Errors in Self-Knowledge and the Transition to Adulthood

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Within social psychology, an extensive literature has developed that identifies and explains systematic errors of self-knowledge (e.g., Ehrlinger, Johnson, Banner, Dunning, & Kruger, 2008; Taylor & Brown, 1988). Some of the latest work on this general topic has gravitated around the seminal research of Kruger & Dunning (1999). They found consistent differences in the size and direction of errors in self-knowledge between people who perform in the bottom quartile compared to those who perform in the top quartile, as shown in the figure below, from Dunning (2005).

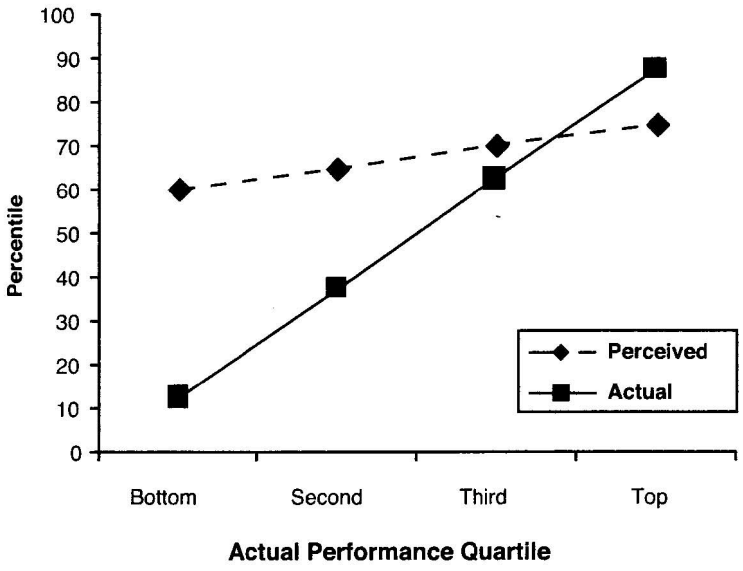

FIGURE 2.1. Typical relationship found between perceived and actual performance in Kruger and Dunning (1999) and follow-up studies.

Specifically, Kruger & Dunning reported that people who perform at the lowest quartile typically perceive their performance as average or slightly above average; thereby creating a large discrepancy between their low actual performance and their perception that

their performance is average or above. In short, students scoring in the lowest quartile perceive their performance, relative to their peers, in excessively positive terms.

Conversely, Kruger & Dunning found students who perform at the highest quartile typically perceive their performance as slightly above average; thereby creating another, albeit smaller, discrepancy between their high actual performance and their perception that their performance is only slightly above average. In short, students scoring in the highest quartile perceive their relative performance in excessively negative terms.

Through a series of studies, Dunning and his many colleagues (e.g., Ehrlinger & Dunning, 2003; Dunning, Johnson, Ehrlinger, & Kruger, 2003) have been able to explain these discrepancies in self-knowledge in terms of errors of meta-cognition, that is, errors people make in thinking about their own performance. They found that the meta-cognitive errors made by people in the lowest quartile were different from those made by people in the highest quartile. The meta-cognitive errors of the lowest performers were found to center on their pre-conceived views of their own skills and abilities. The lowest performers generally think of themselves as normal, or maybe even slightly above normal, and this self-perception determines their self-assessments, even in the face of experiences that should give them clues that they were not performing well, or even normally (Dunning, et al., 2003). In fact, Dunning has argued that if people in the lowest quartile are trained to appreciate what it takes to perform at a higher level, they understand more about what they need to do in order to improve, thereby increasing the likelihood that they will shift themselves to a higher quartile in the future. However, it is also possible that correct self-knowledge for the lowest performers may have negative consequences, particularly for individuals unable to improve their meta-cognitive skills. A substantial body of research has demonstrated the beneficial and protective functions of overly positive self-evaluations (Kunda, 1990; Taylor & Brown, 1988).

In contrast, research has demonstrated that the meta-cognitive errors of the highest performers are based on their assumption that other people perform at the same level they

do (Dunning et al., 2003). Typically, when top performers are confronted with evidence that their skills are superior to those of their peers, they adjust their self-evaluations upward. Thus, research about the meta-cognitive errors made by the top and bottom performers suggests ways of correcting their errors in self-knowledge. While these corrections may lead to improvements in performance or self-evaluations, it is unclear what the long term consequences are for errors in self-knowledge and whether correcting these errors is beneficial, especially for those in the lowest quartile.

The present study is a preliminary exploration to determine if the application of this paradigm will deepen our understanding of the origins of significant outcomes experienced during the transition to adulthood. We broadened the application of this paradigm in three ways. First, previous research has defined performance in terms of specific skills, such as those involved in tests of English grammar or driving a car; while the present study expanded this definition to include performance on a test of intellectual ability, specifically, the Peabody Picture Vocabulary Test (Dunn, 1981). Second, this study broadened the application of this paradigm by considering data from a nationally representative sample of adolescents, the National Longitudinal Study of Adolescent Health, known as Add Health (Udry, 2003). Previous research has been conducted on small, select samples, often related to institutions of higher education. Third, this study applied the Kruger & Dunning paradigm longitudinally, comparing the respondents' performance, and perceptions of their performance, at two times separated by about 7 years. Previous research in this area has involved data collected at one point in time or at two points in time separated by a semester. In this way, we aim to determine the extent to which the errors in self-knowledge affect the outcomes of youth as they make the transition to adulthood.

Method

Participants

This study is based on analyses of the first and third waves of a longitudinal data source known as Add Health (Udry, 2003). Specifically, we used data from the Public Use

CD for these analyses.[1] The first wave of data collection occurred in the homes of 7th through 12th grade students between April and December 1995 (Harris et al, 2003), with the selected students and their parents participating. The third wave attempted to follow up on all of the Wave I students and collected data from them in their homes between August 2001 and April 2002. About 77 percent of the original Wave I sample participated in Wave III.

The sample for this study was generated after applying several filters to the total Wave I and Wave III sample. First, participants were selected into our sample if they possessed Wave III weights, thereby allowing us to adjust the data to reflect a national sample. Second, we included in our sample participants who had no missing data on their Peabody Picture Vocabulary Tests or their reports of perceptions of their own intelligence. We filtered out cases with missing data on these key variables because we wanted to assess the effects of discrepancies at the first wave on intellectual and other outcomes at the third wave. Third, we selected only those participants who reported at wave one being born in the U.S. and speaking English at home. We chose to include in our sample only these participants because we wanted our sample to include only those who had an opportunity to acquire an age appropriate English vocabulary at the first wave. Fourth, we included in our sample only those participants whose biological mother completed the parent questionnaire at Wave I in order to increase the likelihood of obtaining accurate information about the medical history of the participants.

After applying these filters, our final sample consisted of 2527 youth. At the first wave, these youth had an average age of 15.49 (SD = 1.54), and at the third wave, they had an average age of 21.84 (SD = 1.56). A majority of them (66%) were nonHispanic White and about 45% were male. The most commonly reported parental level of education was "high school diploma."

Measures

Intellectual ability was measured at both waves by the Add Health Picture Vocabulary Test (AHPVT), an abridged version of the revised Peabody Picture Vocabulary Test (Dunn, 1981). During the in-home interviews at both waves, the interviewers read aloud each of 87 words and the participants were asked to identify which picture, out of several portrayed on a laptop screen, was associated with each word. The analyses reported here made use of 3 indices derived from the AHPVT: the percentile rank of the participants at both waves (specifically, PVTPCT1L, PVTPCT3) and the standardized AHPVT score at Wave I (PVTSTD1). In our sample, the standardized AHPVT scores averaged 101.95 (*SD* = 14.15) and ranged from 10 to 136.

Participants were asked to evaluate their own intelligence at both waves on a 6-point scale during their in-home interviews. As shown in Table 1, the most commonly selected

Table 1

Distribution of Perceived Intelligence at Two Waves

Compared with (to) other people your own age, how intelligent are you?

	Percentage	
Response Categories	Wave I	Wave III
1. Moderately below average	0.83	0.67
2. Slightly below average	4.79	3.28
3. About average	36.92	34.31
4. Slightly above average	23.23	25.92
5. Moderately above average	27.98	29.44
6. Extremely above average	6.25	6.37

Note: $N = 2527$. H1SE4, H3SP4 are the variables considered.

response at both waves was "about average." Nonetheless, a higher percentage described themselves as "above average" (combining categories 4, 5, & 6); while very few saw themselves as "below average" (combining categories 1 and 2).

Participants were asked to respond to a subset of 9 items from the CES-D depression scale (Resnick, Bearman, Blum et al, 1997) at both waves, by reporting how

often they experienced specific symptoms, ranging from 0 (never) to 3 (most of the time). After recoding the 2 reverse-worded items, we summed the scores across items and calculated the mean score. We found that the sample reported slightly fewer depressive symptoms at Wave III (M = 0.49, SD = .44) than at Wave I (M=0.60, SD = .46).

At Wave III, the heights and weights of the participants were directly assessed by the interviewers and BMI indices were calculated. The average BMI for the whole sample was 26.16 (SD = 5.97). Participants were categorized into underweight (9%), normal weight (46%), and overweight (45%).

The participants were asked several questions about their educational attainment at Wave III. About 11% reported completing less than 12 years of education, and 84% reporting obtaining a high school diploma. Only 8% reported having no degree at all.

Parents were interviewed at Wave I and they were asked questions about a variety of topics, including whether their child had received Special Education services during the past 12 months (9% said yes), whether their child had mental retardation (less than 1% said yes), and whether their child had a learning disability (12% said yes).

Results

Performance vs. Perception: At both Wave I, r (2527) = .32, p< .0001, and Wave III, r (2527) = .29, p < .0001, there were significant correlations between actual intellectual performance scores and perceived intelligence scores. The size of these correlations is consistent with the findings of Mabe and West (1982) who conducted a meta-analysis of 55 studies and found the average correlation between self-evaluations of ability and measures of intellectual performance to be .29. At best, this level of association indicates only around a 10% overlap in variance between performance and perception, leaving ample room for errors in self-knowledge.

We proceeded to examine the data from each wave in terms of the Kruger & Dunning paradigm. We divided the actual performance scores into 4 quartiles, plotting them on the horizontal axis, and then plotting the perceptions of ability on the vertical axis. Below

is the result for the first wave's data. Note that the average perception of ability for all quartiles was above 3, the category reflecting "about average." The resulting graph is similar for both waves, and similar to the first figure presented above. That is, people performing in the bottom quartile had the greatest discrepancy between actual and perceived ability; while, people performing in the top quartile underestimated their performance.

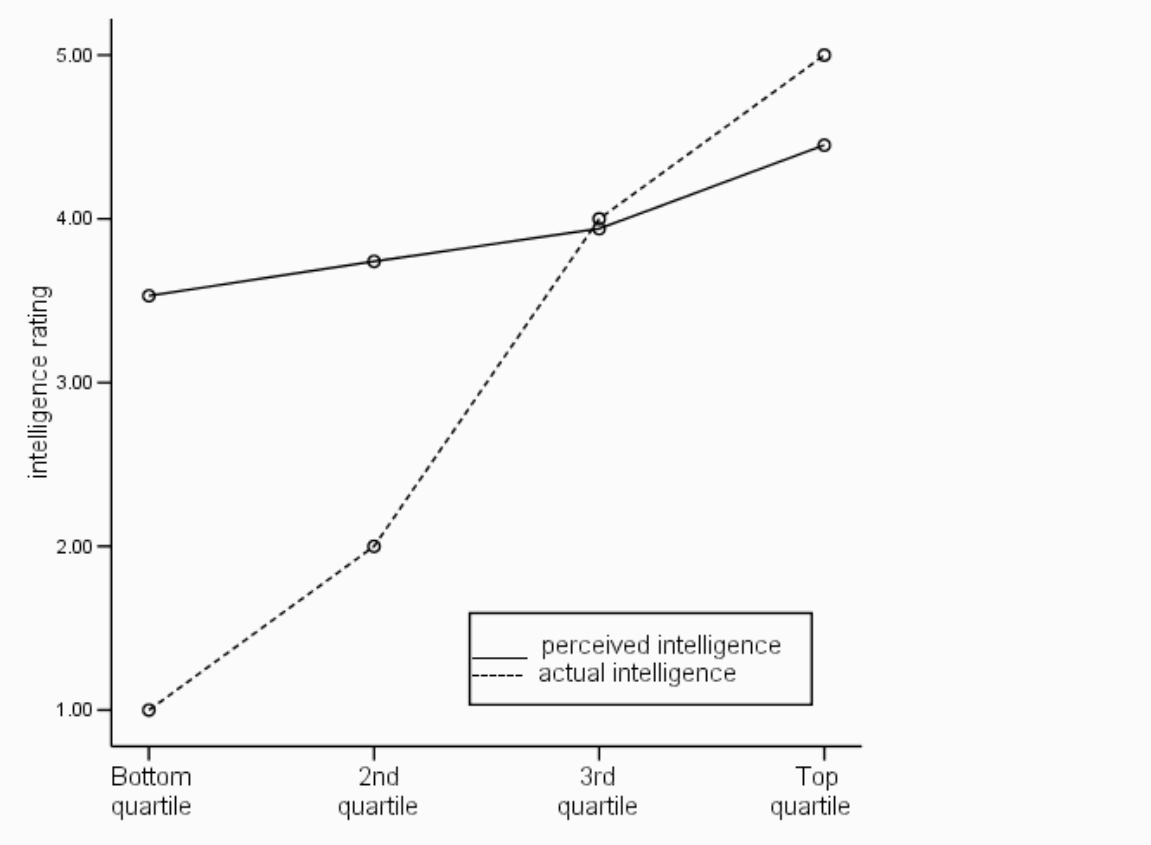

Figure 2.2. Performance by Perception of Intellectual Ability, Wave I

We examined the frequency of disabled youth within each quartile at the first wave. We defined disability in terms of parents' reports of student having mental retardation or learning disabilities, or utilizing special education services. We found that 26% of the bottom quartile students were described by their parents as disabled, while 15% of the second quartile, 12% of the third quartile, and only 7% of the top quartile students were described this way by their parents. Overall, about 15% of the parents of the first wave

students described their children as having any of these disabilities. Therefore, the bottom and top quartile had an over and under abundance, respectively, of students with disabilities.

Consistency vs. Change. One of the hallmarks of tests of intellectual ability is their reliability. Indeed, the correlation between the Wave I and Wave III AHPVT percentile scores was .69, $p < .0001$. In comparison, the correlation between Wave I and Wave III perceptions of intellectual ability was .39, $p < .0001$. Despite the statistical significance of these findings, these correlations indicate that some degree of change was happening in these two variables between the two waves.

The sample as a whole increased in perceived intelligence between Waves I and III: $M = 0.08$, $SD = 1.17$, $t(2527) = 3.44$, $p < .001$. This was true despite a slight decrease in actual intelligence: $M = -0.89$, $SD = 22.31$, $t(2527) = 2.01$, $p < .05$. There was no significant difference between the change in perceived intelligence scores of those who increased in their AHPVT quartile placement between Waves I and III ($M = 0.05$, $SD = 1.12$) and those who were placed in the same quartile across waves ($M = 0.13$, $SD = 1.18$), $t(1920) = 1.27$, $p = .20$, *ns*. Thus, it appears that both actual and perceived intelligence scores changed during the seven years between the two waves, but these changes did not appear to be related systematically and consistently to each other, at least in terms of the whole sample.

Consequently, we examined the percentage of participants who changed quartiles in this interval, and found that about 48% changed quartiles. However, those at the bottom quartile (63%) and the top quartile (62%) were most likely to remain in the same quartile over time. Those in the second (41%) and third (44%) quartiles were less likely to remain in the same quartile. Of course, those in the middle two quartiles at the first wave had more opportunity to shift quartiles, since they could move up or down, while those in the top or bottom quartiles could only move in one direction. Among those in the bottom quartile for

intelligence at Wave I, those with a disability were slightly more likely to remain in the bottom quartile at Wave III (67%).

Consequences. One of the explanations for errors in self-knowledge is that such errors protect individuals from harsh realities, such as low ability or a bad medical diagnosis (Taylor & Brown, 1988). To examine the potentially positive effect of perceptions of normal intelligence on emotional well-being, we correlated these perceptions with depression, separately for both waves. These mean perceptions of intelligence at Wave I (M = 3.91, SD = 1.08) and Wave III (M = 3.99, SD = 1.04) indicated that the average perception was "above average." These perception scores were negatively correlated with depression scores at Wave I, r (2527) = -.18, $p < .001$, and Wave III, r (2527) = -.10, $p <$ .0001, indicating that the higher the perception of intelligence, the lower the depression.

We wondered whether this negative correlation held for both the top and bottom quartiles. If self-views served a protective function, we would expect a stronger association between perceptions and depression for those at the bottom than those at the top quartile. We found support for this expectation at both waves. Specifically, at Wave I, the correlation between perception and depression for those at the bottom quartile, r (640) = -.15, $p < .05$ was significant, while this correlation was not significant for those at the top quartile, r (628) = -.04, p = .57. At Wave III, the correlation between perception and depression for those at the bottom quartile was greater, r (601) = -.18, $p < .0001$, than for those in the top quartile, r (624) = -.10, $p < .01$.

Overall, depression scores decreased between Waves I and III (M = -0.12, SD = 0.50). This decrease was similar in size to that reported by those in the bottom quartile (M = -0.15, SD = 0.54). Interestingly, the decrease was not as great for those in the top intelligence quartile (M = -0.06, SD = 0.49). Indeed, these two groups differed significantly in their change of depression scores, t(1257) = 2.87, $p < .01$. These results

suggest that those in the lowest quartile became less depressed overall, while those in the top quartile at the first wave did not change in their degree of depression.

We considered two important outcomes for the transition to adulthood. Specifically, we looked at educational attainment and weight status at Wave III for individuals placed in the intelligence quartiles at Wave I. While 84% of our total sample reported obtaining a high school diploma by Wave III, this was true of only 74% of those placed in the bottom intelligence quartile at Wave I. In contrast, 92% of those placed in the top intelligence quartile at Wave I reported obtaining a high school diploma by Wave III. Eighteen percent of those in the bottom intelligence quartile reported obtaining no degree at all (no HS diploma or GED equivalent) by Wave III, while this was true of only 8% of the sample as a whole and less than one percent of those in the top intelligence quartile.

In terms of weight status, those in the bottom quartile of intelligence at Wave I were more likely to be overweight (BMI $\geq$ 25) at Wave III than their higher quartile peers. While 45% of the sample as a whole was categorized as overweight at Wave III, this was true of 51% of those in the bottom quartile, but only 38% of those in the top quartile. The reverse trend held for those categorized as underweight at Wave III. Specifically, while only 9% of those in the bottom quartile were underweight, about 11% of those in the top quartile were underweight.

Discussion

This preliminary study is aimed at exploring the usefulness of a social psychological paradigm for deepening our understanding of the origins of variations in educational and health outcomes experienced during the transition to adulthood. These preliminary results demonstrated that the application of the Kruger and Dunning paradigm to the Add Health data sheds light on the protective function of excessively positive self-evaluations, particularly for those who score in the bottom quartile. We

found that those in the bottom quartile of intelligence at the first wave were more likely to be described by their mothers as disabled, specifically, having learning disabilities and mental retardation, and receiving Special Education services. Seven years later, our analyses revealed that those in the bottom quartile completed less education and were more likely to be overweight, but less likely to be underweight, than those in the top quartile. Despite these different outcomes, youth who were in the bottom quartile did not become more depressed over time. Instead, for them, their perceptions of normal ability appeared to serve a protective purpose.

Our plan is to expand our investigation to encompass the Restricted Data as a data source, thereby allowing us access to the Wave III Education Data in order to describe the high school academic and peer experiences of those in the top and bottom quartiles. We expect that students in the top quartile will have extremely different high school experiences from those at the bottom, and that we will find that these experiences serve to confirm their mistaken perceptions of intelligence.

Furthermore, we plan to apply the paradigm within separate racial and ethnic groups in order to determine how errors in self-knowledge influence educational and health outcomes experienced during the transition to adulthood. We will also investigate how these errors differ between these groups. Understanding the nature and function of these errors in self-knowledge will help to inform designs of future treatments aimed at specific subgroups of the population.

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Footnotes

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