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Intelligence and Maturity: Meta-Analytic Evidence for the Incremental and Discriminant Validity of Loevinger's Measure of Ego Development

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This review examined whether Loevinger's measure of personality (ego) development is equivalent to the measurement of intelligence. The authors conducted a meta-analysis of 52 correlations between ego level scores and intelligence test scores (retrieved from 42 studies involving 5,648 participants). The weighted average correlation between ego level and intelligence ranged from .20 to .34, depending on the intellectual ability assessed (e.g., verbal intelligence). Adjusting for measurement unreliability increased these values only minimally. The authors also reviewed 16 studies that examined the association between ego level and various criterion variables (e.g., aggressive behavior) after statistically controlling for the effects of intelligence. Ninety-four percent of the tests revealed significant relations between ego level and criterion variables after controlling for intelligence, indicating that ego development and intelligence are not interchangeable constructs. These findings do not support recent speculations concerning the limited value of stage models of maturity, social development, and moral reasoning.

The construct of intelligence holds a privileged position in the evaluation of new psychological measures and the concepts they purport to assess. Loevinger (1993), for example, argued that psychometricians should ask of every test, "Is this anything more than a poor test of general intelligence?" (p. 57). Lykken (1991) offered a similar caution, observing that "intelligence tends to be correlated with everything," and thus investigators "should make sure that one's finding that A correlated with B is not just because both A and B are loaded on IQ" (p. 35). Such concerns are particularly relevant to studies of social and personality development, where assessment strategies often rely on interviews, sentence completions, and verbal responses to social dilemmas. These measurement procedures may confound the assessment of intellectual abilities with the expression of developmental achievements, such as the growth of impulse control, time perspective, or moral reasoning. This potential confounding has led some investigators to speculate that "contemporary measures of 'moral reasoning' and 'ego development' probably add little to the prediction of meaningful psychological phenomena over conventional general ability measures" (Lubinski & Humphreys, 1997, p. 191).

Such speculation has far-reaching implications for social–developmental research. During the past 30 years, scores of investigators have sought to identify the developmental course and behavioral correlates of constructs purporting to index key dimensions of human development. The extent of this work is illustrated by the frequent use of three measures: Rest's Defining Issues Test, Kohlberg's Moral Judgment Interview, and Loevinger's Washington University Sentence Completion Test (WUSCT) of ego development. The Defining Issues Test is an objective measure of moral reasoning that has been administered to more than 53,000 individuals and discussed in more than 400 articles and books (Rest, Thoma, & Edwards, 1997; Thoma, Narvaez, Rest, & Derryberry, 1999), the Moral Judgment Interview is an interview-based assessment of moral reasoning that has been used in hundreds of studies, and the WUSCT is a semiprojective measure of personality growth that has been used in more than 300 studies and administered to more than 11,000 individuals (Cohn, 1991, 1998). These and related assessment procedures seek to identify developmental changes in reasoning about morality, interpersonal relations, and related constructs. Because reasoning is a salient component of these assessment procedures, it is prudent to ask if such tools assess individual differences in development rather than individual differences in intelligence. Is the assessment of moral reasoning, ego development, and related constructs conceptually and functionally equivalent to the assessment of general intelligence?

The present review addresses one aspect of this question by providing a quantitative assessment of the relationship between intelligence and personality growth, as measured by the WUSCT (Hy & Loevinger, 1996; Loevinger & Wessler, 1970). The WUSCT is widely regarded as one of the most psychometrically sound measures of maturity and personality development. It has been used in several hundred studies and in a variety of clinical and applied settings and translated into at least 11 languages (Westenberg, Blasi, & Cohn, 1998). A recent review of the scientific status of projective techniques concluded that the WUSCT is "arguably the most extensively validated projective technique" (Lilienfeld, Wood, & Garb, 2000, p. 56). Loevinger's instrument

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thus serves as a critical point of inquiry for evaluating the claim that ego development and related constructs add little to the understanding and prediction of meaningful psychological phenomena.

Intelligence and Personality Traits

The potential relationship between intelligence and personality has long been recognized and debated. A half a century ago, Wechsler (1958) commented,

> I have, however, become increasingly convinced that intelligence is most usefully interpreted as an aspect of the total personality. I look upon intelligence as an effect rather than a cause, that is, as a resultant of interacting abilities—nonintellective included. (p. vii)

The relationship between intelligence and personality traits was recently investigated in a meta-analysis of 135 studies involving more than 64,000 participants (Ackerman & Heggestad, 1997). Ten categories of intellectual ability (e.g., general intelligence, crystallized intelligence, math–numerical ability) and 19 personality traits (e.g., well-being, stress reaction, openness) defined the matrix of 190 associations of interest. Sample correlations were available for estimating 161 of the 190 associations. Notably, only 4% of the 161 population correlation estimates were $\geq .30$ (and 90% of the population estimates were $\leq .21$). The largest correlations emerged between measures of intellectual ability and two personality constructs: openness to experience and intellectual engagement.

Ackerman and Heggestad (1997) explicitly excluded from their meta-analysis all studies that involved "developmental assessments (e.g., ego or moral development)" (p. 228), leaving unanswered two questions of increasing importance: (a) Do measures of personality and character development assess anything psychologically meaningful, and (b) do these measures provide any incremental or predictive validity beyond the measurement of general intelligence?

Loevinger's Theory and Measure of Ego Development

Loevinger (1976) has portrayed personality growth as a series of changes in impulse control, interpersonal relations, and conscious preoccupations. Developmental advances in these domains have been depicted in terms of "stages," a term that implies an underlying coherence and structure to personality. Loevinger has identified eight developmental stages, and each stage is defined by a characteristic set of capacities (e.g., impulse control) and milestone developments (e.g., a concern with self-evaluated standards; Loevinger, 1976). For Loevinger, the "ego" is an abstraction, not an extant structure; thus, she has defined the ego informally, referring to it as a "frame of reference" or "lens" through which individuals perceive their social world (*ego development* thus represents a change in one's frame of reference).

Measurement of Ego Development

The WUSCT contains 36 sentence stems; respondents are simply instructed to complete each stem. Several versions of the instrument have been published since 1970. The most recent version of the test, Form 81, is the form that is currently recommended for use with adults because it served as the basis for the revised scoring manual that was published in 1996 (Hy & Loevinger, 1996; Loevinger, 1985, 1998). A new form was developed for adolescents and children over 8 years of age, the Sentence Completion Test for Children and Youths (SCT-Y; Westenberg, Treffers, & Drewes, 1998). Detailed scoring manuals have been developed for the WUSCT (Hy & Loevinger, 1996) as well as for the SCT-Y (Westenberg, Hauser, & Cohn, 2004).

Reliability

Inter-rater agreement per item averages about 85%, and inter-rater agreement within one stage is often close to 95%. Many studies have reported Cronbach's alpha values of .90 or higher. Similar reliability and internal consistency data were obtained for the SCT-Y (e.g., Drewes & Westenberg, 2001; Westenberg, van Strien, & Drewes, 2001).

Intelligence and Ego Development

Loevinger has long sought to disentangle the measurement of intelligence from the measurement of ego development, an issue she raised more than 30 years ago when evaluating the psychometric properties of the WUSCT scoring manual: "What is important," she observed, "is that what we call ego development should not just be another name for intelligence, or that all of its valid variance should not be accountable for in terms of intelligence" (Loevinger & Wessler, 1970, p. 52). Numerous studies have used Loevinger's measure of personality development in conjunction with measures of intellectual ability, providing a large database for assessing the discriminant and incremental validity of the WUSCT. Discriminant validity would be demonstrated by the presence of small correlations between WUSCT scores and intelligence test scores, suggesting little overlap between the two underlying constructs. Incremental validity would be demonstrated by the presence of significant predictive ability of WUSCT scores after statistically controlling for the effects of intelligence on a criterion variable. The present review addresses both issues, investigating if the assessment of ego development is functionally and conceptually equivalent to the assessment of intelligence.

Meta-Analysis

Method

Literature search. A preliminary database was generated from a computer search of WebSPIRS. The search period ranged from 1970 (the publication date of the WUSCT scoring manual) through May 2002. The search key terms *IQ, intelligence, verbal ability,* and *word count* were combined with each of the following terms: *Loevinger, ego development, Washington University Sentence Completion Test,* and *WUSCT.* Additional studies were located using a manual search of published articles, unpublished conference presentations, theses, and dissertations that used the WUSCT; the latter material was obtained from personal files. Approximately 300 research studies were reviewed. This search procedure identified 69 studies that used the WUSCT in combination with measures of intelligence or verbosity. Studies from the latter pool were excluded from the review for the following reasons: (a) Studies did not report correlations (or related statistics) between ego level scores and intelligence; (b) studies were unpublished and not accessible; (c) studies relied on subjective assessments of intellectual ability; (d) studies dichotomized scores on the

Table 1
Correlations Between Level of Ego Development and Measures of Intelligence

Study	*N*	Gender[a]	Age range or mean age	IQ test or ability measure[b]	Independence[c]	Ego level–IQ correlation
Avery & Ryan (1988)	92	3	9–12	1	1	.33
Avery & Ryan (1988)	92	3	9–12	3	2	.19
Blasi (1971)[d]	64	1	12[e]	2	1	.47
Blasi (1971)[d]	59	2	12[e]	2	1	.45
Bonneville (1978)[d]	77	1	12[e]	2	1	.37
Bonneville (1978)[d]	84	1	14[e]	2	1	.36
Browning & Quinlan (1985)[f]	91	3	13–30	1	1	.38
Browning & Quinlan (1985)[f]	91	3	13–30	1	2	.32
Browning & Quinlan (1985)[f]	91	3	13–30	1	2	.32
Browning & Quinlan (1985)[f]	91	3	13–30	1	2	.44
Browning & Quinlan (1985)[f]	91	3	13–30	1	2	.25
Browning & Quinlan (1985)[f]	91	3	13–30	1	2	.23
Browning & Quinlan (1985)[f]	91	3	13–30	2	2	.31
Browning & Quinlan (1985)[f]	91	3	13–30	4	2	.16
Browning (1986)[f]	67	3	13–28	2	1	.26
Candee (1974)[d]	76	—	21[e]	1	1	−.27
Candee (1974)[d]	76	—	21[e]	3	2	.11
Cohn (1984)	124	3	15.3	5	1	.57
Coor (1970)[d]	34	2	14[e]	2	1	.60
Coor (1970)[d]	108	3	13[e]	6	1	.27
Doehring (1999)[e]	140	3	8–12	1	1	−.17
Dubow et al. (1987)	398	3	30–31	2	1	.24
Farrell (1974)[d]	46	—	19[e]	3	1	.29
Fineman et al. (1997)	57	1	28.9	2	1	.41
Frank & Quinlan (1976)	66	1	16.3	1	1	.31
Ginsburg & Orlofsky (1981)	75	1	20[e]	2	1	.58
Haan et al. (1973)	35	3	16–35	1	1	.30
Haan et al. (1973)	35	3	16–35	2	2	.36
Haan et al. (1973)	35	3	16–35	4	2	.27
Head & Shayer (1980)	300	3	12–17	5	1	.20
Helson & Roberts (1994)	90	1	43[g]	1	1	.28
Hoppe & Loevinger (1977)[h]	107	2	13–18	3	1	.14
Hurtig et al. (1985)	72	1	17–18	1	1	.10
Hurtig et al. (1985)	67	2	17–18	1	1	.37
Hurtig et al. (1985)	72	1	17–18	5	2	.02
Hurtig et al. (1985)	67	2	17–18	5	2	.30
Hurtig et al. (1985)	72	1	17–18	5	2	.16
Hurtig et al. (1985)	67	2	17–18	5	2	.20
Jacobson et al. (1991)	137	1	14–44	1	1	.47
Jacobson et al. (1991)	137	1	14–44	4	2	.27
Jacobson et al. (1991)	137	1	14–44	4	2	.34
Kitchener et al. (1984)	74	3	—	1	1	.06
Labouvie-Vief et al. (1989)	72	3	10–77	1	1	.61
Labouvie-Vief & Diehl (1998)	333	3	15–87	2	1	−.06
Labouvie-Vief & Diehl (1998)	333	3	15–87	3	2	.30
Lockett (1979)	53	1	18–47	5	1	.34
Luthar & Zigler (1992; Luthar, 1991)	144	3	14–17	2	1	.36
McCammon (1981)	20	1	12[g]	2	1	.28
McCammon (1981)	20	1	16[g]	2	1	.32
McCammon (1981)	20	2	12[g]	2	1	.58
McCammon (1981)	20	2	16[g]	2	1	.55
McCrae & Costa (1980)	129	2	35–80	1	1	.28
McIntyre (1991)	37	3	15.8	1	1	.62
McIntyre (1991)	44	3	16.2	1	1	.15
Newman et al. (1998)	146	3	15–72	1	1	.47
Newman et al. (1998)	146	3	15–72	1	2	.49
Newman et al. (1998)	146	3	15–72	2	2	.46
Newman et al. (1998)	146	3	15–72	4	2	.37
Rock (1975)[c]	50	—	—	1	1	.30
Rozsnafsky (1981)	26	2	48	2	1	.64
Rozsnafsky (1981)	65	2	42	2	1	.41
Ruprecht (1985)	53	3	22[e]	3	1	−.08
Schenberg (1973)[c]	85	—	—	2	1	.43

Table 1 (*continued*)

Study	*N*	Gender[a]	Age range or mean age	IQ test or ability measure[b]	Independence[c]	Ego level–IQ correlation
Schenberg (1973)[c]	48	—	—	3	1	.17
Silver et al. (1990)	86	3	13–21	1	1	.41
Silver et al. (1990)	86	3	13–21	1	2	.33
Streich (1983)	192	3	16–91	1	1	.56
Streich (1983)	192	3	16–91	4	2	.19
Vaillant & McCullough (1987)	107	2	53–57	3	1	.06
Vincent & Vincent (1979)[e]	100	3	18–60	2	1	.28
Waugh (1984)	78	2	6–11	2	1	.27
Westenberg & Block (1993)	98	3	23[g]	1	1	.28
Westenberg & Block (1993)	103	3	14[g]	1	2	.26
Westenberg et al. (1999)[e]	103	3	8–18	1	1	.49
Westenberg et al. (1999)[e]	112	3	8–18	2	2	.50
Westenberg et al. (1999)[e]	103	3	8–18	4	2	.40
Westenberg et al. (2004)	882	3	8–18	1	1	.31
Wilber et al. (1982)	97	3	27.6	2	1	.41

Note. Dashes in cells indicate that data were not available.
[a] 1 = females only; 2 = males only; 3 = males and females. [b] 1 = Verbal ability or verbal intelligence; 2 = general intelligence; 3 = knowledge and achievement; 4 = performance intelligence; 5 = Piagetian measures of cognitive development; 6 = IQ test not specified. [c] 1 = the correlation that was used when computing the weighted average effect sizes among all independent correlations; 2 = studies not included in the latter analyses (see text for additional details). [d] Cited in Loevinger (1979). [e] Estimated age based on other information (e.g., grade level). [f] Clinical study. [g] Single age group. [h] For demographics, see Hoppe & Loevinger (1977).

WUSCT, for example assigning protocols to either the Impulsive or Nonimpulsive level; (e) studies reported findings published in previous articles. One study failed to report the magnitude of the correlation between ego level and intelligence but did report that the correlation was nonsignificant. In this case we adopted the conservative strategy of setting Pearson's *r* equal to the largest value that would just fail to reach significance given the reported sample size, $\alpha = .05$, and a two-tailed significance test. One additional study failed to report specific correlations, and instead, reported that correlations were "in the 0.10 to 0.20 range" (Head & Shayer, 1980, p. 25). Here, too, we adopted a conservative strategy and included only the largest value ($r = .20$) for use in the meta-analysis. Both of the preceding strategies are conservative because they may inflate the correlation between ego level and intelligence.

Coding. Several pieces of information were retrieved from each study, including sample size, mean age, mean ego level score, and type of intelligence test administered. More than 30 different intelligence tests, subtests, and measures of ability were used in the studies under review. Each intelligence test was assigned to one of five categories: (a) measures of verbal ability and verbal intelligence, (b) measures of general intelligence, (c) measures of knowledge and achievement, (d) measures of performance, and (e) Piagetian measures of cognitive development (Table 1).

Meta-analytic techniques. The index of effect size used in the meta-analysis was Pearson's *r*. Each sample correlation was transformed to z_r using Fisher's *r*-to-*z* transformation. Each z_r was then weighted by the inverse of its variance, giving greater weight in the meta-analysis to sample correlations that provided more precise estimates of the population correlation (Hedges & Olkin, 1985). A test of heterogeneity was subsequently used to determine if sample correlations were homogeneous and obtained from the same underlying population.

Many studies provided more than one correlation between ego level and intelligence; for example, several studies reported correlations between ego level and scores on both the Wechsler Adult Intelligence Scale (WAIS) Verbal and the WAIS Performance subscales. To meet the assumption of independence, we selected one correlation from each sample to include in subsequent analyses. The selection process proceeded as follows. Each sample correlation was initially assigned to one of five categories: (a) correlations between ego level and a measure of verbal ability or verbal intelligence, (b) correlations between ego level and a measure of general intelligence, (c) correlations between ego level and a measure of knowledge and achievement, (d) correlations between ego level and a measure of performance, and (e) correlations between ego level and Piagetian measures of cognitive development. These five categories were rank ordered on the basis of their theoretical relevance to the intelligence–ego level relationship (see Table 1). For example, correlations between ego level and verbal IQ scores were assigned the highest rank order because these correlations were more relevant to the purported ego–intelligence association than were correlations between ego level and performance IQ scores. Several studies reported more than one correlation between ego level and intelligence. In the latter cases, we selected only one correlation from a study: the correlation that had the greatest theoretical relevance.

Sample correlations were subject to measurement error, which, left uncorrected, attenuates the estimated population correlation between ego level and intelligence (Hunter & Schmidt, 1990). The standard correction term was used to correct for measurement unreliability (Ackerman & Heggestad, 1997): $r^*_i = [r_{xy}] \div [\sqrt{r_{xx}}^* \sqrt{r_{yy}}]$, where r^*_i is the adjusted correlation between ego level and intelligence for Study i, r_{xy} is the raw correlation between ego level and intelligence associated with Study i, and r_{xx} and r_{yy} are the estimated reliabilities for the WUSCT and the intelligence test associated with Study i, respectively.

Measurement unreliability associated with the WUSCT was estimated from the Cronbach's alpha coefficients reported in five psychometric studies of the WUSCT (Loevinger & Wessler, 1970; Novy, Blumentritt, Nelson, & Gaa, 1997; Redmore & Waldman, 1975, Studies 1 and 2; Weiss, Zilberg, & Genevro, 1989); the weighted average alpha coefficient was .896 based on data derived from 802 participants. The reliability estimates for 10 intelligence tests were obtained from Phillip Ackerman (personal communication, June 23, 2002; Ackerman & Heggestad, 1997); reliability estimates for 7 additional intelligence tests were obtained from the mental measurements yearbooks or test manuals. When reliability estimates could not be determined, the raw correlations between ego level and intelligence (unadjusted for measurement unreliability) were used in the analyses. For reasons of comparison with earlier reports, the meta-analysis was con-

ducted twice, first using the raw correlations reported by authors and then again using the correlations corrected for measurement error.

Both fixed-effects (FE) and random-effects (RE) meta-analyses were conducted for this review. The hypothesized relationship between ego level and intelligence should be invariant to context, setting, and other variables. Thus, in principle, the current meta-analysis estimated a single parameter. Several writers, however, have recommended using RE analyses because RE analyses yield wider confidence intervals around the weighted average effect size, thereby reducing the likelihood of committing a Type I error. However, the two types of analyses (FE and RE) address fundamentally different research questions, a point that is often misunderstood (Cohn & Becker, 2003). The hypothesized relationship between ego level and intelligence is more consistent with an FE model, but for reasons of completeness we conducted both FE and RE analyses.

Results

We identified 78 correlations between ego level and intelligence (Table 1); 23 additional correlations between ego level and verbosity (word count) were also recovered (Table 2). In total, 51 studies involving 8,133 participants provided usable data (2 studies included both intelligence and verbosity data).

Ego level and intelligence. Correlations between WUSCT scores and intelligence test scores ranged from –.27 to .64; positive correlations were reported in 95% of the samples. The mean, and median, correlation was .31.

We recovered 52 independent correlations, derived from data involving 5,648 participants. The weighted average Pearson correlation between ego level and intelligence was .30 (95% confidence interval [CI] = .27–.32). As expected, there was significant heterogeneity among the 52 sample correlations ($Q = 236.1$, $p < .05$), suggesting the presence of at least one moderator variable. The most obvious candidate for a moderator variable was the type of intelligence test used in a study (e.g., verbal test, achievement test). For each type of intelligence test, we computed the weighted average correlation between ego level and intelligence test scores, the 95% CI, and a test of heterogeneity. Results of the analyses are presented in Table 3.

The weighted average correlation (unadjusted for measurement error) between ego level and measures of verbal intelligence was .32 (95% CI = .30–.34). This estimate of the population correlation is based on findings derived from 22 independent samples involving 2,779 participants. There was significant heterogeneity among the sample correlations within this category ($Q = 119.5$, $p < .05$).

The weighted average correlation between ego level and measures of general intelligence was .32 (95% CI = .28–.35), a finding based on 25 independent samples involving 2,307 participants. Here, too, there was significant heterogeneity among sample correlations ($Q = 89.4$, $p < .05$).

The weighted average correlations between ego level and measures of knowledge and achievement, measures of performance, and Piagetian measures were .20, .29, and .34, respectively (Table 3). The latter population estimates were derived from smaller sets of correlations and thus should be interpreted with caution.

Adjusting for measurement error had minimal impact on the magnitude of the estimated population correlations between ego level and intelligence (Table 3). For example, adjusting for measurement error yielded a weighted average correlation of .33 between ego level scores and intelligence, based on data collected

Table 2
Correlations Between Level of Ego Development and Verbosity (Word Count)

Study	*N*	Gender[a]	Age range or mean age	Ego level–word count correlation
Browning (1987)	158	1	16–18	.44
Browning (1987)	166	2	16–18	.54
Browning (1987)	151	1	19–21	.62
Browning (1987)	140	2	19–21	.56
Browning (1987)	131	1	22–25	.44
Browning (1987)	114	2	22–25	.66
Einstein & Lanning (1998)	92	3	18–46	.60
Ginsburg & Orlofsky (1981)	75	1	20[c]	.43
Hansell et al. (1985)	221	3	13–91	.55
Hershberger (1978)[b]	—	—	—	.63
Jurich & Holt (1987)	32	1	18–32	.72
Kishton et al. (1984)	89	3	14.8	.47
Kishton et al. (1984)	89	3	14.8	.20
Kishton et al. (1984)	89	3	14.8	.23
Kishton et al. (1984)	82	3	18.7	.50
Kishton et al. (1984)	82	3	18.7	.68
Kishton et al. (1984)	82	3	18.7	.40
Loevinger & Wessler (1970)	543	1	12–72	.58
Loevinger & Wessler (1970)	204	1	16–26	.31
McCrae & Costa (1980)	240	2	35–80	.64
Morros et al. (1998)	104	3	55–82	.80
Slaughter (1983)	83	1	24.3	.30
Slaughter (1983)	64	1	24.3	.52

Note. Dashes in cells indicate data were not available.
[a] 1 = females only; 2 = males only; 3 = males and females. [b] Cited in Jurich and Holt (1987). [c] Age estimated from grade level.

Table 3
Correlations Between Washington University Sentence Completion Test Scores and Intelligence: Fixed-Effects Analyses

Coefficient	All measures	Verbal intelligence	General intelligence	Knowledge and achievement	Performance intelligence	Piagetian measures[a]
			Unadjusted for measurement error			
Estimated ρ	.30	.32	.32	.20	.29	.34
No. *r*s (*N*)	52 (5,648)	22 (2,779)	25 (2,307)	8 (862)	6 (704)	5 (383)
95% CI	.27–.32	.30–.34	.28–.35	.13–.26	.22–.36	.25–.43
Q	236.1*	119.5*	89.4*	14.98*	6.95	17.4*
			Adjusted for measurement error			
Estimated ρ	.33	.35	.34	.20	.32	.44
No. *r*s (*N*)	52 (5,648)	22 (2,779)	25 (2,307)	8 (862)	6 (704)	5 (383)
95% CI	.30–.35	.34–.39	.31–.38	.15–.29	.26–.39	.35–.52
Q	306.7*	167.6*	106.9*	11.4	10.4	30.5*

Note. ρ refers to the estimated population correlation. CI = confidence interval.
[a] Two studies reported more than one correlation between ego level and Piagetian scores. To meet the assumption of independent effect sizes, we used the average correlation reported in each of the latter studies when computing the weighted average effect size and associated statistics.
* $p < .05$.

from 52 independent samples (compared with the estimated value of .30, derived from the 52 uncorrected sample correlations reported above). Similarly, the correlation between ego level and verbal intelligence, adjusted for unreliability, was .35, a value that is only marginally higher than the unadjusted estimate of .32.

Seven studies reported the standard deviations of IQ scores. This information was used to examine the impact of range restriction on the correlations between intelligence and ego level that were reported in the latter studies. Adjusting for range restriction yielded correlations that were, on average, 8.9% larger than the sample correlations obtained in the seven studies.

Several additional variables may have contributed to the heterogeneity among ego–IQ correlations. The latter variables include the age of participants, their developmental level, and the presence of psychopathology. Post hoc analyses revealed a significant relation between the mean ego level of a subject sample and the magnitude of the corresponding ego–IQ correlation. Specifically, the mean ego–IQ correlation among samples at the conformist level or lower ($N = 9$) was .45; in contrast, the mean ego–IQ correlation among subject samples whose mean ego level was higher than the conformist level ($n = 6$) was .24. The latter two effect size estimates are significantly different from each other ($Z = 3.11$, $p = .02$). Additional post hoc analyses revealed no significant relationship between the mean age of each sample and the magnitude of the corresponding ego–IQ correlations (regardless of the type of IQ test used), nor was there a significant relation between the gender of the sample and the magnitude of the ego–IQ correlation. Similarly, there was no significant association between the range of ego levels within each sample and the magnitude of the corresponding ego–IQ correlations. Although 31 samples contributed to the latter analyses, the majority of these samples were characterized by a span of five or six developmental levels among participants (e.g., ranging from the Impulsive to the Conscientious level). Thus, there was insufficient variability across studies to rigorously investigate this issue. Finally, we identified five clinical samples ($N = 501$ participants) in our original review. Clinical samples were made up of participants from outpatient psychiatric clinics as well as inpatient psychiatric units. Among clinical samples and nonclinical samples, the weighted average correlations between ego level and intelligence were .23 and .30, respectively, a difference that is not likely to occur by chance ($Z = 1.91$, $p < .06$).

RE analyses. As expected, RE analyses yielded slightly larger effect size estimates and wider CIs. The weighted average correlation between WUSCT scores and all measures of intelligence was .32 (95% CI = .27–.38; $N = 52$). The weighted average correlation between WUSCT scores and verbal IQ was .31 (95% CI = .23–.40; $N = 22$), and the weighted average correlation between WUSCT scores and general intelligence was .38 (95% CI = .30–.46; $N = 25$).[1]

Incremental validity: Removing the influence of intelligence from ego level scores. Using the search procedures described above, we located 16 studies that examined the incremental validity of ego level scores after statistically removing the influence of intelligence (Table 4). The studies examined a range of issues, including the association between ego level and delinquent behavior, aggressive behavior, risk reasoning, maternal sensitivity, breast-feeding, conformity, openness to experience, and psychiatric diagnosis. In total, 31 statistical tests were reported (several studies reported more than one finding); 29 of these tests (94%) revealed significant relations between ego level and the criterion variables after statistically removing the influence of intelligence. An additional 460 studies yielding null findings would need to be identified and included in the above analysis to reduce the mean *Z* value to nonsignificance (Rosenthal, 1991).

Approximately half of the studies provided effect size information (Table 4), indexing the strength of association between ego level and the criterion variables after statistically controlling for

[1] The complete set of random-effects analyses can be obtained from the authors.

Table 4
Incremental Validity of the Washington University Sentence Completion Test of Ego Development (After Removing the Influence of Intelligence)

Study	*N*	Sample	Criterion variable	Relation with ego level controlled for:	Incremental validity of ego level scores[a]
Browning (1986)	67	Adolescent and young adult psychiatric patients	Problem behaviors Length of stay in hospital (n = 41)	General intelligence, age (and gender in second analysis)	R^2 = .06* R^2 = .21***
Cohn (1984)	124	College and secondary school students	Risk judgement	Piagetian measure of cognitive development	Sr^2 = .04**
Fineman et al. (1997)	57	Addicted mothers of newborns	Maternal sensitivity	Intelligence (unspecified)	—
Frank & Quinlan (1976)	66	High-risk delinquent adolescents	Delinquent status	Verbal intelligence	$F(2, 62)$ = 7.8***
Ginsburg & Orlofsky (1981)	75	College women	Identity status	General intelligence	$F(3, 69)$ = 3.81**
Hoppe & Loevinger (1977)	107	Adolescent males	Self-reported conformity	Verbal intelligence, age, grade, GPA	$F(4, 105)$ = 3.93*[b]
Jacobson et al. (1991)	137	Inner city mothers	Breast-feeding Duration of breast-feeding	Verbal and performance intelligence	β = .21* β = .20*
	50	Mothers	Breast-feeding		β = .24*
Labouvie-Vief et al. (1989)	72	Children and adults	Emotional understanding	Verbal intelligence	β = .22
Luthar (1991)	144	High-risk adolescents	Assertiveness Disruptiveness School grades	General intelligence, gender, age, internality, social skills	R^2 = .05** R^2 = .04* R^2 = .07***
McCrae & Costa (1980)	129	Adult males	Openness to experience	Verbal intelligence, education	$F(3, 118)$ = 3.15*
Noam et al. (1994)	269	Child and adolescent psychiatric inpatients	*DSM-III* psychiatric diagnosis	General intelligence, age, gender	F = 7.87***[c]
Recklitis (1993)	245	Adolescent psychiatric patients	Delinquency Externalizing Aggressiveness	General intelligence, gender	R^2 = .13*** R^2 = .11*** R^2 = .08***
Westenberg & Block (1993)[d]	104; 98	Adolescents tested at age 14 and 23 in a longitudinal study	Ego-resiliency Interpersonal integrity Conformity Need regulation	Verbal intelligence	$F(1, 99)$ = 19.61*** $F(1, 92)$ = 12.54** $F(1, 99)$ = 10.20** $F(1, 92)$ = 16.40*** $F(1, 99)$ = 5.86* $F(1, 92)$ = 14.15*** $F(1, 99)$ = 14.40*** $F(1, 92)$ = 10.75***
Westenberg et al. (1999)	118	Child and adolescent psychiatric patients	Type of anxiety disorder	Verbal intelligence	R^2 = .36***
Westenberg et al. (2004)	882	Dutch children and adolescents	Social and physical fearfulness	Verbal intelligence, age	$F(1, 868)$ = 18.71***

Note. GPA = grade point average; *DSM-III* = *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.).
[a] The statistics reflect the incremental validity of ego level scores after controlling for intelligence (and other variables listed in the previous column); for example, R^2 refers to the ΔR^2 due to the inclusion of ego level scores in the regression equation after controlling for intelligence. [b] Degrees of freedom retrieved from earlier analysis. [c] No degrees of freedom were provided in the original article. [d] As was predicted on conceptual grounds, ego level was unrelated to two other variables (self-ease and expressive/playful), after and before controlling for verbal ability.
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

the influence of intelligence. The incremental validity of ego level scores is large in some studies and small in other studies (range = 4%–36%). For example, ego level explained 13% of the variability in delinquency scores in a sample of psychiatric inpatients after controlling for the effects of intelligence (Recklitis, 1993). In contrast, ego level explained 4% of the variability in scores on a scale of disruptiveness–disengagement administered to a sample of psychiatric patients (Luthar, 1991).

Ego level and verbosity. Twenty-three correlations between ego level and verbosity or word count were retrieved (Table 2). Correlations ranged from .20 to .80. Eighteen of the latter correlations were independent, comprising data derived from 2,721 participants. The weighted average correlation between ego level and word count was .54. There was significant heterogeneity among sample effect sizes ($Q = 77.1$, $p < .05$), indicating that one or more moderator variable may be present.

We identified five studies that examined the incremental validity of ego level scores after statistically controlling for the effects of verbosity (word count). Within each study, a significant relationship was reported between ego level and the criterion variable after statistically controlling for the effects of verbosity (Table 5). Indeed, in one study (McCrae & Costa, 1980) verbal fluency served as a suppressor variable and controlling for its influence increased the semipartial correlation between ego level and open-

Table 5
Incremental Validity of the Washington University Sentence Completion Test (After Removing the Influence of Verbosity)

Study	*N*	Sample	Criterion variable	Correlation between ego level and word count	Covariance analysis (adjusting for verbosity)
Einstein & Lanning (1998)	92	University students	Shame	.60[a]	$r_{\text{semi-partial}}$ [b]
Ginsburg & Orlofsky (1981)	75	College women	Identity status	.43	$F(3, 69) = 3.81$**
McCrae & Costa (1980)	230	Adult men	Openness to experience	.64	$r = .31$***
			Extraversion		$r = -.11$*
Morros, Pushkar, & Reis (1998)	104	Older adults	Openness	.80	$r = .22$**
			Community volunteer status		$F(2, 100) = 6.19$**
Slaughter (1983)	64	Low-income mothers	Parent education program intervention status	.30–.52	$F(2, 55) = 8.16$**

[a] Verbosity measured as the number of characters per protocol. [b] Authors did not report the corrected semipartial correlation or *p* value but instead reported that following covariance analysis, "correlations remained essentially unchanged, and there were no changes in the pattern of significant findings, when response length was partialled from SCT scores" (Einstein & Lanning, 1998, p. 568).
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

ness to experience, as well as increasing the semipartial correlation between ego level and scores on Eysenck's Extraversion scale.

Moderator variables. The magnitude of the correlation between WUSCT scores and verbosity was related to the mean age of a sample ($r = .57$, $p < .05$, $N = 13$ studies) but not significantly related to the gender of a sample. There were insufficient data to assess the impact of developmental level on the magnitude of ego level–verbosity correlations.

Discussion

Several investigators have questioned the validity of Loevinger's WUSCT, asserting that contemporary measures of ego development add "little to the prediction of meaningful psychological phenomena over conventional ability measures" (Lubinski & Humphreys, 1997, p. 191). The current findings provide no support for this assertion. Indeed, the findings support, unequivocally, the opposite conclusion: Ego development and intelligence are conceptually and functionally distinct concepts.

Discriminant validity. Evidence for discriminant (conceptual) validity is provided by the estimated correlation between ego level and intelligence, which ranges from .20 to .34 depending on the intellectual ability assessed. Adjusting for measurement error increased these values only minimally. Our findings, retrieved from 42 studies and approximately 5,600 participants, contrast sharply with the reported correlations among intelligence tests themselves. For example, the technical manual for the Wechsler Adult Intelligence Scale (3rd ed.; WAIS-III) reports a correlation of .88 between WAIS-III Full Scale scores and composite scores on the Stanford–Binet Intelligence scale (Wechsler, 1997). Similarly, a correlation of .64 was obtained between WAIS-III Full Scale IQ scores and total raw scores on Raven's Progressive Matrices. Finally, a recent meta-analysis of intercorrelations among six leading child intelligence tests yielded weighted average correlations ranging from .50 to .86 (Sternberg, Grigorenko, & Bundy, 2001); the median intercorrelation was .72, which is more than twice the magnitude of the estimated population correlations between ego level and intelligence. Such findings support the conclusion that ego development and intelligence are conceptually distinct and should not be regarded as interchangeable constructs.

There is an intuitive appeal to the suggestion that variability in ego level scores reflects individual differences in intelligence (in particular, individual differences in verbal abilities such as verbosity, word fluency, vocabulary) rather than individual differences in impulse control, time perspective, or other aspects of personality growth. Yet the weighted average correlation between verbal IQ and ego level was only .32 (and only .35 when adjusted for measurement unreliability). Inspection of the WUSCT scoring manual suggests why there is only a modest association between ego level and verbal ability. First, the scoring manual explicitly excludes sentence length as a criterion for scoring responses, and a review of the manual reveals numerous instances where short responses are assigned higher ratings than longer responses. Consider two responses to the stem "Raising a family . . .": (a) "takes planning" and (b) "is nice if you can afford children" (Loevinger, Wessler, & Redmore, 1970, pp. 9 and 3, respectively). The first response is two words long yet scored at the Conscientious stage (Stage 5 on an 8-point developmental scale); the second response is seven words long yet scored at the Self-Protective stage (Stage 2 on an 8-point scale). Such scoring "reversals" should not be present if verbosity guided the scoring procedure. Second, verbal fluency per se is unlikely to influence WUSCT responses. Tests of verbal fluency typically assess the speed with which words are produced in response to specified constraints (e.g., producing as many words as possible that start with the letter *C*, within a certain time period). The WUSCT bears no resemblance to the latter tasks. Third, most adults have sufficient vocabulary to express the key signs of ego development (impulse control, perspective taking, self-reflection). Consider two responses to the stem "My mother and I . . . ": (a) "are very much alike even though I don't like to think so" and (b) "see each other once a year—she lives in Florida" (Loevinger et al., 1970, pp. 81 and 76, respectively). The first response is rated at the Individualistic stage (Stage 6 on an 8-point scale), and the second response is rated at the Conformist stage (Stage 4 on an 8-point scale). Despite the notable difference in ratings, the words that are used in both responses are present in children's readers by second grade (Harris & Jacobson, 1982). The critical difference between the two responses lies not in sentence length but in the degree of self-reflection revealed by each response.

Our meta-analysis yielded a moderately high correlation between ego level and word count (weighted average $r = .54$), a value that is close in magnitude to the correlation of .58 reported by Loevinger and Wessler (1970). The correlation between ego level and word count does not reflect a spurious relationship: More words are typically needed to express complex thoughts and emotions. The correlation becomes spurious if word count is used as a scoring criterion, which it is not (Hy & Loevinger, 1996). Several findings support Loevinger's conclusion that the WUSCT is not a proxy measure of verbosity. First, our review of five studies (and six statistical tests) indicates that the relationship between ego level and criterion variables remained significant after statistically controlling the number of words on WUSCT protocols. Second, written and oral administration (via the telephone) of an abbreviated version of the WUSCT yielded similar ego level scores among respondents with limited education, even though their telephone responses contained twice as many words as did their written responses (Hansell, Sparacino, Ronchi, & Strodtbeck, 1985). Among participants with a high school education, however, written responses yielded higher ego level ratings than did oral responses even though oral and written responses were similar in word length. Both findings support the conclusion that verbosity (word count) is not the determining factor in ego level ratings. Finally, Slaughter (1983) assessed the impact of verbosity on ego level scores in a longitudinal study of low-income mothers who were exposed to a unique parenting intervention. Mothers who participated in the intervention advanced in ego level between Time 1 and Time 2 assessments, yet there was no concomitant increase in word count, suggesting that the intervention led to a genuine increase in ego level and not simply an increase in verbal fluency.

The above findings demonstrate that WUSCT scores contain variance that is not shared with intelligence or verbosity, providing strong evidence for discriminant validity of the WUSCT. Such evidence, however, does not demonstrate that the nonshared variance is systematic or psychologically meaningful. That is, the findings do not address the issue of incremental validity, an issue we address below.

Incremental validity. Lubinski and Humphreys (1997) proposed that psychological measures should be considered functionally equivalent when "two measures (which may look quite different and carry quite different names) assess individual differences that translate into interchangeable forecasts over a broad mix of criteria" (pp. 164–165). Our review of 16 studies (and 31 statistical tests) of incremental validity does not support the claim that intelligence test scores and ego level scores yield interchangeable forecasts: 94% of the tests of incremental validity revealed significant relations between ego level and a host of criterion variables after statistically removing the influence of intelligence. These findings are especially noteworthy because many analyses controlled for the influence of several variables simultaneously (e.g., age, gender, and intelligence), thereby introducing unusually stringent tests of incremental validity.

We sought to identify all studies of incremental validity that evaluated the relationship between ego level and behavioral or psychological phenomena (controlling for individual differences in intelligence). The latter studies were retrieved from the population of (approximately) 300 studies referred to above. Because ego level represents a person's characteristic level of maturity, we expected WUSCT scores to be related to a wide variety of behaviors and traits. For example, Loevinger's developmental model predicts that impulse control is weakest at the preconformist stages and increases in strength as individuals progress through the Conscientious stage. Studies of incremental validity (reviewed above) supported this prediction. For example, after controlling for individual differences in intelligence, ego level scores were negatively related to disruptiveness (Luthar, 1991) and positively related to impulse regulation (Browning, 1986) and complexity of risk judgments (Cohn, 1984). WUSCT scores were also positively related to need regulation, a relationship that was maintained even after controlling for individual differences in intelligence (Westenberg & Block, 1993). Loevinger's developmental model also predicts that advances in maturity are accompanied by changes in interpersonal style; specifically, an egocentric orientation is replaced by an increasing capacity for perspective taking. Studies of incremental validity (again controlling for individual differences in intelligence) supported this prediction. For example, studies revealed positive relations between ego level and tolerance (Helson & Roberts, 1994), nurturant parenting (Jacobson, Jacobson, & Frye, 1991), and community volunteer status (Morros, Pushkar, & Reis, 1998). In contrast, negative relations were obtained between ego level and aggressiveness, delinquency, and other externalizing behaviors that reflect egocentrism and impulsivity (Browning, 1986; Frank & Quinlan, 1976; Recklitis, 1993). As predicted, ego level was significantly related to maternal sensitivity (Fineman, Beckwith, Howard, & Espinosa, 1997) and emotional understanding (Labouvie-Vief, DeVoe, & Bulka, 1989), although neither relationship remained statistically significant after controlling for individual differences in intelligence (a finding that may reflect, for one of the studies, an unusually high sample correlation between WUSCT and verbal intelligence, $r = .61$). Finally, Loevinger's developmental model predicts that advances in maturity are accompanied by changes in conscious preoccupations and personal concerns. Individuals at the preconformist stages tend to be preoccupied with issues of trouble, danger, and control; in contrast, individuals at the conformist stage are preoccupied with social approval, and individuals at the postconformist stages are preoccupied with self-evaluated standards, personal achievements, and psychological conflicts. Here, too, studies of incremental validity supported the latter predictions. For example, fearfulness of physical danger was negatively related to ego level (Westenberg, Drewes, Goedhart, Siebelink, & Treffers, in press), whereas the achievement of a personal identity was positively related to ego level (Ginsburg & Orlofsky, 1981). Loevinger's model predicts that individuals at the Conformist and Self-Aware stages are concerned with social desirability and social approval. Here, too, studies of incremental validity supported this prediction. Individuals at the conformist level displayed increased fearfulness of negative social evaluation (Westenberg, Drewes, et al., in press; Westenberg, Siebelink, Warmenhoven, & Treffers, 1999) and a greater likelihood to experience shame (Einstein & Lanning, 1998).

Several investigators have predicted a modest relationship between ego development and openness to experience. Individuals who are intellectually curious, nondogmatic, and willing to reevaluate their personal values should also display a capacity for self-awareness and perspective taking, capacities that characterize advances in personality (ego) development. Several findings support

this hypothesis. McCrae and Costa (1980) reported a small correlation ($r = .23$) between ego level and openness; Morros et al. (1998) reported a similar finding ($r = .35$). Notably, both ego development and openness are related to intelligence. The weighted average correlation between openness and crystallized intelligence is .30 (Ackerman & Heggestad, 1997); the weighted average correlation between ego level and verbal intelligence (one index of crystallized intelligence) is .35. McCrae and Costa (1997) commented that the magnitude of association between intelligence and openness indicates that one construct cannot be reduced to the other, a conclusion that also characterizes the relationship between ego development and intelligence.

Some degree of association between intelligence and ego development is expected. The capacity for self-awareness, perspective taking, and psychological insight most likely requires some degree of intelligence. Intellectual capacity, however, may be a necessary but insufficient condition for reaching relatively high levels of maturity. Thus, there may be an asymmetric relationship between intelligence and ego level (Hauser, 1976): A wide range of IQ scores may be present among individuals at the earliest stages of personality (ego) development, whereas a more restricted range of IQ scores (ranging from above average to high) may be present among individuals at the later developmental stages. The current analyses provide tentative support for this hypothesis, but the available data are limited, and additional research is needed to rigorously address the issue.

The observed correlations between intelligence and WUSCT scores may also reflect, in part, a systematic error in the measurement of ego development. Loevinger (1993) noted that

> any method that relies on internal consistency for its bootstraps, as ours does, is bound to end up slanted towards its most reliable elements. The cognitive and intellectual element is just what is most easily and reliably judged. Therefore it will assume more weight in the outcome of measurement than it does in life . . . (p. 61)

Notably, however, the present meta-analysis did not reveal markedly different correlations between WUSCT scores and verbal and nonverbal aspects of intelligence (see Table 3).

Several limitations should be noted regarding the current review. First, there was significant heterogeneity among sample correlations, indicating that our parameter estimates can only be viewed as suggestive. Future research will need to investigate more carefully the moderator variables that contribute to heterogeneity among correlations. Second, we probably failed to identify every study that examined the association between intelligence and WUSCT scores. This failure, however, only introduces a confound if there is a systematic bias between the studies that are retrieved and the studies that remain hidden in file drawers. Although significant results are more likely to be published than nonsignificant results, the present review was unlikely to fall prey to this bias. The conceptual and psychometric debates concern the magnitude of association between intelligence and ego level (large vs. small) and not the absence of a relationship per se (indeed, publishing nonsignificant correlations would be more notable in this context). In contrast, studies of incremental validity might remain unpublished when WUSCT scores have no significant predictive validity beyond their association with intelligence. Our calculation of a fail-safe *N* suggests that hundreds of such studies would need to be hidden in file drawers to invalidate the current conclusions, a scenario that seems unlikely. Third, we did not adjust for the effect of range restriction on the estimated population correlation between ego level and intelligence. Only seven studies reported the information needed to correct for this artifact. Although the average adjustment within these studies was small (8.9%), the available data are too limited to permit extrapolations to the larger set of studies used in the meta-analysis. This general problem is not unique to the present review (e.g., Ackerman & Heggestad, 1997). Fourth, the present review may underestimate the predictive validity of the WUSCT. In each of the 31 tests of predictive validity that we reviewed (Table 4), investigators examined the association between ego level scores and criterion variables after statistically removing the influence of intelligence. Yet Block (1995) argued that this analytic strategy may overestimate the importance of intelligence because it "claims for its own banner" (p. 396) shared variance that may be more appropriately associated with other variables (e.g., ego development). Thus, future studies may benefit from analyses that enter ego level scores into regression equations prior to, as well as after, inclusion of IQ scores (e.g., Westenberg, Drewes, et al., in press; Westenberg et al., 1999).

The current findings have implications that extend beyond our evaluation of Loevinger's measure of ego development. Several respected investigators have questioned the utility of developmental measures of social, moral, and personality development, arguing that such measures contribute little to the understanding of developmental phenomena. For example, Lubinski and Humphreys (1997) commented,

> Investigators purporting to assess optimal forms of psychological functioning with innovative measures (e.g., creativity, ego development, moral reasoning) frequently launch their validation campaigns without ever considering the possibility that preexisting concepts and measures [i.e., conventional ability measures] might explain their outcomes of interest more fully. (p. 191)

Similarly, Lykken (1991) wrote, "One can reasonably wonder whether many of the interesting findings obtained in research on Kohlberg's Stages of Moral Development would remain if verbal intelligence had been partialed out in each case" (p. 35). Sanders, Lubinski, and Benbow (1995) tested the latter hypothesis and found that scores on the Defining Issues Test were unrelated to 62 criterion variables after partialing out the effects of verbal ability, a finding that prompted the following speculation:

> Other psychological constructs, especially those of the fulfillment variety (purporting to index sophisticated forms of psychological development), such as ego development and self-actualization, appear to be likely candidates for analyses similar to those reported here. . . . It is intriguing to speculate on the extent to which findings based on these instruments (and interpreted in terms of constructs they purport to assess) are actually more centrally related to the construct of general intelligence or the specificity of one of its major markers (e.g., verbal ability). (Sanders et al., 1995, p. 502)

The preceding speculations raise important issues that require careful investigation. Speculation, however, should not replace empirical scrutiny, and edict should not replace evidence when evaluating the presumed contribution of intelligence to personality development, moral development, or related aspects of maturity and social development. Nor should reference to the findings of a single study replace the accumulated evidence of an extant body of

research. The current review, based on findings derived from 51 studies, reveals that at least one developmental variable (ego development) is not interchangeable with the construct of intelligence. Additional reviews are needed to evaluate the contribution of intelligence to other developmental constructs.

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