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Stability of Vocational Interests Among the Intellectually Gifted From Adolescence to Adulthood: A 15-Year Longitudinal Study

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A sample of 162 intellectually gifted adolescents (top 1%) were administered the Strong–Campbell Interest Inventory at age 13. Fifteen years later, they were administered the Strong again. This study evaluated the intra- and interindividual temporal stability of the 6 RIASEC (Realistic, Investigative, Artistic, Social, Enterprising, Conventional) themes and the Strong's 23 Basic Interest Scales. Over the 15-year test–retest interval, RIASEC's median interindividual correlation for the 6 themes was .46; the median of all 162 intraindividual correlations was .57. Configural analyses of the most dominant theme at age 13 revealed that this theme was significantly more likely than chance to be either dominant or adjacent to the dominant theme at age 28—following RIASEC's hexagonal structure. For intellectually gifted individuals, it appears to be possible to forecast salient features of their adult RIASEC profile by assessing their vocational interests during early adolescence, but some RIASEC themes seem more stable than others.

Just as study-to-study fluctuations in ability–performance correlations are known to be due largely to small samples, unreliability of predictors and criteria, and restriction of range (Humphreys, 1992; Schmidt & Hunter, 1981), it also is known now that these very same factors operate to attenuate the covariation between individual differences within the top 1% of ability and educational–vocational criteria (Benbow, 1992; Lubinski & Dawis, 1992, pp. 41–42). When intellectually gifted 7th graders (top 1–2%) are given the College Board Scholastic Aptitude Test (SAT), an instrument designed for able 11th and 12th graders, they generate score distributions indistinguishable from random samples of high school students (Benbow, 1988; Keating & Stanley, 1972). Moreover, when academic–vocational criteria with sufficiently high ceilings are regressed onto these SAT score distributions, substantively significant correlations are observed over 10-year time frames (Benbow, 1992)—from age 13, when SAT predictor-assessments are conducted, to age 23, when academic–vocational longitudinal-criterion-data are collected.

These long-range (adolescence to adulthood) forecasts add applied psychological significance to ability-based predictions regarding the amount of learning that gifted adolescents can achieve and should be allowed to achieve (Humphreys, 1985; Stanley, 1973). For example, the seventh- and eighth-grade students who participate in above-grade ability testing every year through talent searches (Stanley, 1977, 1990) and score beyond the mean of college-bound high school seniors routinely assimilate a full school year of a high school course (e.g., algebra, chemistry, Latin, physics) in 3 weeks. Their comprehension and retention are as good as or better than if they were exposed to the same curriculum over 1 full school year (Benbow & Stanley, 1983; Lynch, 1992; Stanley & Stanley, 1986; Swiatek & Benbow, 1991), and their subjective evaluations of their educational experiences are highly favorable (Benbow, Lubinski, & Suchy, in press; Benbow & Stanley, 1983). These are robust findings. And talent searches followed by opportunities for educational acceleration at programs for gifted at universities such as Duke, Iowa State University, Johns Hopkins, Northwestern, the University of Iowa, and the University of Denver, which serve over 150,000 seventh and eighth graders annually, have been producing such outcomes for over two decades.

Recognizing these findings in the ability domain, we became curious as to whether it might be fruitful to assess other key personal attributes in gifted adolescents that are typically assessed in older subjects (later teens and beyond) for use in educational–vocational decision-making. Our desire to examine this question was motivated further by a well-established model of vocational adjustment, the theory of work adjustment (TWA; Dawis & Lofquist, 1984; Lofquist & Dawis, 1991).

According to the tenets of TWA, there are two critical dimensions of correspondence required for optimal vocational adjustment, *satisfactoriness* and *satisfaction.* The former primarily denotes competence and is defined by the extent to which an individual's abilities correspond to the ability requirements of the work environment. The latter primarily denotes personal fulfillment and commitment and is defined by the extent to which an individual's needs correspond to the reinforcers and rewards provided by the work environment. Although TWA was formulated to foster a better understanding of vocational ad-

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justment, we have extended the concepts of satisfactoriness and satisfaction to the examination of optimal learning environments for gifted adolescents (Lubinski & Benbow, 1992; Lubinski, Benbow, & Sanders, 1993).

The purpose of this article is to examine the extent to which it is profitable to assess individual differences among the gifted in the second important set of determinants to educational–vocational adjustment, namely, preferences (Dawis, 1991). Given the utility of having gifted adolescents take tests designed for much older persons, we wondered whether additional educational–vocational planning information might be gleaned from assessing their vocational interests with questionnaires designed for much older persons. Specifically, we wanted to ascertain the temporal stability of vocational interests among the intellectually gifted, from the start of adolescence (age 13) to adulthood (age 28). To the extent that vocational interests crystallize early in this special population, their assessment may serve to complement ability assessments of the major markers of general intelligence and contribute further refinement to educational and vocational counseling with this population. In what follows, then, we address the following question: Can a nascent picture of the ultimately secured vocational interest profile of intellectually gifted adults be obtained by measuring their interests at age 13 with conventional instruments designed for adults?

Method

Participants

The participants were 114 males and 48 females identified by the Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins University through its 1978 (Mathematics) Talent Search. These participants scored high enough to be included in Cohort 2 of SMPY's planned 50-year longitudinal study (top 1% in overall intellectual ability; Lubinski & Benbow, 1994). This longitudinal study is now in its third decade and includes over 5,000 participants. Individuals in the present investigation were identified when they were in seventh grade through the use of the College Board Scholastic Aptitude Test (SAT). They met at least one of the following criteria by age 13: SAT–Math $\geq$ 500 and SAT–Verbal $\geq$ 430, SAT–Math $\geq$ 550, SAT–Verbal $\geq$ 580, or TSWE (Test of Standard Written English) $\geq$ 58.

Subsequently, at the beginning of eighth grade, in October 1978, they came to Johns Hopkins University and completed a variety of tests of specific abilities and achievement, as well as the Strong-Campbell Interest Inventory (SCII; Campbell, 1977). On the Sequential Tests of Educational Progress (STEP; Educational Testing Service, 1969) science achievement tests, Forms A and B, the group as a whole scored better than 52% to 69% of the national sample of college sophomores who took the test in the spring. On the College Board Physics achievement test they scored well above the mean for college-bound high school seniors. They also rated their liking for mathematics and the various sciences in 7th and 12th grade. Their mean ratings, for both genders, exceeded 4 on a 5-point scale, where 5 equals *strong liking.* Mathematics tended to have been their favorite high school course, as reported during their first year at college.

Measures

In 1978, at Time 1 (age 13), participants were administered the SCII. In 1993, at Time 2, these same participants took the current augmented research version of the SCII (available through Consulting Psychologists Press, Palo Alto, California). It includes some additional biographical items and some experimental objectively scored questions about data, people, and things. Both instruments contain identical measures of Holland's RIASEC themes and 23 Basic Interest Scales thought to reflect components of the former. For this study, both Time 1 and Time 2 data were normed using the 1985 standardization sample (Hansen & Campbell, 1985).

RIASEC is an acronym for Holland's (1985) hexagonal system of six vocational-interest themes: realistic (R; interests in working with things and gadgets, working in the outdoors, need for structure); investigative (I; scientific interests, especially mathematics and the physical sciences, independent work); artistic (A; interests in creative expression in writing and the arts, need for little structure); social (S; people interests, drawn toward the helping professions); enterprising (E; preferring leadership roles aimed at achieving economic objectives); and conventional (C; preferring well-structured environments and chains of command, such as those found in office practices, tend to be followers rather than leaders). The usefulness of using Holland's RIASEC system for mapping major dimensions of vocational interests can be found in the research by Rounds and Tracey (1993).

The 23 Basic Interest Scales (preceded by the letter of their most closely associated RIASEC theme) follow: R (Agriculture, Nature, Adventure, Military, and Mechanical Activities), I (Science, Mathematics, Medical Science, and Medical Service), A (Music/Dramatics, Art, and Writing), S (Teaching, Social Service, Athletics, Domestic Arts, and Religion), E (Public Speaking, Law/Politics, Merchandising, Sales, and Business Management), and C (Office Practices).

Procedure and Design

SMPY participants are tracked longitudinally at 5- or 10-year intervals (Lubinski & Benbow, 1994). In our 15-year follow up, SMPY participants initially assessed in 1978 at age 13 were asked to retake the Strong. Approximately 88% of our Cohort 2 participants elected to participate. Because of the huge number of scales on the Strong and our relatively small sample (especially of females), we chose to examine in detail only the structural properties and configural patterning of Holland's (1985) six RIASEC themes. This reduced the likelihood of interpreting chance correlations, while speaking most directly to our main research question. We do, however, provide some aggregated statistics on the 23 Basic Interest Scales.

Results

Descriptive Statistics

Table 1 shows means and standard deviations for both male and female participants at ages 13 and 28. At Time 1, many males and females had pronounced investigative themes. The interesting developmental trend in these data for both male and female participants is that the realistic, investigative, artistic, and social themes increase across Time 1 and Time 2, whereas enterprising and conventional decrease. Given that these scales were normed at means of 50 and standard deviations of 10, these gifted participants are almost a full standard deviation below the norm on E as adults. The pattern that female participants ultimately secured is *I–A* (at comparable intensities), whereas the male participants tilted toward *I* (primarily)–*R* (secondarily).

Correlational Analyses

Table 2 gives RIASEC test–retest intercorrelations, organized in a *convergent* (diagonal) and *discriminant* (off-diagonal) pat-

Table 1
Means and Standard Deviations of Holland's RIASEC Themes at Time 1 (Age 13) and Time 2 (Age 28) by Gender

RIASEC theme	Female participants (*n* = 48)				Male participants (*n* = 114)			
	First test		Retest		First test		Retest	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Realistic	45.2	8.2	47.5	9.4	49.9	8.2	52.2	9.9
Investigative	52.6	7.9	53.6	7.9	54.9	6.9	55.3	7.4
Artistic	51.2	8.0	53.6	8.3	41.5	8.4	48.4	9.6
Social	47.3	10.5	49.5	10.5	42.9	9.5	46.5	10.7
Enterprising	42.6	7.8	41.6	9.0	44.8	8.5	42.0	8.6
Conventional	49.0	9.7	45.6	9.9	51.9	8.7	47.7	9.9

Note. For both time points, 1985 norms were used to compute *t* scores for all six RIASEC themes (Hansen & Campbell, 1985); these scales were standardized around means of 50 and standard deviations of 10. RIASEC = Realistic, Investigative, Artistic, Social, Enterprising, and Conventional.

tern collapsed across sex. A near-perfect convergent–discriminant pattern is revealed in this intercorrelation matrix. (This pattern also was observed within each sex.) Test–retest correlations of the I and E themes are less than impressive (.21 and .27, respectively), but a close examination of Time 1 and Time 2 combined-sex standard deviations reveals some curtailed variability for these two themes, relative to the others (sex-combined Time 1 and Time 2 standard deviations, respectively, are R = 9.3, 9.9; I = 7.5, 7.6; A = 9.6, 9.5; S = 10.2, 10.7; E = 7.7, 8.7; and C = 9.0, 9.9). The I theme, in particular, displayed reduced standard deviations across both testings; the variability observed on the E theme was relatively constrained as well. This, we hypothesize, is likely due to a degree of subject-homogeneity that serves to attenuate I and E scale variability. As indicated earlier, students participating in SMPY programs for the mathematically gifted during the late-1970s tended to be especially interested in mathematics and the physical sciences (Benbow & Stanley, 1982). Indeed, the I theme did emerge as most popular first during the first testing, and as one would anticipate from the structural organization of Holland's (1985) hexagon, the E theme tended to be the least attractive overall (see below).

Table 2
Convergent and Discriminant Test–Retest Intercorrelations of Holland's RIASEC Themes Over 15 Years, Time 1 (Age 13) to Time 2 (Age 28)

Time 1	Time 2					
	R	I	A	S	E	C
Realistic	**.51**	.28	.06	.17	.09	.11
Investigative	.12	**.21**	−.03	.07	.13	.15
Artistic	.04	.05	**.48**	.18	.05	−.02
Social	.14	.11	.19	**.52**	.24	.18
Enterprising	.17	.11	.06	.32	**.27**	.24
Conventional	.24	.16	−.10	.26	.31	**.44**

Note. For *r*s > .14, $p < .05$. Convergent test–retest correlations are the diagonal entries presented in bold. (*N* = 162; 114 male, 48 female). RIASEC = Realistic, Investigative, Artistic, Social, Enterprising, and Conventional.

We also computed 162 intraindividual correlations. For each participant, we correlated their Time 1 RIASEC scores with their Time 2 scores (mean *r* = .47, SE = .03, *Mdn* = .57, range = −0.71–.99).

In addition, we computed 23 interindividual test–retest correlations for the Basic Interest Scales (mean *r* = .42, SE = .02, *Mdn* = .44, range = .22–.62). Finally, we computed 162 intraindividual correlations for the Basic Interest Scales (mean *r* = .47, SE = .02, *Mdn* = .51, and range = −.02–.91).

Co-Occurrence Analysis of Dominant Time 1 Theme

Table 3 is a co-occurrence matrix based on the most salient RIASEC theme at Time 1. Base-rate expectations derived from Time 1 frequencies are also provided. Clearly, as expected, the I theme was most popular and the E theme least popular: 74 (45%) of the participants manifested dominant I themes at age 13, whereas only 4 (2.5%) had dominant E themes.

The first column of Table 3 (Concordant) provides the number of participants with corresponding dominant themes at both time points (and base rate expectations or the number expected by chance). Column 2 (Adjacent) gives chance expectations and the observed number of participants whose dominant theme at Time 2 was adjacent to their dominant Time 1 theme following RIASEC's hexagonal organization (e.g., adjacent themes for R = C and I, and for I = R and A, etc.). Finally, column 3 (Nonadjacent) gives chance expectations and the observed number of participants whose dominant theme at Time 2 was neither their dominant theme at Time 1 nor a theme adjacent to it—again, following RIASEC's hexagonal pattern (e.g., for R = A, S, and E, and for I = S, E, and C, etc.).

First, focusing on column 1 of Table 3, we computed a kappa coefficient to ascertain whether the co-occurrence of the same RIASEC theme at both time points exceeded chance expectations. Our kappa coefficient was .18 (with a 95% CI ranging from .07 to .29). Clearly, the co-occurrence of the same domi-

Table 3
Co-Occurence of Most Salient RIASEC Theme at Time 1 (Age 13) and Time 2 (Age 28) Along With Base-Rate Expectations Derived From Time 1 Data (N = 162)

		Time 2			
Time 1	*n*	Concordant	Adjacent	Nonadjacent	Total
Realistic	25				
Expected		3.9	17.3	3.9	25
Observed		14	9	2	25
Investigative	74				
Expected		33.9	16.4	23.8	74
Observed		36	26	12	74
Artistic	11				
Expected		.7	5	5.2	11
Observed		5	4	2	11
Social	10				
Expected		.6	.9	8.4	10
Observed		4	3	3	10
Enterprising	4				
Expected		.1	1.2	2.7	4
Observed		0	1	3	4
Conventional	38				
Expected		8.9	6.8	22.3	38
Observed		9	11	18	38
Total	162				
Expected		48	48	66	162
Observed		68	54	40	162

Note. For column 3 (Concordant), base-rate expectations were derived for each theme by squaring its proportion observed at Time 1 and multiplying this value by 162. For column 4 (Adjacent), expectations were derived for each theme by first ascertaining two products: its Time 1 proportion was multiplied by the Time 1 proportions of each of its two adjacent themes. These two values were then summed and multiplied by 162. For column 5 (Nonadjacent), expectations were derived for each theme by first ascertaining three products: each theme's Time 1 proportion multiplied by the Time 1 proportions for each of its three nonadjacent themes. These three values were then summed and multiplied by 162.

nant theme is greater than one would anticipate from chance expectations.

Second, to evaluate Table 3 more comprehensively, following theoretical considerations based on Holland's (1985) *calculus assumption,* namely, that RIASEC is organized in a circular fashion and forms a hexagon (Rounds & Tracey, 1993), a chi-square for the entire 18-cell table, namely, 3 (concordant-adjacent-nonadjacent) × 6(R-I-A-S-E-C), was computed, $\chi^2(10, N = 162) = 102.8$ ($p < .001$).[1] According to Holland (1985), not only should there be more observed than expected co-occurrences of dominant Time 1 and Time 2 themes, one also would anticipate a divergent pattern for the two kinds of discorrespondences: That is, there should be more observed than expected adjacent themes and fewer observed than expected nonadjacent themes. This is indeed the case. The overall percentages, derived from the column totals, neatly reflect this pattern: concordant expected (48/162) = 30%, concordant observed (68/162) = 42%; adjacent expected (48/162) = 30%, adjacent observed (54/162) = 33%; and nonadjacent expected (66/162) = 41%, nonadjacent observed (40/162) = 25%. This analysis therefore supports the idea that we can be relatively confident in assuming that the most dominant RIASEC theme at age 13 is likely to be a prominent feature of the gifted adult's vocational interest profile.

Discussion

This investigation affords empirical support for the measurement of vocational interests in gifted adolescents. It appears that assessing vocational interests at age 13 can indeed provide a glimpse of their eventual adult vocational-interest pattern. A clear test (age 13)–retest (age 28) convergent–discriminant pattern for Holland's (1985) RIASEC themes was revealed over a 15-year temporal gap (*Mdn* = .46), with comparable interindividual test–retest correlations for the 23 Basic Interest Scales (*Mdn* = .44). The most dominant RIASEC theme at age 13 was highly likely to be a salient feature of the gifted adult's vocational interest profile. For applied psychologists working in a variety of settings, the educational and vocational implications of these findings are clear. It may be less clear, however, for psychologists interested in educational programming or, more precisely, creating optimal educational environments for the intellectually gifted (Benbow & Lubinski, 1994; Stanley, 1973). Interest assessments, in combination with traditional ability assessments, might be useful for structuring ideal learning experiences that are more motivating for gifted students. Gifted students, as for all students, are likely to achieve more highly when they are in a correspondent environment defined by the satisfactoriness and satisfaction dimensions of TWA.

Our intraindividual correlational and configural analyses are psychologically significant in another regard as well. One-, two-, and three-letter Holland codes are often the method of choice for capturing individuals' vocational interests in vocational counseling (Holland, 1987). Earlier studies have established the stability of this profiling system in adult samples over 12-year temporal gaps (Swanson & Hansen, 1988), with median intraindividual test–retest correlations for male = .60 and female = .58 participants for the RIASEC and Basic Interest Scales combined. The present study extends these findings to intellectually gifted young adolescents as well as over a longer time frame. Our median intraindividual correlations were greater than .50 as well. It seemed to us that our female sample comprised too few to warrant analyzing the sexes separately; however, 162 intraindividual correlations were computed on the 29 combined Basic Interest Scales and RIASEC scales (mean r = .47, SE = .02; *Mdn* = .51, range = −.030–.90.)

[1] Readers may be interested in the dominant RIASEC frequencies at age 28, along with base-rate expectations for all 18 cells mirroring Table 3. First, the Time 2 frequency counts follow: R = 37, I = 60, A = 26, S = 16, E = 3, and C = 20. (Clearly, the adult profile is more balanced than the pattern observed during adolescence.) Now, following the format of Table 3, the expected–observed values for each RIASEC theme are provided in descending order: Concordant (t_1) = 8.4/14, 22.2/36, 4.1/5, 1.6/4, .02/0, and 2.5/9; Adjacent (t_1) = 18.1/22, 23.2/13, 12.1/15, 2.9/1, .7/2, and 4.9/1; Nonadjacent (t_1) = 10.3/1, 14.5/11, 9.5/6, 11.7/11, 2.3/1, and 12.7/10. This too is an impressive pattern in good accord with the hexagonal organization of RIASEC. This 18-cell chi-square, based on Time 2 base-rate expectations, was $\chi^2(10, N = 162) = 57.7$, ($p < .001$). Moreover, the kappa coefficient based on Time 2 base rates is more impressive than the one derived from Time 1 frequencies (κ = .24, with a 95% CI ranging from .14 to .34).

Finally, our co-occurrence analysis of the most dominant theme across both time points was consistent with Holland's (1985) theory of RIASEC's hexagonal structure. When calibrated against chance expectations, the dominant RIASEC theme at Time 1 was significantly more likely to be concordant with or adjacent to the dominant Time 2 theme. Some themes, however, appear to be less indicative of a stable profile than others. In particular, the C theme (second most popular at Time 1) appears much less likely to maintain dominance from adolescence to adulthood, at least among this group of adolescents. Perhaps a dominant C theme at age 13 is a sign of a developmentally inchoate profile, whereas dominant R, I, A, and S themes are indicative of a more developmentally mature vocational interest profile? Observations of E were too few to allow meaningful generalizations.

Our participants were not a random sample of gifted adolescents, because of their intense interests and ability in mathematics and the physical sciences. Nevertheless, we venture the following generalization (as worthy of subsequent empirical research): both personal attributes underscored by TWA, namely abilities and preferences, can be meaningfully assessed in intellectually gifted young adolescents as early as age 13 for use in educational and vocational contexts.

References

Benbow, C. P. (1988). Sex differences in mathematical reasoning ability among the intellectually talented: Their characterization, consequences, and possible explanations. *Behavioral and Brain Sciences, 11,* 169–232.

Benbow, C. P. (1992). Academic achievement in mathematics and science between ages 13 and 23: Are there differences among students in the top one percent of mathematical ability? *Journal of Educational Psychology, 84,* 51–61.

Benbow, C. P., & Lubinski, D. (1994). Individual differences among the mathematically gifted: Their educational and vocational implications. In N. Colangelo, S. G. Assouline, & D. L. Ambroson (Eds.), *Talent development* (Vol. 2, pp. 83–100). Dayton: Ohio Psychology Press.

Benbow, C. P., Lubinski, D., & Suchy, B. (in press). Impact of the SMPY model and its programs. In C. P. Benbow & D. Lubinski (Eds.), *Psychometric and social issues concerning intellectual talent.* Baltimore: Johns Hopkins University Press.

Benbow, C. P., & Stanley, J. C. (1982). Intellectually talented boys and girls: Educational profiles. *Gifted Child Quarterly, 26,* 82–88.

Benbow, C. P., & Stanley, J. C. (1983). *Academic precocity: Aspects of its development.* Baltimore: Johns Hopkins University Press.

Campbell, D. P. (1977). *Manual for the SVIB-SCII* (2nd ed.). Stanford, CA: Stanford University Press.

Dawis, R. V. (1991). Vocational interests, values, and preferences. In M. Dunnette & L. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., Vol. 2, pp. 833–871). Palo Alto, CA: Consulting Psychologists Press.

Dawis, R. V., & Lofquist, L. H. (1984). *A psychological theory of work adjustment.* Minneapolis: University of Minnesota Press.

Educational Testing Service. (1969). *Sequential Tests of Educational Progress.* Princeton, NJ: Author.

Hansen, J. C., & Campbell, D. P. (1985). *Manual for the SCII* (4th ed.). Palo Alto, CA: Consulting Psychologists Press.

Holland, J. L. (1985). *The making of vocational choices: A theory of vocational personalities and work environments* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L. (1987). *1987 manual supplement for the Self-Directed Search.* Odessa, FL: Psychological Assessment Resources.

Humphreys, L. G. (1985). A conceptualization of intellectual giftedness. In F. D. Horowitz & M. O'Brien (Eds.), *The gifted and talented: Developmental perspectives* (pp. 331–360). American Psychological Association: Washington, DC.

Humphreys, L. G. (1992). Commentary: What both critics and users of ability tests need to know. *Psychological Science, 3,* 271–274.

Keating, D. P., & Stanley, J. C. (1972). Extreme measures for the exceptionally gifted in mathematics and science. *Educational Researcher, 1,* 3–7.

Lofquist, L. H., & Dawis, R. V. (1991). *Essentials of person-environment-correspondence counseling.* Minneapolis: University of Minnesota Press.

Lubinski, D., & Benbow, C. P. (1992). Gender differences in abilities and preferences among the gifted. *Current Directions in Psychological Science, 1,* 61–66.

Lubinski, D., & Benbow, C. P. (1994). The Study of Mathematically Precocious Youth (SMPY): Its planned 50-year longitudinal study of intellectual talent. In R. Subotnik & K. Arnold (Eds.), *Beyond Terman* (pp. 255–281). Norwood, NJ: Ablex.

Lubinski, D., Benbow, C. P., & Sanders, C. E. (1993). Reconceptualizing gender differences in achievement among the gifted. In K. A. Heller, F. J. Monks, & A. H. Passow (Eds.), *International handbook for research on giftedness and talent* (pp. 693–708). Oxford, England: Pergamon Press.

Lubinski, D., & Dawis, R. V. (1992). Aptitudes, skills, and proficiencies. In M. D. Dunnette & L. M. Hough (Eds.), *The handbook of industrial and organizational psychology* (2nd ed., Vol. 3, pp. 1–59). Palo Alto, CA: Consulting Psychologists Press.

Lynch, S. J. (1992). Fast-paced high school science for the academically talented: A six year perspective. *Gifted Child Quarterly, 36,* 147–154.

Rounds, J. B., & Tracey, T. J. (1993). Prediger's dimensional representation of Holland's RIASEC circumplex. *Journal of Applied Psychology, 78,* 875–890.

Schmidt, F. L., & Hunter, J. E. (1981). Employment testing: Old theories and new research findings. *American Psychologist, 36,* 1128–1137.

Stanley, J. C. (1973). Accelerating the educational progress of intellectually gifted youths. *Educational Psychologist, 10,* 133–146.

Stanley, J. C. (1977). The predictive value of the SAT for brilliant seventh- and eighth-graders. *The College Board Review, 106,* 31–37.

Stanley, J. C. (1990). Leta Hollingworth's contributions to above-level testing of the gifted. *Roeper Review, 12,* 166–171.

Stanley, J. C., & Stanley, B. S. K. (1986). High school biology, chemistry or physics learned well in three weeks. *Journal of Research in Science Teaching, 23,* 237–250.

Swanson, J. L., & Hansen, J. C. (1988). Stability of vocational interests over 4-year, 8-year, and 12-year intervals. *Journal of Vocational Behavior, 33,* 185–202.

Swiatek, M. A., & Benbow, C. P. (1991). A 10-year longitudinal follow-up of participants in a fast-paced mathematics course. *Journal of Research in Mathematics Education, 22,* 138–150.

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