

## A 20-Year Stability Analysis of the Study of Values for Intellectually Gifted Individuals From Adolescence to Adulthood

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A sample of 203 intellectually gifted adolescents (top 1%) were administered the Allport-Vernon-Lindzey (1970) Study of Values (SOV) at age 13; 20 years later, they were administered the SOV again. In this study, researchers evaluated the intra- and interindividual temporal stability of the 6 SOV themes, namely, Theoretical (T), Economic (E), Political (P), Aesthetic (A), Social (S), and Religious (R). Over the 20-year test-retest interval, the SOV's mean and median interindividual correlations for the 6 themes were .37 and .34, respectively. Correspondingly, the mean and median of all 203 intraindividual correlations were .30 and .39. Configural analyses of the most dominant theme at age 13 revealed that this theme was significantly more likely than chance to be dominant or adjacent to the dominant theme at age 33. Adjacency was ascertained through a number of empirically based auxiliary analyses of the SOV, revealing 2 robust gender-differentiating clusters: T-E-P for males and A-S-R for females.

For more than 20 years, intellectually gifted (top 1%) 7th graders have repeatedly produced score distributions on the Scholastic Aptitude Test (SAT) indistinguishable from average 12th graders (Benbow, 1988; Keating & Stanley, 1972; Lubinski & Benbow, 1994). Moreover, just as they do for college-bound high school students, the two SAT subscales, SAT-V (verbal) and SAT-M (math), have differential validity for gifted adolescents across verbally complex versus quantitatively demanding course work, respectively (Benbow, 1992; Benbow & Lubinski, in press; Lubinski & Benbow, 1994, 1995). Counseling and educational psychologists have found individual differences in level and pattern on SAT profiles most useful in working with the gifted in a variety of applied settings (Achter, Lubinski, & Benbow, 1996; Benbow, 1992; Benbow & Stanley, 1983; Benbow & Lubinski, in press).

According to the Theory of Work Adjustment (Dawis & Lofquist, 1984; Lofquist & Dawis, 1991), relevant abilities are only one important set of critical determinants to fully conceptualize optimal vocational and educational adjustment. They are relevant to making competence appraisals of learning and performance, which is termed *satisfactoriness*. Yet another important set of

determinants related to educational and vocational adjustment, familiar to applied psychologists working with adult populations, are referred to as *preferences* (e.g., needs, interests, and values). They are relevant to *satisfaction* with various learning and work environments. However, little systematic attention has been devoted to personal preferences, relative to abilities, in the scientific literature on the gifted. This is partly due to the unknown stability of educational and vocational preferences when assessed in early adolescence. We address this issue in this article.

Specifically, we have investigated whether other well-known, but nonintellectual attributes relevant to educational and vocational choice (i.e., preferences) might be profitable to assess in gifted adolescents. The possible applied psychological significance of doing so comes from the realization that the gifted typically begin to think about career possibilities much earlier than their age-equivalent peers (Achter et al., 1996). That is, their precocious intellectual development, which calls for rapid educational acceleration (Benbow & Stanley, in press; Terman, 1954), also brings them to issues involving educational and vocational decision making at an earlier age (Benbow & Stanley, 1983; Benbow & Lubinski, in press; Stanley, Keating, & Fox, 1974). Providing evidence for the long-term stability of preferences assessed in early adolescence will provide a second set of potent, yet complementary tools for helping gifted adolescents navigate among the educational and vocational choices available to them.

In an earlier article, Lubinski, Benbow, and Ryan

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(1995) provided evidence for the potential usefulness of assessing vocational interests in the intellectually gifted age 13 and under. Using Holland's (1985) familiar (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional; RIASEC) themes, as assessed by the Strong Interest Inventory (Harmon, Hansen, Borgen, & Hammer, 1994), Lubinski et al. (1995) documented a significant degree of temporal stability for these major dimensions of vocational interest over a 15-year time frame from early adolescence to adulthood. Moreover, the structural properties of Holland's hexagon (Rounds & Tracey, 1993) also emerged at age 13. Although Holland's RIASEC system is a widely used framework in counseling psychology, one study using one instrument comes somewhat short of justifying large-scale preference assessments among the gifted in ways commensurate with that currently enjoyed by the SAT.

More technically, this study was designed to constructively replicate, following Lykken (1968), the Lubinski et al. (1995) study of vocational interests, as assessed by the Strong, by examining the temporal stability of yet a different class of personal preferences relevant to educational and vocational choice, namely values, as assessed by the Allport-Vernon-Lindzey (1970) Study of Values (SOV). That is, we attempted to replicate the general hypothesis that stable, relatively lifelong educational and vocational preferences can be forecasted in intellectually gifted adults from preadolescent assessments.

Constructive replications aim to reveal the robustness of general concepts by using distinct assessment devices and procedures (Lykken, 1968), which replicate the phenomenon under analysis but with a different approach. In this regard, consider the following differences between the Strong and the SOV: (a) their dimensions are not isomorphic; both are thought to provide unique and valuable information (relative to one another) to many applied educational and vocational settings (Achter et al., 1996; Dawis, 1991); (b) the SOV is completely ipsative (and scales responses intraindividually), whereas the Strong is normative (and scales responses interindividually); and, finally, (c) the SOV was developed primarily from theoretical considerations, linked to Spranger's (1928) types, and is termed *idiographic* in orientation, whereas the Strong was developed primarily from empirical considerations (linked to internal and external correlates) and is termed *nomothetic* in orientation. Given these salient differences between the Strong and SOV (content, format, scaling, and conceptual underpinning), if two independent studies uncover evidence that each manifests significant degrees of temporal stability from age 13 to considerably beyond early adulthood, we would be in an excellent position to infer that teaming above-level ability assessment with conventional prefer-

ence questionnaires initially designed for adults would result in applied psychological benefits for gifted youth (just as it always has for older people). This hypothesis is examined in this article.

A final noteworthy feature of this study is that participants were initially assessed during years 1972 and 1973 (and retested 20 years later), whereas participants in the Lubinski et al. (1995) study were first assessed during 1977 and 1978 (and retested 15 years later). Thus, a degree of cross-sectional generalizability is gleaned from each sample drawn from different cohorts (Lubinski & Benbow, 1994).

Before proceeding, however, we need to point out some unique features to our temporal stability analysis of the SOV. In our earlier study of vocational interests (Lubinski et al., 1995), Holland's (1985) calculus assumption, or the postulation that RIASEC empirically manifests a circular hexagonal structure, allowed us to refine our (Time 1 and Time 2) co-occurrence analysis of the most dominant theme observed on both occasions. As opposed to simply using a conventional Concordant/Discordant dichotomy (for which kappa coefficients are computed), three categories were used: (a) Concordant, where dominant theme Time 1 (e.g., Investigative) = dominant theme Time 2 (i.e., Investigative), (b) Adjacent, where dominant theme Time 1 (e.g., Investigative) = Adjacent theme Time 2 (i.e., Realistic or Artistic), and finally (c) Nonadjacent, where dominant theme Time 1 (e.g., Investigative) = Nonadjacent theme Time 2 (i.e., Social, Enterprising, or Conventional). This partitioning was helpful inasmuch as when Time 2 themes were discordant with those observed at Time 1, they tended to be Adjacent to Time 1 themes, as opposed to Nonadjacent, at proportions greater than chance. Could a similar kind of three-way partitioning be accomplished with the SOV? We thought so, but, to our knowledge, this had never before been proposed.

Although, like the RIASEC dimensions, postulated relationships between the SOV themes have been suggested (e.g., Allport et al., 1970; Vernon & Allport, 1931), the most empirically robust SOV findings involve gender differences. Specifically, men and boys tend to score higher than women and girls on Theoretical-Economic-Political (T-E-P), whereas women and girls tend to score higher than men and boys on Aesthetic-Social-Religious (A-S-R; e.g., Achter et al., 1996; Allport et al., 1970; Cantrel & Allport, 1933; Coffield & Buckalew, 1984; Stanley, 1953). This has been shown to hold true for the gifted population as well (Benbow & Lubinski, 1994; Fox, 1976, 1978; Fox & Denham, 1974; Haier & Denham, 1976; Lubinski & Benbow, 1992; Stanley, Strup, & Cohn, in press). Moreover, with ipsative measures, many scale intercorrelations are inherently negative (for reviews, see

Clemans, 1966; Guilford, 1952). However, within these two triadic clusters of the SOV scales tend to display insignificant or lightly positive intercorrelations, whereas salient negative correlations are observed between scales belonging to opposite triads (Stanley et al., in press).

Given these empirical findings, the T-E-P and A-S-R triads will be used to refine our co-occurrence analysis of dominant Time 1 and Time 2 themes. More specifically, like our (Time 1 and Time 2) co-occurrence analysis of RIASEC (Lubinski et al., 1995), our analysis of the SOV distinguishes between two kinds of discordances: *Adjacent* and *Nonadjacent*. The former discordance is defined by dominant Time 1 and Time 2 themes belonging to the same cluster (e.g., dominant theme Time 1 = Theoretical and dominant theme Time 2 = Political or Economic), whereas the latter is indicative of a discordance involving dominant themes of different clusters (e.g., dominant theme Time 1 = Theoretical and dominant theme Time 2 = Aesthetic, Social, or Religious). If this partitioning provides additional clarity to our analysis of SOV's temporal stability, we gain further support for the idea that preference interrelationships observed in adults are beginning to take shape among the gifted during early adolescence. In addition, we would have established an innovative analytical approach for evaluating the temporal stability of the SOV, which is a bit more refined than simply computing kappa coefficients on the basis of Concordant/Discordant dichotomies.

## Method

### Participants

The participants were 94 male and 109 female students who were identified by the Study of Mathematically Precocious Youth at Johns Hopkins University through its 1972 and 1973 talent searches (Stanley, Keating, & Fox, 1974). They took the SOV at the two time points investigated here. The Study of Mathematically Precocious Youth is a planned 50-year longitudinal study of intellectually gifted individuals (at least top 1% of age mates), which was launched in 1971, and is currently in its third decade (Lubinski & Benbow, 1994). The participants in the current study are members of the Study of Mathematically Precocious Youth's first cohort (Cohort 1), one of four similar cohorts that together total more than 5,000 individuals. Participants in the present investigation were identified when they were in either the seventh or eighth grade through the SAT. They met at least one of the following criteria: SAT-M  $\geq$  390 or SAT-V  $\geq$  370 (the average scores of a random sample of high-school girls at that time).

### Measures

The SOV is an intrinsically ipsative instrument emanating from theory (Spranger, 1928) that consists of the following six dimensions (Allport et al., 1970): Theoretical (dominant value

is discovery of truth and interests are empirical, critical, and rational); Economic (dominant value is usefulness, and a tendency to be practical and see unapplied knowledge as being wasteful); Political (dominant value is power, and a tendency to desire personal power, influence, and renown, with likelihood of becoming a leader in society); Aesthetic (dominant values are form and harmony with interests in the artistic side of life, and a tendency toward individualism and self-sufficiency); Social (dominant value is the altruistic or philanthropic love of others, and a tendency to be kind, sympathetic, and unselfish); and Religious (dominant value is unity, and a tendency to seek to comprehend the cosmos as a whole, attempt to relate it to themselves, and embrace its totality).

To be precise, we modified the SOV used at Time 2 slightly. The original SOV contained a few dated items with sexist connotations. We modernized these items relatively easily and seemingly without altering their psychological meaning in any substantively significant way. This amounted to simply changing a few pronouns and adding one filler item (which was not scored) for balance.

The SOV has two parts: Part 1 consists of 30 dichotomous items on which people are asked to rank order their personal preferences and indicate how strongly they feel about each by assigning a 3,0 to a *strong preference* or a 2,1 to a *slight preference*; for example, "Assuming that you have sufficient ability, would you prefer to be, A: a banker, or B: a politician?" A strong preference for banker would be communicated by an A = 3, B = 0, response pattern, whereas a slight preference for banker would be communicated by an A = 2, B = 1, response pattern. Part 2 consists of 16 items, each having four options, where people are asked to rank order 1, *most appealing*; 2, *second most*; 3, *third*; and 4, *least appealing*: for example, "If you lived in a small town and had more than enough income for your needs, you would prefer to, A: apply it productively to assist commercial and industrial development, B: help to advance the activities of local religious groups, C: give it to the development of scientific research in your locality, D: give it to The Family Welfare Society." Total scores on the SOV for each scale may range from 10 to 70. Because the SOV is ipsative, the sum of all six scales for each individual always totals 240.

### Procedure

In 1973 or 1974, at age 13 (Time 1), participants were administered the SOV at Johns Hopkins University, where they were participating in special educational opportunities for the gifted. In the mid-1990s, at age 33 (Time 2), these same participants took the SOV again, but this time through the mail as part of their follow-up questionnaire conducted by the Study of Mathematically Precocious Youth at Iowa State University.

## Results

### Descriptive Statistics

Table 1 shows means, standard deviations, and effect sizes for both male and female participants at Time 1 and Time 2. Initially, the female participants displayed a

markedly dominant Social value (significantly distinguished from Time 1's rank-two theme, Aesthetic,  $p < .001$ ). However, over time, Social switched rankings with Aesthetic. By age 33, SOV's Aesthetic value was dominant followed by Social (secondarily) and Economic (tertiary). At Time 2, these three values were tightly clustered; the effect sizes for these two contiguous contrasts, A-S and S-E, are .09 and .16, respectively (both *ns*). For the male participants at Time 1, Theoretical was dominant and closely followed by Political (*ns*), whereas Economic was tertiary. Although Theoretical maintained its dominant status for the male participants at Time 2, Economic and Political switched their secondary and tertiary standing. The ultimately secured (age 33) male group profile was Theoretical–Economic–Political; and the effect sizes for these two contiguous Time 2 contrasts, T-E and E-P, are .29 ( $p < .05$ ) and .27 (*ns*), respectively. Therefore, across Time 1 and Time 2, the dominant feature of the male group profile became more differentiated, whereas that of the female group profile became less so.

A second interesting developmental trend in these data is that across both genders Aesthetic and Economic values took on more saliency with time, whereas the Political and Social values both became less dominant overall. Furthermore, for both male and female participants, the most augmented value in their profile is one more characteristic of the opposite sex, whereas the most attenuated value decay is found on dimensions more characteristic of their own sex. For male participants, their greatest increase change is observed on Aesthetic (.81 effect size units,  $p < .001$ ), whereas their greatest decrease change is on Political (−.69 effect size units,  $p < .001$ ); on the other hand, for the female participants, their greatest increase change is on Economic (.56 effect size units,  $p < .001$ ), whereas their greatest decrease change is on Social (−.78 effect size units,  $p < .001$ ).

This pattern of gender-differentiating attributes be-

coming less pronounced at high levels of intellectual functioning has been noted in other literature (Lubinski & Humphreys, 1990). Here, we see the emergence of less stereotypic preferences over time. For Time 1 data, the average difference between male (M) and female (F) participants for the feminine-triad A-S-R was −.89 effect size units ( $p < .001$ ), and for the masculine-triad T-E-P the average difference was 1.00 effect size units ( $p < .001$ ); for Time 2 data, corresponding contrasts revealed effect sizes of −.47 for A-S-R ( $p < .001$ ) and .56 for T-E-P ( $p < .001$ ). We return to the significance of these attenuated gender differences in the Discussion section.

### Correlational Analyses

Table 2 gives test–retest intercorrelations for the six SOV themes organized in a convergent (diagonal) pattern and discriminant (off-diagonal) pattern. A clear convergent–discriminant pattern is revealed in this matrix. The mean and median test–retest reliabilities of the six SOV scales were .37 and .34, respectively. The two SOV triads, T-E-P and A-S-R, manifest insignificant or lightly positive within-cluster intercorrelations, whereas between-cluster intercorrelations show a sharp negative manifold. This general pattern is also observed within each time frame (i.e., age 13 and age 33; see Appendix).

To assess overall profile stability, we also computed 203 intraindividual (parametric and nonparametric) correlations. For each participant, we correlated their Time 1 SOV scores with their Time 2 scores (mean Pearson  $r = .30$ ,  $SE = .03$ ,  $Mdn = .39$ , quartiles (Q):  $Q_1 = -.06$  and  $Q_3 = .72$ ). Finally, we computed 203 intraindividual Spearman rank-order correlations by correlating participants' Time 1 SOV scores with their Time 2 scores (mean Spearman  $\rho = .29$ ,  $SE = .03$ ,  $Mdn = .34$ , quartiles:  $Q_1 = -.06$ ,  $Q_3 = .72$ ).

Table 1  
Means, Standard Deviations, and Effect Sizes (ES) for the Study of Values (SOV) at Time 1 (Age 13) and Time 2 (Age 33) by Gender

SOV theme	Female participants ( $n = 109$ )					Male participants ( $n = 94$ )				
	Time 1		Time 2		T2 – T1 ES	Time 1		Time 2		T2 – T1 ES
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Theoretical	37.8	6.6	39.5	7.0	.25	46.9	7.6	45.0	7.0	−.25
Economic	35.7	6.8	40.2	9.0	.56**	40.8	6.8	42.9	8.9	.25
Political	39.3	5.9	37.0	5.8	−.39**	45.1	5.9	40.7	6.6	−.69**
Aesthetic	40.7	8.1	42.2	8.1	.19	31.8	7.2	38.2	8.3	.81**
Social	47.1	7.2	41.5	7.1	−.78**	39.7	6.5	37.3	7.7	−.34*
Religious	39.5	9.9	39.6	11.2	.01	35.4	8.4	35.8	11.0	.05

\*  $p < .05$ . \*\*  $p < .01$ .

Table 2  
*Convergent and Discriminant Test-Retest Intercorrelations of the Study of Values Themes Over 20 Years From Time 1 (Age 13) to Time 2 (Age 33)*

Time 1 variable	Time 2 variable					
	1	2	3	4	5	6
1. Theoretical	<b>.47</b>	<i>.12</i>	<i>.15</i>	-.13	-.22	-.25
2. Economic	<i>.11</i>	<b>.32</b>	<i>.17</i>	-.11	-.22	-.20
3. Political	<i>.16</i>	<i>.17</i>	<b>.33</b>	-.11	-.12	-.27
4. Aesthetic	-.10	-.13	-.23	<b>.35</b>	<i>.12</i>	-.04
5. Social	-.30	-.21	-.11	<i>.00</i>	<b>.31</b>	<i>.21</i>
6. Religious	-.30	-.20	-.17	-.03	<i>.08</i>	<b>.43</b>

Note. Convergent test-retest correlations are boldface ( $n = 94$  males; 109 females); off-diagonal, triadic clusters defining adjacency are italicized ( $r_s \geq .14, p < .05$ ;  $r_s \geq .19, p < .01$ ).

### Co-Occurrence Analysis of Dominant Time 1 Theme

Table 3 is a co-occurrence matrix that is based on the most salient SOV theme observed at Time 1. The observed counts reflect the category that the Time 2 theme fell in, that is, Concordant, Adjacent, or Nonadjacent, relative to the theme observed at Time 1. Base-rate expectations derived from Time 1 frequencies also are provided for each of these three categories.<sup>1</sup>

Focusing on column 3 of Table 3 (Concordant), we first computed a kappa coefficient to ascertain whether the co-occurrence of the same SOV theme at both time points exceeded chance expectations. Our kappa coefficient was .12 (with a 95% confidence interval ranging from .04 to .20). Although statistically significant, the magnitude of this coefficient was depressed because of the marked instability of two themes, Political and Social.

To evaluate Table 3 more comprehensively, we computed a chi-square for the entire 18-cell table, namely, 3 (Concordant-Adjacent-Nonadjacent)  $\times$  6 (T-E-P-A-S-R),  $\chi^2(10, N = 199) = 116.87$  ( $p < .001$ ). Accordingly, if the Adjacent-Nonadjacent partitioning is psychologically meaningful, one would expect a divergent pattern in the two types of discordances. There should be (a) more observed than expected Adjacent themes and (b) fewer observed than expected Nonadjacent themes. This is indeed the case. The overall percentages derived from the column totals clearly support this trend: Adjacent expected ( $61.2/199$ ) = 31% and Adjacent observed ( $71/199$ ) = 36% and Nonadjacent expected ( $99.5/199$ ) = 50% and nonadjacent observed ( $70/199$ ) = 35%. Coupled with observed counts surpassing chance expectations for the Concordant column (expected,  $38.3/199 = 19\%$  and observed,  $58/199 = 29\%$ ), this analysis corroborates the idea that the most dominant SOV dimension at age 13 is likely to be a salient aspect of the gifted adult's ultimately developed set of SOV values, or at least a member of the

same cluster. It also suggests that structural properties of the SOV, typically observed in adulthood, are beginning to emerge during early adolescence among gifted youth (see Appendix).

### Discussion

The present investigation supports the idea that global, educationally and vocationally relevant preferences among intellectually gifted adults are somewhat related to early adolescent assessments. Lubinski et al. (1995) provided the first evidence supporting the longitudinal stability of interests in this special population (by using RIASEC over a 15-year time frame). The current study further supports this idea by showing that individual differences in preferences of the intellectually gifted adult are partially related to their values assessed during early adolescence (by using the SOV over a 20-year time frame).

Given the intrinsic differences between the instrumentation used in these two studies (the Strong vs. the SOV), cohort differences among the participants, and, with re-

<sup>1</sup> Readers may be interested in the dominant SOV frequencies at age 33, along with base-rate expectations derived from Time 2 data for all 18 cells mirroring Table 3. First, the Time 2 frequency counts follow: T = 35, E = 52, P = 13, A = 41, S = 19, and R = 39. Now, following the format of Table 3, the expected-observed values for each SOV dimension are provided in descending order: Concordant ( $t_1$ ) = 6.2/17, 13.6/7, 0.8/6, 8.4/9, 1.8/5, and 7.6/14; Adjacent ( $t_1$ ) = 11.4/8, 12.5/21, 5.7/4, 12.0/16, 7.6/7, and 11.8/15; Nonadjacent ( $t_1$ ) = 17.4/10, 25.9/24, 6.5/3, 20.6/16, 9.6/7, and 19.6/10. This too is an impressive pattern in good accord with the intercorrelational pattern of the SOV. The 18-cell chi-square that is based on Time 2 base rate expectations was  $\chi^2(10, N = 199) = 88.09$  ( $p < .001$ ). The kappa coefficient that is based on Time 2 base rates is .12 (with a 95% confidence interval ranging from .04 to .20).

Table 3  
*Co-Occurrence of Dominant SOV Theme at Time 1 (Age 13) and Time 2 (Age 33) Along With Base Rate Expectations Derived From Time 1 Data*

Time 1	<i>n</i>	Time 2			Total
		Concordant <sup>a</sup>	Adjacent <sup>b</sup>	Nonadjacent <sup>c</sup>	
Theoretical	42				
Expected		8.9	11.4	21.7	42
Observed		17	12	13	42
Economic	16				
Expected		1.3	6.4	8.3	16
Observed		7	3	6	16
Political	38				
Expected		7.2	11.1	19.7	38
Observed		6	18	14	38
Aesthetic	19				
Expected		1.8	8.0	9.2	19
Observed		9	5	5	19
Social	54				
Expected		14.6	13.3	26.1	54
Observed		5	25	24	54
Religious	30				
Expected		4.5	11.0	14.5	30
Observed		14	8	8	30
Total	199				
Expected		38.3	61.2	99.5	199
Observed		58	71	70	199

*Note.*  $N = 199$ . Four participants were removed from this analysis because a dominant theme was indeterminable on at least one assessment. SOV = Study of Values.

<sup>a</sup> Base rate expectations were derived for each theme by squaring its proportion observed at Time 1 and multiplying this value by 199. <sup>b</sup> 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 199. <sup>c</sup> Expectations were derived for each theme by first ascertaining three products: Each theme's Time 1 proportion was multiplied by the Time 1 proportions for each of its three nonadjacent themes. These three values were then summed and multiplied by 199.

spect to the current report, a larger test-retest time frame, the present investigation constitutes a constructive replication (Lykken, 1968) of Lubinski et al. (1995). It corroborates the general hypothesis that global educational-vocational preferences (routinely measured in adult populations) can be meaningfully assessed in intellectually gifted young adolescents. These adolescent assessments provide a rough outline of developed inclinations in adulthood toward contrasting educational-vocational pursuits. However, there are some particulars of the present study that are worth highlighting.

It appears that some SOV patterns are more indicative of developing profiles rather than of stable profiles. Theoretical, Economic, Aesthetic, and Religious values are much more likely to maintain a dominant standing during adulthood (if they emerged as dominant during adolescence) than either Political or Social. Our failure to observe many Time 1 and Time 2 co-occurrences for Political and Social is in good accord with shifts within the mean profiles for both genders. This is reported in Table 1: For female participants, Political shifted from

fourth- to sixth-ranked ( $-.39$  effect size units,  $p < .01$ ), and Social shifted from first- to second-ranked ( $-.78$  effect size units,  $p < .001$ ); for male participants, Political shifted from second- to third-ranked ( $-.69$  effect size units,  $p < .001$ ), and Social shifted from fourth- to fifth-ranked ( $-.34$  effect size units,  $p < .05$ ). These marked group-profile shifts attenuate the likelihood of observing co-occurrences for these two particular themes. Therefore, for applied use in working with intellectually gifted adolescents, it might be advisable to view SOV profiles defined by dominant Political or Social values as more indicative of a nascent preference structure. These changes in Social and Political values may reflect, in part, changes in value saliency among the gifted from early adolescence to adulthood, perhaps because of the natural changing presses of life as people move from adolescence to adulthood. Nevertheless, it is important to recall that a dominant standing at age 13 on four values (Theoretical, Economic, Aesthetic, and Religious) is relatively more likely to remain for 20 years.

It also might be useful to note the growth in aesthetic

appreciation for both the male and female participants over these two time periods. Unpublished data suggests that this growth is occurring during early adolescence (Tobin, 1985). Hence, the relatively low Aesthetic value of intellectually gifted young adolescents is another sign that they are still developing and maturing individuals. Interestingly, part of this maturation seems to lead to further differentiation of the dominant preference for male participants but less differentiation for female participants. For both sexes, some gender differentiating attributes appear to lessen over time or with maturity, especially Social for female participants and Political for male participants.

With respect to our co-occurrence analysis, the fidelity of our Adjacent and Nonadjacent categories formed by two SOV clusters, Theoretical–Economic–Political and Social–Aesthetic–Religious, is supported by the data. There are consistent findings throughout the Nonadjacent column. Namely, overall the observed counts are below chance expectations. Furthermore, the overall observed counts within the Adjacent column are above chance expectations, and overall counts for the Concordant column are even more marked in this regard. This analysis indicates that dominant Time 1 and Time 2 themes are much more likely than chance to be Concordant or to belong to the same cluster. This generalization appears to especially hold for Theoretical, Economic, Aesthetic, and Religious themes. We recommend this analytical approach to other investigators working with the SOV in similar as well as other contexts.

This two-triad analysis (T-E-P and A-S-R) also fits with traditional personological accounts of the level and organization of masculine–feminine attributes, on which some treatments of “masculinity” and “femininity” are based (Lubinski, Tellegen, & Butcher, 1981, 1983; Spence, 1983, see below).<sup>2</sup> It appears that a number of masculine characteristics are organized around an “agentic world-view,” whereas many feminine characteristics are oriented toward a “communal outlook on life.” Indeed, on the basis of what is known about the construct validity of the SOV, certainly Aesthetic–Social–Religious may be viewed as communal in orientation (with female intellectuals on average gravitating toward Aesthetic) and Theoretical–Political–Economic appears to be much more agentic in nature (with male intellectuals gravitating on average toward Theoretical).

This above is intriguing because rare mixes of gender-differentiating traits have been postulated to engender a variety of “ideal” psychological states (ranging from creativity to ego development and to personal adjustment; see Lubinski et al., 1981, 1983, for reviews). Indeed prominent co-occurrences of certain male-typical and female-typical attributes is the essence of psychological an-

drogyny (which was anticipated by a number of earlier theorists): agency versus communion (Bakan, 1966), *anamus* versus *anima* (Jung, 1959), instrumentality versus expressiveness (Parsons & Bales, 1955), and masculinity versus femininity (Terman & Miles, 1936). MacKinnon (1962) and other workers from Berkeley’s Institute of Personality Research (IPAR; e.g., Barron, 1969) have long held that profiles dominated by the co-occurrence of the SOV’s two intellectual dimensions (one female-typical and the other male-typical), namely Aesthetic and Theoretical, respectively, depict a personological propensity for creative innovation. Although we are unaware of any reports that provide base-rate expectations in the general population for this two-point configuration, among adults in the present investigation, this constellation is seen in 11% of participants. It appears to evolve developmentally in that only 4% of our participants manifested this profile at age 13. It might be profitable for future investigators to examine this constellation empirically to ascertain whether it is indeed predictive of especially noteworthy achievements.

For intellectually gifted adolescents, we have known for over 20 years that above-level ability testing (administering tests initially designed for much older persons) is most useful for their educational–vocational planning. Yet personal preferences critical for adjustment across various educational–vocational paths has received relatively little attention. The present investigation provides a constructive replication of Lubinski et al.’s (1995) finding that personal preferences assessed in intellectually gifted adolescents might provide some prediction of their ultimately developed (adult) preference structure. It appears that both sets of personal attributes underscored by the Theory of Work Adjustment (abilities and preferences), the critical determinants of educational–vocational adjustment and choice, are profitably assessed in intellectually gifted adolescents using instrumentation initially designed for young adults. This suggests that applied educational and psychological services currently offered to the gifted, like traditional services routinely offered to adult populations (Dawis, 1992), may be refined by teaming above-level ability assessment with preference assessments (Achter et al.,

<sup>2</sup> Of course, theoreticians are aware of the overlap between preferences (interests, needs, and values) and personality constructs more generally (Hogan, 1991; Jackson, 1967, 1977); these domains have enjoyed a long history of intermingling (Dunnette, Kirchner, & DeGidio, 1958). The present findings suggest that long-term forecasts, based on measures of these attributes (cf. Arsenian, 1970; Huntley & Davis, 1983) may be profitably (but cautiously) initiated during early adolescence for the intellectually gifted.

1996; Lubinski & Benbow, 1995) so as to maximize satisfactoriness and satisfaction in both learning and work.

### References

- Achter, J. A., Lubinski, D., & Benbow, C. P. (1996). Multipotentiality among the intellectually gifted: It was never there and already it's vanishing. *Journal of Counseling Psychology, 43*, 65–76.
- Allport, G. W., Vernon, P. E., & Lindzey, G. (1970). *Study of Values*. New York: Houghton Mifflin.
- Arsenian, S. (1970). Change in evaluative attitudes during 25 years. *Journal of Applied Psychology, 54*, 302–304.
- Bakan, D. (1966). *The duality of human existence*. Chicago: Rand McNally.
- Barron, F. (1969). *Creative person and creative process*. New York: Holt, Rinehart, & Winston.
- Benbow, C. P. (1988). Sex differences in mathematical reasoning ability among the intellectually talented: Their characterization, consequences, and possible causes. *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 1% 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. Ambrosio (Eds.), *Talent development* (Vol. 2, pp. 83–100). New York: Trillium Press.
- Benbow, C. P., & Lubinski, D. (in press). *Intellectual talent: Psychometric and social issues*. Baltimore: Johns Hopkins University Press.
- Benbow, C. P., & Stanley, J. C. (1983). *Academic precocity: Aspects of its development*. Baltimore: Johns Hopkins University Press.
- Benbow, C. P., & Stanley, J. C. (in press). Inequity in equity: How current educational equity policies place able students at risk. *Psychology, Public Policy, and Law, 2*.
- Cantril, H., & Allport, G. W. (1933). Recent applications of the Study of Values. *Journal of Abnormal and Social Psychology, 28*, 259–273.
- Clemans, W. V. (1966). An analytical and empirical examination of some properties of ipsative measures. *Psychometric Monographs* (Supplement, Whole No. 14).
- Coffield, K. E., & Buckalew, L. W. (1984). The study of values: Toward revised norms and changing values. *Counseling and Values, 28*, 72–75.
- 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. (1992). The individual differences tradition in counseling psychology. *Journal of Counseling Psychology, 39*, 7–19.
- Dawis, R. V., & Lofquist, L. H. (1984). *A psychological theory of work adjustment*. Minneapolis: University of Minnesota Press.
- Dunnette, M. D., Kirchner, W. K., & DeGidio, J. (1958). Relations among scores on Edwards Personal Preference Schedule, California Psychological Inventory, and Strong Vocational Interest Blank for an industrial sample. *Journal of Applied Psychology, 42*, 178–181.
- Fox, L. H. (1976). The values of gifted youth. In D. P. Keating (Ed.), *Intellectual talent: Research and development* (pp. 273–284). Baltimore: Johns Hopkins University Press.
- Fox, L. H. (1978). Interest correlates to differential achievement of gifted students in mathematics. *Journal for the Education of the Gifted, 1*, 24–36.
- Fox, L. H., & Denham, S. A. (1974). Values and career interests of mathematically and scientifically precocious youth. In J. C. Stanley, D. P. Keating, & L. H. Fox (Eds.), *Mathematical talent: Discovery, description, and development* (pp. 140–175). Baltimore: Johns Hopkins University Press.
- Guilford, J. (1952). When not to factor analyze. *Psychological Bulletin, 49*, 25–37.
- Haier, R. J., & Denham, S. A. (1976). A summary profile of the nonintellectual correlates of mathematical precocity in boys and girls. In D. P. Keating (Ed.), *Intellectual talent: Research and development* (pp. 225–241). Baltimore: Johns Hopkins University Press.
- Harmon, L. W., Hansen, J. C., Borgen, F. H., & Hammer, A. L. (1994). *Applications and technical guide for the Strong Interest Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Hogan, R. (1991). Personality and personality measurement. In M. Dunnette & L. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., Vol. 2, pp. 873–919). 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.
- Huntley, C. W., & Davis, F. (1983). Undergraduate study of value scores as predictors of occupation 25 years later. *Journal of Personality and Social Psychology, 45*, 1148–1155.
- Jackson, D. N. (1967). *Personality Research Form manual*. Goshen, NY: Research Psychologists Press.
- Jackson, D. N. (1977). *Jackson Vocational Interest Survey manual*. London, Ontario, Canada: Research Psychologists Press.
- Jung, C. G. (1959). *Collected works* (Vol. 9, Part I). Princeton, NJ: Princeton University Press.
- 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: Implications for the math-science pipeline. *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. (1995). Optimal development of talent: Respond educationally to individual differences in personality. *Educational Forum*, 59, 381-392.
- Lubinski, D., Benbow, C. P., & Ryan, J. (1995). Stability of vocational interests among the intellectually gifted from adolescence to adulthood: A 15-year longitudinal study. *Journal of Applied Psychology*, 80, 196-200.
- Lubinski, D., & Humphreys, L. G. (1990). A broadly based analysis of mathematical giftedness. *Intelligence*, 14, 327-355.
- Lubinski, D., Tellegen, A., & Butcher, J. N. (1981). The relationship between androgyny and subjective indicators of emotional well-being. *Journal of Personality and Social Psychology*, 40, 722-730.
- Lubinski, D., Tellegen, A., & Butcher, J. N. (1983). Masculinity, femininity, and androgyny viewed and assessed as distinct concepts. *Journal of Personality and Social Psychology*, 44, 428-439.
- Lykken, D. T. (1968). Statistical significance in psychological research. *Psychological Bulletin*, 70, 151-159.
- MacKinnon, D. (1962). The nature and nurture of creative talent. *American Psychologist*, 17, 484-495.
- Parsons, T., & Bales, R. F. (1955). *Family socialization and interaction process*. Glencoe, IL: Free Press.
- Rounds, J., & Tracey, T. J. (1993). Prediger's dimensional representation of Holland's RIASEC circumplex. *Journal of Applied Psychology*, 78, 875-890.
- Spence, J. T. (1983). Comment on Lubinski, Tellegen, and Butcher's "Masculinity, femininity, and androgyny viewed and assessed as distinct concepts." *Journal of Personality and Social Psychology*, 44, 440-446.
- Spranger, E. (1928). *Types of men*. New York: Stechert-Hafner.
- Stanley, J. C. (1953). Study of values profiles adjusted for sex and variability differences. *Journal of Applied Psychology*, 37, 472-473.
- Stanley, J. C. (1977). The predictive value of the SAT for brilliant seventh- and eighth-graders. *College Board Review*, 106, 31-37.
- Stanley, J. C., Keating, D. P., & Fox, L. H. (1974). *Mathematical talent: Discovery, description, and development*. Baltimore: Johns Hopkins University Press.
- Stanley, J. C., Strup, H., & Cohn, S. J. (in press). Ipsative evaluative attitudes versus cognitive abilities and vocational interests of bright male versus female seventh graders. In N. Colangelo, S. G. Assouline, & D. L. Ambroson (Eds.), *Talent development* (Vol. 3). Dayton: Ohio Psychology Press.
- Terman, L. M. (1954). The discovery and encouragement of exceptional talent. *American Psychologist*, 9, 221-230.
- Terman, L. M., & Miles, G. (1936). *Sex and personality*. New York: McGraw-Hill.
- Tobin, D. (1985). *A longitudinal study of values and career interests of mathematically gifted students*. Unpublished doctoral dissertation, Johns Hopkins University, Baltimore.
- Vernon, P. E., & Allport, G. W. (1931). A test for personal values. *Journal of Abnormal and Social Psychology*, 26, 231-248.

## Appendix

Study of Values Intercorrelations at Time 1 (Age 13) and Time 2 (Age 33)

Theme	1	2	3	4	5	6
1. Theoretical	—	.19	.11	-.10	-.43	-.52
2. Economic	.20	—	.18	-.32	-.49	-.46
3. Political	.25	.30	—	-.29	-.37	-.33
4. Aesthetic	-.37	-.31	-.44	—	.05	-.29
5. Social	-.50	-.45	-.35	.04	—	.18
6. Religious	-.47	-.46	-.46	-.06	.20	—

*Note.* Time 2 correlations are above the diagonal, and Time 1 correlations are below. Off-diagonal, triadic clusters defining adjacency are italicized ( $r_s \geq .14, p < .05$ ;  $r_s \geq .19, p < .01$ ). To assess the structural similarity between these two sets of intercorrelations, we correlated the age 13 (Time 1) intercorrelations with the age 33 (Time 2) intercorrelations (parametrically and nonparametrically, respectively): Pearson  $r = .92$ , and Spearman  $\rho = .87$ .

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