very little during the greater part of adolescence. Stability rises markedly only during the beginning of emerging adulthood (i.e., ages 18–21.9), and subsequently plateau for the remainder of the next two decades. These findings, graphed as an age trajectory in Fig. 1, permit the debate of possible person–environment transactions responsible for the observed developmental trend.

Based on conventional wisdom about biopsychosocial changes during adolescence, adolescents' interests can be expected to become progressively more stable with age—in part because of cognitive maturity, accumulated exposure to educational and vocational information and increased mastery of their environments. However, contrary to popular belief, we found the stability of adolescents' interests remained consistent for the entire period prior to graduation from high school (Low et al., 2005). The lack of change in rank-order and profile stability may be a consequence of the way the academic curriculum is structured in the United States and other developed countries. For instance, opportunities for students in U.S. schools to observe and participate in adult activities are scarce (Task Force on Education of Young Adolescents, 1989). Moreover, classroom instruction is typically divorced from social contexts. Without an adequate understanding of workplace roles



**Fig. 1** Adjusted population estimates of mean interest stability across age categories. hypothesized stability. Error bars indicate 95% confidence intervals for each age group. Dashed line indicates hypothesized stability. (Adapted with permission from Low et al. (2005))

and demands, and befitted of the ability to choose or manipulate their environments, there is little internal or external press towards crystallisation of adolescents' interests.

The marked increase during the age period of 18 to 22 years coincided with the societal ritual of entry into emerging adulthood (Arnett, 2000) in which adolescents leave their familiar surrounds, such as their family and high schools, for novel settings like college or the workforce. With less environmental constraints, people are more able to choose the contexts, such as courses, work, leisure activities, and social relationships that are better aligned with their interests. These experiences serve to deepen the characteristics that lead people to those experiences in the first place, resulting in an elaboration, and subsequent stabilisation of the interest dispositions being shaped by experience. After the age 18–22 period, the individual begins his or her entry to adulthood. The definitional quality of adulthood is the increased commitments to other life roles, such as being a spouse, a parent, and/or care-giver (Levinson, 1986). These commitments serve to restrict the latitude an individual has in changing work environments. A person's talents, expectations, irreversible choices and credentials further diminish the range of movement he or she has after entry into the workforce (Holland, 1997). Interests, therefore, increase in stability within a small window of time, after which the constancy of workplace environments limits the frequency of new experiences, as well as curtails further elaboration of fit between the individual and the environment.

Low and colleagues (2005) also found the developmental trend to replicate across gender—in line with Hansen's (1988) findings—that vocational interests for female and male norm samples as well as people in specific occupa-

tions from versions of the *Strong Interest Inventory* remained largely unchanged over 50 years (from 1930s to 1980s), despite the dramatic changes in women's participation in the workforce. At the same time, when the cohorts were compared, the authors found that there was a significant dip in stability for individuals born in the 1940s. This particular cohort consisted mostly of the first wave of baby-boomers in the United States; most of these individuals came of age and were initially tested during the 1960s—a time of widespread unrest on college campuses and the exhortations to “turn on, tune in, and drop out” (Leary, 1965). These historical events might have led to a disruption of educational and vocational plans and decisions that typically occur during late adolescence and early adulthood. To a large extent, there are similarities between interest stability of the 1940s cohort and interest stability during middle adolescence.

Occasionally, investigators have focused on mean-level changes in vocational interests. Researchers (e.g., Tracey et al., 2005) have found vocational interests to increase in mean levels across all Holland's (1997) RIASEC types during adolescence. Moreover, interest growth occurs along stereotypical gender lines, with adolescent girls becoming more interested in female stereotypical activities and in female-dominated professions, and adolescent boys becoming more interested in male stereotypical activities and in male-dominated professions. In a cross-sectional comparison of the mean-levels of RIASEC interests across different age groups, Donnay and colleagues (2004) found that the younger age groups to have lower mean-levels of interests compared to individuals in the middle adulthood groups. Although there were overt gender differences in mean-levels, all vocational interests, regardless of gender stereotypes, were higher in mean-levels at middle adulthood compared to adolescence.

Mean-level changes in dispositional attributes are often likened to normative changes that are posited to be consequences of maturational or historical processes shared by members of a population (Caspi, Roberts, & Shiner, 2005). These shared processes may have biological origins, such as the general chronological age for puberty, and tend to occur within a specific window of time during the life course for the majority of the population. Many of life tasks are age-graded—individuals build identities through psychological commitments to social roles (such as schooling, work and family) that parallel the expectations of a social clock (Helson, Mitchell, & Moane, 1984). These age-normative roles thus act as impetus for interest change through internal psychological and external environmental pressures.

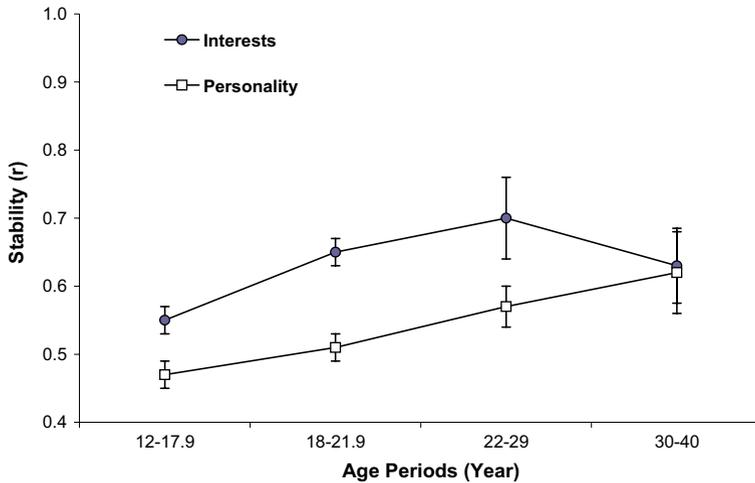
### **Mechanisms of continuity**

The dispositional nature of vocational interests is supported by behavioural genetics research that suggests vocational-interest stability can in part be attributed to genetic factors. Moloney, Bouchard, and Segal (1991) examined the interests of monozygotic and dizygotic twins reared apart across an interval

of 10 years. Results supported a balance between consistency and change in interest development, with the mean correlation of monozygotic twins at .50, and heritability estimates of .41, .66, .50, .52, .50, and .38, respectively for Holland's RIASEC typology. Subsequent studies (Betsworth et al., 1994; Lykken, Bouchard, McGue, & Tellegen, 1993) have replicated Moloney's findings. In general, there is consensus that 40–50% of interest invariance is associated with genetic variance. These estimates were somewhat lower compared to findings on personality traits (Plomin & Caspi, 1999) and cognitive abilities (Finkel, Pedersen, McGue, & McClearn, 1995), leading to claims (e.g., Lykken et al., 1993; Swanson, 1999) that interests are “developmentally downstream” of precursor traits (i.e., personality and intelligence) that are closer to the genetic level. A similar stance is reflected in theoretical conceptualisations of interest development. For instance, it is a widely held supposition (e.g., Lent et al., 1994) that vocational interests are indirectly shaped by personality traits through their influence on individuals' self-efficacy beliefs and outcome expectations regarding certain activities.

There is evidence that the personality traits → self efficacy/outcome expectations → vocational interests causality sequence may not be true. When Low and colleagues (2005) compared meta-analytic estimates of rank-order stability between vocational interests and personality traits using Roberts and DelVecchio's (2000) data, interests were consistently more stable than personality traits throughout the entire period examined (see Fig. 2). Although higher rank-order stability alone does not imply causality, we expect that the developmental antecedent (i.e., personality traits) to be sufficiently stable enough to elicit and maintain the cascade of events that result in the consequence (i.e., vocational interests). Furthermore, genes do not directly encode for any single class of individuality domains. Heritability coefficients constitute the direct effects of genes as well as the interactions between genes and environments. Research (Caspi et al., 2003) indicated that environmental effects on a person can be conditioned upon his or her genotype; conversely, environmental experiences moderate gene expression as well. It is likely that the genetic factors identified within different domains constitute a group of general dispositional tendencies that jointly affect personality traits, vocational interests, abilities and other individuality domains. By directly influencing the choice of one's environment, vocational interests thus represent the manifestation of these dispositional tendencies in a situation-specific manner. Personality traits, on the other hand, reflect manifestation of these tendencies across situations and environments. It is therefore unsurprising that findings demonstrate greater environmental influences on vocational interests; the individual has placed himself/herself in an environment that has the greatest potential to effect both change and continuity when he or she acts on his/her interests.

Interest stability may be promoted by environmental stability. To the extent that familial expectations, workplace demands and peer influences remain stable over time, the cumulative and continuing stability of these environments present considerable pressure against change. Most adolescents,



**Fig. 2** Comparison between interest stability and personality consistency across age groups. Error bars indicate 95% confidence intervals for each age group. (Adapted with permission from Low et al. (2005))

prior to graduation from high school, stay with their parents (Goldscheider & Goldscheider, 1994) and have fairly confined interpersonal circles (Bearman, Moody, & Stovel, 2004). Familial influence (Helwig, 1984) and peer group affiliation (Johnson, 1987) tend to attenuate drastic changes in adolescents' vocational interests. These stable environments (i.e., family, high school peers, neighbourhood friends) are likely to restrict novel experiences that may bring about changes in interest and could account for the plateaus in interest stability during adolescence and post-emerging adulthood seen in the Low et al. (2005) results.

The most potent mechanisms of vocational interest stability are likely person–environment transactions across the life course. There is empirical evidence suggesting that trait continuity is facilitated by the propensity of individuals to select roles and environments that best fit their identities, and upon not being able to do so, manipulate and change existing environments to better their preferences (see Caspi et al., 2005). Although many social psychological theories (e.g., Bandura, 1977) posit that peer groups are homogeneous due to the socialisation effects of membership, there is evidence that selection effects may have a larger impact on peer group homogeneity than socialisation effects. Ennett and Bauman (1994), for example, demonstrated that peer group members were similar because individuals selectively choose to affiliate with similar others. Thus, vocational interest development is an iterative process of increasing fit between the person and the environment as individuals choose activities and prune their social networks to conform with their identities, motives, goals, and values. In other words, people “pick their niches” (Scarr & McCartney, 1983)—aligning their environments with their interests such that the environmental press is in the direction of maintaining the direction of their interests.

## Mechanisms of change

In addition to normative change in vocational interests that result from maturational processes, studies indicate that interests do undergo changes throughout the life course that are specific to individuals. People change their interests in response to the positive and negative environmental reinforcements they receive. For example, parents and teachers shape children's interests by controlling the type of activities the children are exposed to, and through their interactions, influence their perceptions of acceptable careers. Changes in interests are also triggered by assimilation of new role demands, by watching others and ourselves, as well as by responding to feedback from those around us. Meir and Navon (1992), for example, found newly-employed bank tellers to converge towards a conventional profile after half a year of employment, with the tellers' level of congruence being highly associated with their performance evaluation. Nauta, Epperson, and Kahn (1998) also pointed to the presence of role models in increasing the participation of women in non-traditional occupational fields.

Sociocultural forces are also powerful influences. By affecting barriers and supports to goal fulfillment, and by determining what individuals construe as important, sociocultural pressures affect the types of interests expressed across gender, racial/ethnic groups, and socioeconomic status (see Fouad, 2006 for a review). In addition, macro-level factors such as economics and public policy can be expected to impact vocational interest development (Blustein, Phillips, Jobin-Davis, Finkelberg, & Roarke, 1997).

## Implications

There are important implications for interest change and continuity through different periods of the life course, as well as to the way change is understood and quantified. If and when interests increase and decrease—in stability and in mean-levels – can inform decisions in educational and occupational training, and enhance personnel selection efforts.

An individual's vocational interests, it appears, are relatively stable by the time he or she reaches early adolescence. On the one hand, high stability suggests that educational and career decisions based on one's interests may be made at an early age. Since interests are related to students' attention to material and persistence on learning tasks (Schraw & Lehman, 2001), interest-based curricula can serve to increase personal relevancy of school subject matter even for students who, conventionally, are believed to have underdeveloped notions of future careers. A typical freshman high school class in the United States shrinks by 40% or more by the time students reach their senior year (Balfanz & Legters, 2004). The most common and consistently cited reason for dropping out is a dislike of schools and a view that school is boring and not relevant to one's needs (e.g., Beekman, 1987); conversely identification with academic activities has been found to be a robust factor in retention

interventions (Lehr, Hansen, Sinclair, & Christenson, 2003). Therefore the use of students' interests in tailoring their educational contexts will likely reduce middle school and high school dropout rates. On the other hand, the early stability of adolescents' interests means that interventions to increase parity in gender and racial representations in science and engineering must start at a much earlier age than previously thought. It is perhaps not premature for educators to consider interventions as early as children's first encounters with formal schooling.

Linear increases in the mean-levels of older adults' vocational interests (Donnay et al., 2005) suggest that employees may be more amenable to changes in their job content, such as movement into supervisory and management positions, even when these new roles are not congruent with their highest interest. Changes in mean-levels of interests can also inform individuals' exploration of activities—occupation, leisure and retirement—that at an earlier age might not have the same level of meaningfulness or bring the same amount of pleasure as they do at a latter age.

Vocational interests go beyond just job preferences; they affect an individual's success and satisfaction across the entire life course. All evidence points to the importance of considering individuals' vocational interests at different stages of their lives, especially during the process of education and guidance.

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