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Gifted Child Quarterly 2008; 52; 217

DOI: 10.1177/0016986208319704

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Teachers' Negative Affect Toward Academically Gifted Students

An Evolutionary Psychological Study

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Abstract: A frequent reason for teachers not making special provisions for a gifted child is that the child is “not fitting in socially.” The conjecture that a psychological source of such negative affect has evolved along with human language was tested with a large sample ($N = 377$) of teachers in England, Scotland, and Australia who were undertaking continuing professional development (CPD) in gifted education. Quantitative indicators of teachers' subconscious feelings toward gifted children were measured using a five-dimensional semantic differential instrument. Oblique factor analysis produced a three-factor structure, namely, general characteristics of gifted children including high cognitive abilities, social misfits, and antisocial leaders. Teachers' negative affect toward gifted children concerns the potential use of high intelligence toward social noncompliance. The factor scores for teachers completing the CPD programs were lower for the social noncompliance factors and higher for the general factor compared with scores of teachers commencing the programs.

Putting the Research to Use: The results of this research can be used by designers and presenters of teacher professional development (PD) programs in gifted education to address implicit negative attitudes of teachers toward gifted students. The major cause of such negative affect is a deep concern about potential antisocial applications of the intelligence of gifted students, and this should be made explicit to PD participants. The results show that teachers' unconscious negative attitudes can be reduced through PD courses in which teachers become more familiar with the characteristics of gifted students and their learning needs. In future PD programs, teachers could be asked to reflect on their personal responses to questions based on this research: Are gifted students potential social misfits? Are gifted students disrespectful of authority? Are gifted students sensitive to the feelings of others? Could gifted students use their intelligence for antisocial leadership? Would gifted students make good schoolteachers?

Keywords: *negative teacher attitudes; gifted students; evolutionary psychology*

An Introductory Story

More than 30 years ago, in his book *Teaching the Gifted Child*, Gallagher (1976) told the story of Mr. Palcuzzi, the principal of an American elementary school who greatly disturbed his Parent-Teacher Association with a proposal that the school should develop a program for gifted and talented students that

would involve ability grouping, acceleration, and possibly most contentiously, interschool competition! A specially trained teacher would be hired and the program would be funded by a levy placed on the entire parent body. When the PTA protested vehemently that such a program would be elitist, divisive, and antidemocratic, Palcuzzi explained calmly that the program he was describing was not in fact a new program for the intellectually gifted but an existing program that the school had been enthusiastically supporting for many years—its program for gifted basketball players!

Note: This article was accepted under the editorship of Paula Olszewski-Kubilius.

Gallagher's (1976) story is effective because we *do* treat students who are intellectually or academically gifted quite differently from students with precocious sporting and athletic talent—or even talent in the performing arts; *school choir* or *band* can be substituted for *basketball team* with much the same effect. The most interesting observation about Gallagher's story is that even at gifted education conferences it can engender a palpable degree of discomfort in the listeners—including the story's presenters—even though “we” comprise an audience at least moderately sympathetic to the plight of academically gifted students in our schools. Despite our allegiances, we can empathize with—and may even secretly side with—the PTA.

Why? What internal process prevents us from celebrating precocious intellect as enthusiastically and publicly as we highlight precocious athletic or musical talent? Colangelo (2002) suggested that the pervasive pressure on gifted students to camouflage or moderate their academic achievements that is characteristic of contemporary Western society is specifically linked to a hostility toward *intellectual* elites. Indeed, the compulsion to “cut down the tall poppies” as it is referred to in Australia, is not directed at tall poppies per se; a similar cultural discomfort with precocity is not evident with regard to exceptional performance in sport or music.

Neither can this issue of apparent hostility toward intellectual elites be simply about individual difference. Academic giftedness, when it presents itself in schools, receives a qualitatively different response from other, more accepted, individual differences such as physical disability (in most countries, affirmative school policy toward children with physical disabilities is mandated by law), Language Background Other Than English (LOTEB), or even athletic or artistic precocity. For each of these latter cases, schools have long-standing policies of individual provision, with designated, trained teachers in charge of the various special programs. However, in the majority of schools in America, England, and Australia, this is not so for academically gifted students (Colangelo, Assouline, & Gross, 2004; Eyre & Geake, 2002; Gross, 1993). Why this systemic resistance to embracing special education for the academically gifted? What holds teachers back from viewing academically gifted children as having just another difference requiring an individual and differentiated response? As Bégin and Gagné (1994b) asked about the provision of educational services for gifted children, ranging from complete acceptance to complete rejection, “How can variation in this attitude be explained, and what are the major factors involved?” (p. 75).

All Gifts Are Equal, but Some Gifts Are More Equal Than Others

Researchers in gifted education have noted for some time that the majority of teachers in Australia, Britain, the United States, and Europe who are opposed to special provisions for intellectually gifted students have little or no objection to the same provisions (e.g., ability groupings, acceleration) for students talented in sport or music (Bégin & Gagne, 1994a, 1994b; Gross, 1999, 2001). Several hypotheses have been offered for teachers' willingness to provide talent development interventions for some students that they are reluctant to provide for others. One hypothesis is that whereas outstanding ability in sport or the performing arts is seen as a form of “*social compliance*” in that the talent is being developed for the enjoyment of the community, development of high intellectual ability is seen as a selfish endeavor—*social noncompliance*—as it is the possessor of the talent himself or herself who will primarily benefit (Gross, 2001). High intellectual ability is generally viewed by the community as a passport to higher education; prestigious, lucrative employment; and a desirable lifestyle (Gross, 1993).

The problem is intensified by the stereotypic view of gifted students that holds they are arrogant, overconfident, and self-centered (Gross, 1997). Such negative attitudes not only restrict the provision of effective differentiated education but also threaten to constrain the effectiveness of (continuing) professional development (CPD) programs in gifted education (Eyre & Geake, 2002). Teachers who hold stereotypical hostile views of gifted students are unlikely to enroll voluntarily in such CPD programs; their attendance is more likely to have been required by their school principals (Eyre & Geake, 2002). It is deeply ironic that students who have the potential to learn most easily and swiftly in school are often regarded by teachers with qualified enthusiasm at best while if the rhetoric of some teacher unions is representative of the views of their members (see e.g., Gross, 2004), gifted students can even be regarded with open hostility. It seems reasonable to ask Why?

The phenomenon of hostility described is not confined to any one country or culture. This is not to say that there are no cultural specificities in how gifted children are regarded. For example, Mansour (2004) argued that Palestinian teachers do not create challenging learning opportunities for gifted children because their attitudes toward such educational differentiation for gifted children are influenced by the way they conceptualize the gifted child in terms of traditional social values and restrictions. We suggest, however, that

cross-cultural comparisons are revealing of similar negative teacher attitudes toward gifted children. For example, in Austria, a country renowned for celebrating academic success with a streamed school system and where school examination prize winners, even in kindergarten, are featured on the front page of regional newspapers, academic giftedness is not widely recognized with formally differentiated programs or provisions. The government has been reluctant to develop a policy for gifted students on the grounds, according to a high-ranking official in the Department of Education, of wanting to avoid a tall poppies syndrome (Geake, 1997a). Indeed, Austria's first school for the gifted, The Sir Karl Popper Schule, was established only after 6 years of lobbying by its founders, and then only within a technical secondary school in Vienna rather than as a separate institution to avoid the gifted students' being seen as socially elite (Geake, 1997a).

Could societal discomfort with intellectual precocity be a general psychosocial phenomenon rather than restricted to teachers qua teachers? Could it simply be more evident in teachers than in the general population given teachers' daily interactions with gifted children? Some support for this position can be derived from research into the attitudes of university students who were enrolled in teacher training programs but were not yet themselves practicing as teachers (Carrington & Bailey, 2000). To compare Australian preservice teachers' attitudes about gifted students with attitudes of in-service and preservice teachers in America (Cramond & Martin, 1987), Carrington and Bailey (2000) asked preservice teachers to rank a range of hypothetical gifted children in terms of their desirability as potential students. Both elementary and secondary preservice teachers rated studious gifted students lowest on a scale of whom they, as new teachers, wanted to teach. The children rated highest by elementary preservice teachers were children of average ability who were nonstudious; those rated highest by secondary preservice teachers were gifted nonstudious students. In other words, it was not so much the hypothetical student's level of ability that primarily determined these preservice teachers' attitudes; rather, the critical variable was the students' attitudes toward study.

Carrington and Bailey (2000) linked this finding to previous Australian research (Goldberg, 1981) that found

The major obstacle to [gifted students'] receiving appropriate provision was the attitude among educators and the general public that the ability to relate well to others was of prime importance, with the concomitant fear that any school procedures that single students out as more able might jeopardize this overriding social concern. (p. 18)

Encouraging further studiousness in children who already loved study could mar their chances of social acceptance (Goldberg, 1981).

Consistent with Carrington and Bailey's (2000) findings, Kokkinos, Panayiotou, and Davazoglou (2004), in a study of preservice teachers in Cyprus, found that the student misbehavior that these teachers anticipated as being of greatest concern was inappropriate socializing, whereas a lack of interest in studying was rated as of little concern. What is it about socializing that causes it to be rated higher than scholarlyness in the attributes of an ideal student?

An Evolutionary Story?

In an attempt to shed some light on the several questions raised concerning social hostility to high levels of intelligence in children and the consistent negative affect of teachers toward academically gifted children, we looked to evolutionary psychology to provide putative hypotheses. In doing this we were mindful that evolutionary psychology as an academic field is often criticized for providing little more than "just so" stories (Palmer & Palmer, 2002). Consequently, our study was undertaken to test evolutionary psychological hypotheses. The plausibility of an evolutionary psychological basis for our hypotheses and the adequacy of an evolutionary psychological explanation of our results, we leave readers to judge.

As discomfort with intellectual precocity seems to be an international and cross-cultural phenomenon, Geake (2000) conjectured that its source might lie in the human psyche and thus in the human genome as an outcome of the evolution of human language for the purposes of social binding as proposed by Dunbar (1996). In a proto-human (early hominid) society where language was beginning to evolve, an individual with marked superiority in intelligence, which was manifested as a superiority in the use of proto-language, could have a superior understanding of the various relationships between members of the group and

could thus be regarded as having the potential to affect, manipulate, exploit, or even distort the group's social relationships (Geake, 2000). Such an influential language user might be perceived as having "unreasonable" or "unfair" powers of persuasion. An individual who even seemed to show the potential to develop such powers could be viewed as a threat to the group. If so, then it could be in the group's self-interest to cut such a precocious tall poppy down to size. Of course, in an early human society there could be another potential response, namely, to foster a precocious child as a future shaman or tribal leader who might mediate with the gods in times of trouble. But, given the social, technological, and cognitive stasis that characterized proto-human groups (Mithen, 1996), we suggest it unlikely that such social teleology was widely acknowledged. In this respect, a critical ambivalence may be developed between practice and perception: that demonstrations of intellectual utility in, say, survival problem solving, although probably gratefully acknowledged, simultaneously served to foster feelings of difference and hence of social suspicion.

If Dunbar (1996) is correct, that language originally developed as a vehicle for social binding, then the relevant question is Could a tall poppy syndrome, arising from fear that intellectually gifted group members might seize unfair social advantages, be an outcome of this linguistic evolution? In *The Society of Mind*, Minsky (1988) suggested,

Perhaps what we call genius is rare because our evolution works without respect for individuals. Could any tribe or culture endure in which each individual discovered novel ways to think? If not, how sad, since genes for genius might then lead not to nurturing but only to weeding-out. (p. 80)

Clearly this is not the case for our contemporary sporting, musical, and thespian heroes and heroines. But in our evolutionary past, outliers with superiority in physical or musical or dramatic attributes would not by virtue of these attributes pose a threat to society through social cheating. Rather, the physically talented could significantly enhance group survival through success in hunting and in warfare whereas the artistically talented could contribute to social cohesion through leading the dance, preserving the oral culture, and so on. Their intellectually precocious fellows, however, might not have had such obviously useful social roles, notwithstanding that during infrequent times of unprecedented crisis, the original solutions offered by an intellectual

prodigy to the problem of survival might have been valued. The aggressive behavior of modern chimpanzees toward perceived rivals from other groups suggests that antagonism toward strangers is deeply rooted in the primate genome. The issue here, however, is the response to the "outsider" growing up *within* the group: the non-compliant individual who benefits from the talents of others but whose own talents are seen as primarily benefiting himself or herself.

This study sought evidence to test possible hypotheses arising from this conjectural account of negative affect toward intellectual precocity and its putative origins. In sum, we were interested in why the development of young people who may become sports stars or popular entertainers is fostered, but educators seem far less willing to accord similar special opportunities for young educational "superstars." More specifically, why is there resistance to identify those with high intellectual potential and support them in our regular classrooms? Is there a key element of the human condition to harbor a suspicion of those who are highly intelligent—especially those who exhibit precocious intelligence? The main hypotheses tested in this study were

Hypothesis 1: Teachers harbor negative feelings toward academically gifted students, either consciously or subconsciously, in the form of suspicion of their intellectual precocity.

Hypothesis 2: Following Dunbar's account of the evolution of language in proto-humans, such suspicion of intellectual precocity will not relate to superior academic performance per se but rather will focus on superior articulateness and nonconformist socializing.

Influence of Teacher Training and Inservice in Improving Teacher Attitudes

By posing these hypotheses, we are not suggesting such attitudes are immutable. To the contrary, studies conducted in both Australia and the United States have found that providing in-service to teachers in topics relating to gifted education can result in significant improvements to teacher attitudes toward gifted and talented students (Copenhaver & McIntyre, 1992; Feldhusen, Haeger, & Pellegrino, 1989; Gross, 1994, 1997; Korynta, 1982).

Korynta (1982) compared the attitudes of 61 teachers who had participated in in-service on the gifted with 140 teachers who had no such in-service and found teachers who participated in in-services held fewer stereotypical ideas about gifted students

and were more supportive of special programming. Similarly, Feldhusen et al. (1989) found attitudes toward gifted students of school administrators who completed a 50-hour training program in gifted education were significantly more positive than the attitudes of a matched control group. Copenhaver and McIntyre (1992) asked 85 teachers enrolled in a graduate course on curriculum for the gifted to complete an open-ended questionnaire stating the characteristics that came to mind when they thought of gifted and talented students. Teachers with previous CPD experience listed significantly more positive characteristics ($p < .008$) than teachers who had no previous CPD in gifted education.

In Australia, using the Gagné-Nadeau Attitude Scale, Gross (1994) found substantial and significant changes in attitude over the course of a year in teachers enrolled in postgraduate training in gifted education, including strongly positive attitudinal shifts on a factor that measured attitudes toward the social usefulness of gifted persons. Subsequently, Gross (1997) found significant positive attitudinal change in teachers over the course of a 6-hour in-service program that included information on the incidence and causes of underachievement in gifted students.

Teachers involved in special training or in-service in gifted education are likely to be exposed to research findings on the cognitive and affective characteristics of academically gifted students that may contradict their previous suppositions (Gross, 1997). Coupled with factual information about issues such as underachievement, intellectual frustration, and social rejection experienced by gifted students, such targeted CPD exposure may reduce teacher resentment of these children. However, we are not aware of any previous study that has investigated the effects of training or in-service on teachers' suspicion of intellectual precocity of gifted students. The present study therefore tested a third hypothesis:

Hypothesis 3: Teachers' suspicion of intellectual precocity of gifted students will be significantly reduced after participation in a CPD program in gifted education.

Method

Participants

The study involved 377 teachers in England, Scotland, and Australia who were undertaking a program of CPD in gifted education between September 2003 and May 2005. In England, the participants' CPD

Table 1
Demographic Data

| | England EiC + INSET | Scotland SCA | Australia COGE | Total |
|----------------------|---------------------------|-----------------|-------------------|-------|
| Program | 117 + 34 | 67 | 159 | 377 |
| Female | 112 | 53 | 128 | 293 |
| Male | 33 | 13 | 24 | 70 |
| Age range 21-25 | 5 | 0 | 6 | 11 |
| 26-30 | 28 | 4 | 27 | 59 |
| 30-35 | 24 | 3 | 18 | 45 |
| 36-40 | 20 | 10 | 15 | 45 |
| 41-45 | 22 | 8 | 30 | 60 |
| 46-50 | 18 | 16 | 30 | 64 |
| 51-55 | 22 | 19 | 16 | 57 |
| 56-60 | 4 | 5 | 7 | 16 |
| 61-65 | 2 | 1 | 2 | 5 |
| Primary | 19 | 49 | 98 | 166 |
| Secondary | 123 | 12 | 33 | 168 |
| Bachelor's degree | 51 | 21 | 73 | 145 |
| Postgraduate diploma | 54 | 28 | 47 | 129 |
| Master's degree | 32 | 5 | 29 | 66 |
| Doctorate | 4 | 0 | 1 | 5 |

Note: EiC = Excellence in Cities initiative; INSET = school-based inservice training; SCA = Scotland Education Authority; COGE = university-accredited postgraduate award, the Certificate of Gifted Education.

was either presented within the government's Excellence in Cities (EiC) initiative (Haight, 2004; Lowe, 2002) ($N = 117$) or as school-based in-service training (INSET) ($N = 34$) (total $N = 151$). The first author was involved as a lecturer in some of the EiC CPD sessions. In Scotland, the CPD was a special program, presented by the second author, of the Scotland Education Authority (SCA) ($N = 67$). In Australia, the CPD was in the form of a university-accredited postgraduate award, the Certificate of Gifted Education (COGE) of the University of New South Wales, directed by the second author ($N = 159$). Demographic data including educational background were gathered via a simple questionnaire and are reported in Table 1. The missing data in this and all subsequent tables and analyses are due to incomplete returns from a number of participants.

It is important to note at the outset that this study is not an international comparison. To the contrary, the education systems in Australia and the United Kingdom are remarkably similar, those in Australia having been based on those in England and Scotland. Moreover, both authors have extensive experience of teaching in both Australia and the United Kingdom.

Despite the common demographic variance among the teachers from the three countries, there were some

Table 2
Participants' Experiences in Gifted Education

| | United Kingdom | Percentage (<i>N</i> = 218) | Australia | Percentage (<i>N</i> = 159) | Total <i>N</i> |
|--|----------------|---------------------------------|-----------|---------------------------------|----------------|
| Currently teach gifted curriculum | 128 | 54 | 119 | 75 | 237 |
| Have taught gifted curriculum | 147 | 67 | 101 | 64 | 248 |
| Currently teach special gifted classes | 88 | 40 | 91 | 57 | 171 |
| Have taught gifted classes | 95 | 44 | 78 | 49 | 173 |

Table 3
**Participants' Experience in Gifted Education
Continuing Professional Development (CPD)**

| | United Kingdom | Australia | Total |
|-------------------------------|----------------|-----------|-------|
| No previous CPD course | 133 | 0 | 133 |
| Partial completion CPD course | 54 | 74 | 128 |
| Full completion CPD course | 30 | 85 | 115 |

differences in participants' experience in gifted education, reported in Table 2. The COGE program in Australia recruits fee-paying volunteers, all of whom attend for the full 80 hours of face-to-face sessions presented during school vacations. In contrast, the government-based programs in England and Scotland are a mandatory imposition on school policy development; many CPD participants there have been directed to attend, but as the delivery is during term time, not all complete the course of 44 hours. Not surprisingly, then, the proportion of Australian participants who were currently teaching in a gifted education program are higher than those in England and Scotland (consequently combined under the *United Kingdom* heading in Table 2), although the proportions reporting such past experiences are not different. As a consequence of these differences in experience of teaching gifted children, we combined data from these different CPD programs by deliberately not including any COGE teachers at entry but only including COGE teachers who were at various stages of their course.

Several further survey questions were used to classify participants' experience with CPD in gifted education. This was difficult to standardize, so the relevant independent variable of CPD experience was categorized three ways: none, partial completion, full completion. The breakdown of participants' CPD experience for the purposes of our analysis is given in Table 3.

Semantic Differential Instrument

Quantitative indicators of the teachers' subconscious feelings toward gifted children were measured using a five-dimensional semantic differential instrument (Geake, 1992; Heise, 1970; Osgood, Suci, & Tannenbaum, 1967). The purpose of semantic differential scales is to measure the meanings people attribute to concepts when making judgments (Osgood et al., 1967).

We chose a semantic differential scale over the more usual Likert-type scale for several reasons. First, the standard bipolar Likert-type scale *agree-disagree* is in fact two dissociated scales due to the fact that the neural correlates of the emotional states accompanying agreement and disagreement are spatially dissociated in the brain (medial vs. lateral prefrontal cortices) (LeDoux, 1998; Rolls, 1999). This may explain the central tendency bias observed in much attitude research in education (Popham, 1988) and could bias the resulting factor structure. Second, such a neural dissociation might also account for the scaling nonlinearity in *agree-disagree*, which, as Start (2002) suggested, can lead to conflation of extreme positions and other threats to validity. Third, the purpose of Likert-type scales is usually so obvious that respondents cannot avoid a degree of acquiescence response bias (Burns, 1990). In contrast, the semantic differential scale aims to elicit connotations (Heise, 1970; Osgood et al., 1967), particularly in the rapid-response format employed in this study. Of course, a semantic differential instrument cannot overcome the limitations of all attitude measures, including variance arising from self-report and subjective interpretations of the scale adjectives and key statements (Burns, 1990; Heise, 1970), and such limitations are acknowledged here.

As there is no standardized semantic differential test, the general approach "must be adapted to the requirement of each research problem to which it is applied" (Osgood, et al., 1967, p. 76). In this case, a pilot study of U.K. teachers (*N* = 59, none involved in the main study) was employed to construct an appropriate semantic differential instrument. The components were selected as those producing the highest

Table 4
Target Statements

1. Gifted students have advanced comprehension.
2. Gifted students are verbally articulate.
3. Gifted students dominate discussions.
4. Gifted students have unusual interests.
5. Gifted students are brighter than most adults.
6. Gifted students are disrespectful to authority.
7. Gifted students are creative thinkers.
8. Gifted students make friends easily.
9. Gifted students are perceived by others as elitist, or superior, or too critical.
10. Gifted students can find original relationships between ideas.
11. Gifted students have unusual sensitivity to the feelings of others.
12. Gifted students deserve special treatment by society at large.
13. Gifted students have a keen sense of humor.
14. Gifted students are insensitive to hurting the feelings of others.
15. Gifted students can see diverse relationships among ideas.
16. Gifted students can remember a large store of information.
17. Gifted students keep to themselves socially.
18. Gifted students have high expectations of others.
19. Gifted students are natural leaders.
20. Gifted students would make good schoolteachers.

scale reliabilities ($\alpha > 0.90$), resulting in five semantic dimensions out of eight piloted and 20 target statements of 28 piloted.

The resulting semantic differential instrument required judgments to be made of statements about gifted children. Most of the 20 target statements were derived from Clark's (1997) lists of characteristics of gifted children, although some were original. The target statements in order of presentation are found in Table 4. Participants' judgments about these 20 statements were made on each of five semantic dimensions: *good–bad*, *like–dislike*, *fair–unfair*, *strong–weak*, and *valuable–worthless*. To control for response biases, for each of 20 target statements, the five semantic dimensions were presented in a pseudorandom order, about 50% with reverse polarity.

Finally, in an attempt to minimize threats to validity arising from the criticisms of attitude measurement outlined earlier, respondents were presented a somewhat novel instruction set for completion of our semantic differential instrument. As a departure from Osgood et al. (1967) but consistent with Heise (1970) and Geake (1992), the instructors deliberately sought to maximize the influence of subconscious feelings on the judgments. As the subconscious neural processing that supports emotionally mediated decision making occurs prior to

conscious awareness (Damasio, 1994; LeDoux, 1998; Rolls, 1999), participants were instructed to respond as rapidly as possible, in an impulsive rather than in a considered manner, specifically, not to deliberate over their responses. Although this was in accord with the instructions for undertaking a semantic differential test recommended by Heise, such an instruction stood in some contrast to teachers' usual *modus operandi*.

Procedures

Participants completed the semantic differential while enrolled in their CPD program, usually at a suitable break between course sessions. A written description of the research and its aims was first distributed to the whole class. This was followed by a verbal explanation, during which the voluntary nature of participation was emphasized. Those not wishing to participate left at that stage. All but a few teachers were keen to contribute. The attitudes instrument was then distributed and the participants instructed in its manner of completion.

Results

Hypothesis Testing

The data were reduced with an oblique factor analysis (OFA) using maximum likelihood extraction to optimize sample to population generalizability (Tabachnick & Fidell, 1996), with oblimin rotation, delta set to zero, to retrieve a "more natural" nonorthogonal solution. OFA was chosen over other rotations because it was expected that an OFA would reveal a more veridical factor structure, albeit with correlated factor scores. In the analysis, the data on each of the five semantic dimensions, *good–bad*, *like–dislike*, *fair–unfair*, *strong–weak*, and *valuable–worthless*, were reduced separately. The OFA was constrained to three factors after inspection of unconstrained scree plots in which the changes in cumulative variance did not rise above 4% (most only 1%) after the third factor was extracted. This constraint was also justified by the requirement that each factor have at least four significant loadings (≥ 0.3) for interpretability from the set of 20 statements. Moreover, the results of the Kaiser-Meyer-Olkin measure of sampling adequacy and the Bartlett's Test of Sphericity were supported by an inspection of the diagonals of the correlation matrices which showed that the communality values were all positive but less than unity, an indication that both the number of data and variables were sufficient and that the number of factors extracted was appropriate

Table 5
Combined Oblique Factor Analysis Factor Structure (Mean Loadings)

| | Factor 1 | Factor 2 | Factor 3 |
|--------------------------|-------------|-------------|--------------|
| Advanced comprehension | 0.46 | -0.06 | -0.09 |
| Verbally articulate | 0.36 | 0.06 | -0.26 |
| Dominate discussions | 0.09 | 0.47 | -0.07 |
| Unusual interests | 0.40 | 0.17 | -0.15 |
| Brighter than adults | 0.38 | 0.16 | -0.05 |
| Disrespect authority | -0.02 | 0.61 | 0.01 |
| Creative thinkers | 0.45 | 0.01 | -0.14 |
| Make friends | 0.04 | 0.21 | -0.40 |
| Seen as elitist | -0.04 | 0.48 | 0.11 |
| Originality | 0.55 | -0.01 | -0.09 |
| Sensitivity to others | 0.35 | -0.09 | -0.33 |
| Deserve special social | 0.19 | 0.24 | -0.12 |
| Keen humor | 0.45 | -0.10 | -0.30 |
| Insensitive to others | 0.05 | 0.34 | 0.00 |
| See diversity | 0.48 | -0.04 | -0.12 |
| Remember lots | 0.41 | -0.05 | -0.19 |
| Social isolates | 0.05 | 0.38 | -0.20 |
| High expectations | 0.06 | 0.11 | -0.20 |
| Natural leaders | 0.23 | 0.09 | -0.37 |
| Make good teachers | 0.21 | -0.04 | -0.38 |
| Mean eigenvalues | 4.42 ± 0.47 | 1.57 ± 0.31 | 0.77 ± 0.30 |
| Mean unique variance (%) | 21.2 ± 2.4 | 7.2 ± 1.6 | 3.2 ± 1.5 |

(Tabachnick & Fidell, 1996). As the patterns and loadings of the five factor matrices were identical and the size of the loadings very similar, a combined factor matrix with mean loadings is reported (Table 5). On some dimensions, the eigenvalue of the third factor fell below 1.0, so reducing the mean; it is included nevertheless for completeness of interpretability. The mean OFA factor correlations are reported in Table 6.

Using the OFA combined factor structure, Hypotheses 1 and 2 were tested by analyzing the patterns of significant loadings (≥ 0.32) on the three factors. With loadings from 9 of the 20 target statements concerning comprehension, verbal articulateness, originality, good memory, and superior brightness, Factor 1 seems to represent general cognitive or intellectual characteristics of gifted children. Explaining 21.2% of the variance, Factor 1 is a general giftedness factor that might be expected from this factor design. With loadings from five different target statements (*gifted students dominate discussions; gifted students are disrespectful to authority; gifted students are perceived by others as elitist, or superior, or too critical; gifted students are insensitive to hurting the feelings of others; and gifted students keep to themselves socially*), Factor 2 (7.2% explained variance) seems to represent the view that gifted students are articulate social misfits. That is, Factor 2 captures teachers'

Table 6
Mean Oblique Factor Analysis Factor Correlations

| | Factor 1 | Factor 2 | Factor 3 |
|----------|----------|----------|----------|
| Factor 1 | 1.00 | 0.13 | -0.52 |
| Factor 2 | | 1.00 | -0.16 |
| Factor 3 | | | 1.00 |

disaffection with gifted students whenever high intelligence is potentially manifest in an exclusive social setting. Such an interpretation is further supported by the structure of Factor 3 (3.2% explained variance), namely, negative loadings on *make friends easily; have unusual sensitivity to the feelings of others; have a keen sense of humor; are natural leaders; and would make good school teachers*, suggesting that this factor represents another aspect of social noncompliance concerned with social withdrawal or unworthy individuality, a mirror to normative social leadership.

The structures of the second and third factors provide evidence to support Hypothesis 1, that teachers harbor (subconscious) negative feelings toward academically gifted students in the form of suspicion of their intellectual precocity, and Hypothesis 2, that such negative feelings will focus on students' superior articulateness and nonconformist socializing.

To test Hypothesis 3, that teachers' negative affect will be significantly reduced after participation in a professional development program about gifted education, composite Bartlett factor scores were computed for every participant by averaging their three Bartlett factor scores from each of the five OFAs. Bartlett factor scores were chosen because each factor's set of scores is normally distributed ($M = 0.00$, $SD = 1.00$), thus facilitating robust interparticipant comparisons. Of course this criterion will not survive averaging, but in this case, the distribution of the composite factor scores did not depart too far from normality. Post hoc tests for differences in homogeneity were nonsignificant ($p = 1.00$). The Bartlett composite factor scores were used as dependent variables in subsequent ANOVAs that compared the participant responses by stage of CPD completion (none, partial, completed) for hypothesis testing and by other demographic independent variables, such as school type and educational background, to check for contributory variance. The results of the ANOVAs are reported in Table 7.

Scheffé post hoc tests were significant ($p < .05$) for all three comparisons on each factor except for Factor 2, partial versus completed CPD. When teachers who

Table 7
ANOVA for Continuing Professional Development (CPD) Completion (Mean
Oblique Factor Analysis Bartlett Factor Scores)

| | No Previous CPD | CPD Partially Completed | CPD Completed | <i>F</i> (2, 326) <i>p</i> < .000 | Effect Size (Partial Eta-Squared; %) |
|--|-----------------|-------------------------|---------------|--------------------------------------|--------------------------------------|
| Factor 1: Cognitive characteristics of gifted students | -.47 | .14 | .48 | 31.00 | 16.0 |
| Factor 2: Social noncompliance | .33 | -.19 | -.19 | 10.76 | 6.2 |
| Factor 3: Antisocial leadership | .42 | -.12 | -.43 | 28.11 | 14.7 |

had completed their professional development program in gifted education were compared with teachers who were only beginning a professional development program in gifted education, mean composite Bartlett factor scores on Factor 1, general characteristics, were significantly higher for the trained teachers ($p < .01$), whereas the mean of trained teachers' composite Bartlett factor scores on Factor 2 (social misfits) and Factor 3 (antisocial leaders) were significantly lower ($p < .01$). That is, teachers who have completed CPD in gifted education are more positive about both the intellectual and social leadership characteristics of gifted children and are less negative about their potential social noncompliance. Moreover, the effect sizes (partial Eta-squared) are large for Factor 1 (general giftedness) (16.0%) and Factor 3 (antisocial leadership) (14.7%) and medium for Factor 2 (social noncompliance) (6.2%).

Interestingly, the factor scores of participants who had partially completed their CPD program or who had some previous exposure to CPD in gifted education were intermediate on all three factors. Moreover, post hoc tests revealed that these differences were significant higher on Factor 1 for teachers who had been exposed to some CPD than for teachers who had no previous CPD experience yet were significantly lower than scores of teachers who had completed a full CPD program. On Factor 2, the social noncompliance factor, the factor scores for teachers who had been exposed to some CPD were significantly lower than scores of teachers who had no previous CPD experience. These findings provide evidence in support of Hypothesis 3, that professional development in gifted education makes a positive difference to teachers' attitudes toward gifted children.

Here it is interesting to note that the low correlation between OFA Factors 2 and 3 ($r = -.16$) is consistent with the preceding interpretation that these represent different aspects of social noncompliance. Moreover, the relatively strong negative correlation between Factors 1

and 3 ($r = -.54$) supports an interpretation that Factor 3 represents a perceived negative side to high intelligence, perhaps in accord with the stereotype of madness as a covariate with genius. Such a speculative interpretation adds support to Hypotheses 1 and 2, that teachers' subconscious negative affect toward academically gifted students focuses on nonconformist socializing.

Supplementary Analyses

To test the robustness of assumptions of international sample homogeneity and explore some nonhypothesized questions that arose during the study, several further analyses were undertaken (Tables 8 and 9).

The first supplementary analysis examined the extent to which demographic variables such as sex, country, or educational sector might explain some of the variance in negative affect measures. Although no such effect was expected, none could be ruled out a priori. MANOVAs on the three Bartlett composite factor scores with the demographic categorical variables of sex, school type (primary, secondary), and educational qualifications (four values) as independent variables and country as a covariate (required because all of the Australian participants were COGE participants), revealed no significant multivariate or univariate effects, even before Bonferroni adjustments for multiple comparisons, save for school, where secondary teachers were initially less favorably disposed toward gifted children than their elementary school colleagues: Factor 1, univariate $F(1, 293) = 10.5$, $p = .001$, Eta-squared = 3.4%; Factor 2, univariate $F(1, 293) = 17.6$, $p < .001$, Eta-squared = 5.7%; Factor 3, univariate $F(1, 293) = 7.0$, $p = .009$, Eta-squared = 2.3%. These differences persisted when covaried with sex, assuming that the majority of elementary school teachers are female, as is certainly the case in Australia and Scotland at this time.

Although this result is consistent with the aphorism that secondary teachers teach the subject while elementary teachers teach the child, we have no data

Table 8
MANOVA for Supplementary Analyses (Mean Oblique Factor Analysis Bartlett Factor Scores)

| | Female (<i>N</i> = 259) | Male (<i>N</i> = 61) | <i>F</i> (2, 326) <i>p</i> < .05 | Effect Size (Partial Eta-Squared; %) |
|---|-----------------------------|--------------------------|-------------------------------------|---|
| Factor 1: Cognitive characteristics of gifted | .006 | -.16 | (2.3 <i>ns</i>) | — |
| Factor 2: Social noncompliance | .008 | .24 | 4.98 | 1.5 |
| Factor 3: Antisocial leadership | .006 | .16 | (1.5 <i>ns</i>) | — |

| | Elementary School Teacher | Secondary School Teacher | | |
|---|------------------------------|-----------------------------|-------|-----|
| Factor 1: Cognitive characteristics of gifted | .16 | -.21 | 10.48 | 3.4 |
| Factor 2: Social noncompliance | -.20 | .27 | 17.56 | 5.7 |
| Factor 3: Antisocial leadership | -.13 | .15 | 6.98 | 2.3 |

| | Covaried With Sex | Covaried With Sex | | |
|---|----------------------|----------------------|-------|-----|
| Factor 1: Cognitive characteristics of gifted | .16 | -.20 | 9.30 | 3.1 |
| Factor 2: Social noncompliance | -.19 | .26 | 14.81 | 4.9 |
| Factor 3: Antisocial leadership | -.14 | .14 | 6.29 | 2.1 |

Table 9
**Pearson Correlations for
 Supplementary Analyses**

| | Years of Experience |
|---|---------------------|
| Factor 1: Cognitive characteristics of gifted | .05 |
| Factor 2: Social noncompliance, | .07 |
| Factor 3: Antisocial leadership | .01 |

Discussion

The emergence from the OFA of a factor representing social misfits, with significantly positive loadings of statements that gifted students are disrespectful of authority, seen as elitist, insensitive to others, and social isolates, together with a factor representing antisocial leadership, with significantly *negative* loadings of statements that gifted students make friends easily, have unusual sensitivity to the feelings of others, have a keen sense of humor, are natural leaders, and would make good schoolteachers, is evidence in favor of the main hypothesis that teachers harbor subconscious feelings of disaffection toward gifted students. Given the reasonably large effect sizes involved, these findings support Geake's (2000) conjectured application of Dunbar's (1996) evolutionary psychology, that such disaffection has its source in suspicion about the use of high intelligence toward social noncompliance. In other words, psychological suspicion of outsiders, for example, as described by Wilson (1956) in *The Outsider*, could explain why the most cited reason by teachers for not accelerating a gifted child is that the child is "not fitting in socially." This is in complete contrast to how precocity in sport or music is treated in schools, where today's heroes and heroines, also outliers but with superiority in physical/musical attributes, do not pose a threat for

on our participants' affect toward nongifted children to clarify this point. This result notwithstanding, the nonsignificance of all of the other interparticipant analyses allows some relaxation over concerns of systemic lack of homogeneity of this large international sample.

It might be expected that teachers who have more extensive teaching experience would concomitantly have more experience teaching gifted students and that this would be associated with a more positive attitude toward gifted students in general and consequent ameliorated negative affect. However, all Pearson correlations between the noncategorical variable *teaching experience* and the Bartlett composite scores were nonsignificant.

social cheating. In our evolutionary past, such heroes and heroines might well have enhanced group survival in warfare and contributed to social cohesion through leading the dance. The intellectual outsider's contribution, however, would have been far less predictable. The deep-rooted nature of such suspicion is reflected in the absence of effect of teaching experience on factor scores. This in turn suggests that the suspicion is not the exclusive province of teachers per se but might be a general population attribute. Interestingly, a study by Massé and Gagné (2002) of sources of envy of gifted adolescents among secondary school students (not teachers) found that whereas gifted adolescents attributed envy to their intellectual talents, their nongifted peers identified social issues as predominant. This seems consistent with earlier suggestion of a dichotomy between social utility and social noncompliance.

Evolution of Language for Social Binding

Dunbar's argument that language evolved to facilitate social binding, which replaced binding through physical grooming in increasingly larger prehuman groups, is based on anthropological evidence of correlated increases over evolutionary time periods between brain size (actually the ratio of neocortex size with whole brain size, evidenced by increasing skull capacity) and proto-human group size (evidenced by extrapolation from extant monkey and ape group sizes, around 30, and modern hunter-gatherer tribes of about 150 to 200 individuals) (Dunbar, 1996). Dunbar's account of the evolution of social binding has been independently corroborated by Byrne, 1996, who found a significant correlation, (.77) between neocortex to whole-brain ratio and social intelligence among modern primates). A larger group has many obvious advantages for survival, not the least being division of labor into specialized activities such as hunting, gathering, child rearing, and so on. But this in turn poses a considerable challenge for social cohesion. Other non-language-using primates maintain social cohesion through dyadic grooming: literally, nit picking; the size of a primate group is limited by the number of others who a member of the group can groom in the maximum time available for grooming, about 20% of daylight hours (Barrett, Dunbar, & Lycett, 2002).

However, the size of proto-human groups did increase to at least five times that of modern primates. Clearly some other form of social binding must have replaced physical grooming, pleasant as it is. Dunbar's (1996) candidate is language. He argued that the dyadic interpersonal stimulation of oxytocins was replaced by

interpersonal mental stimulation of speech. There are several lines of evidence. First, the explosion in proto-human group size is coincident with etymological estimates for the onset of language, about 50,000 to 100,000 years ago. Second, social cohesion can be enhanced by speech. Whereas the actor-receiver ratio of physical grooming is essentially limited to one to one, speech is more efficient, involving ratios of one to many or many to one. Moreover, speech contains third-party information about other dyads in the group, which implies a theory of other minds, a critical development in the evolution of the modern human brain (Mithen, 1996). The third line of Dunbar's evidence for the role of language in social binding, and perhaps the most convincing, is that fly-on-the-wall recordings of everyday speech show that the overwhelming purpose of most speech is gossip. Around 75% of all speech is gossip, slightly more for women and significantly more for academics (Barrett et al., 2002).

As attractive as such a story might be, it begs the question of evolutionary mechanism: How might such a predisposition be selected for? A possible answer is provided by the Baldwin effect. The Baldwin effect, which can be regarded simplistically as "a kind of" Lamarckism, involves the favorable selection of individual differences in phenotype that lead to (socially) advantageous behaviors, such that this phenotype becomes common throughout the species (Plotkin, 1994). At a genetic level, it means that extant alleles for the favorable phenotype become overrepresented in the genome. The Baldwin effect explains adaptive change over time spans that are far too brief for selection of random genetic mutations, or even genetic drift. Here, in the case of language, the time span is at best 100,000 years—much too brief a period for genetic evolution. However, a Baldwin effect whereby individual differences in suspicion of nonsocially compliant behaviors are selected favorably and the relevant alleles become overrepresented in the genome could provide an evolutionary mechanism for the intellectual tall poppy syndrome.

However, this cannot be the whole story. There is something wrong with Minsky's (1988) proposition that genes for high intelligence might get "weeded out" as gifted children do exist. Whatever combination of genes is required for intellectual prodigies, they have not been wiped out of the human genome (Mayr, 1994). Clearly, for our story to hang true, genes for high intelligence must have been evolving together with genes for suspicion of high intelligence.

Is there any evidence for the coevolution of counter-adaptive genes? Interestingly, there is. Rice and Holland (1997) showed that different loci within the genome of

a single species can potentially coevolve to produce mutually antagonistic phenotypes. The major factor driving this antagonistic coevolution is intergenomic conflict, namely, discord between individuals that is mediated by two or more gene products that are derived from different gene loci. Important here, antagonistic coevolution is common among loci that code for social interactions.

Importance of Professional Education

Does this mean then that suspicion of social non-compliance is an immutable characteristic of the human condition? Happily, this is not necessarily so. The view that all human behavior is hostage to our distant evolutionary past is one of the unfortunate overinterpretations of evolutionary psychology. A better interpretation is to view our genetic legacy not as a predestination but as a *predisposition* for a dynamic interdependence with our biological, physical, and social environments. Genetic up-regulation and down-regulation can be mediated by, and in turn can shape, biological and social environments (Plomin, 1994). Where environments are stable, such predispositions can lead to common behaviors, or stereotyping, sometimes regarded as “common sense.” In contrast, changeable environments can produce non-stereotypical responses by eliciting differences in genetic mediation (Plomin, 1994). In the case of gifted children, their genetic predispositions might include shaping their educational environments to favor their precocious learning needs (Geake, 1997b). Here, the results add to those previously that demonstrate the efficacy of CPD environments for improving teachers’ attitudes toward their gifted charges (Buttery, 1978; Copenhagen & McIntyre, 1992; Gross, 1994, 1997; Rubenzer & Twaite, 1981).

As educators, we are optimistic about effective educational mediation. We can be encouraged by the results of a recent large factor study by Tirri and Tallent-Runnels (2005) that used the Gagné and Nadeau (1985) attitude scale to compare the attitudes of Finnish and American preservice and experienced teachers toward gifted children. The primary difference in their findings was that the Finnish teachers showed a higher degree of concern about the possible negative social effects of special educational provision for the gifted. The authors attributed the lower concern shown by American teachers to their more widespread exposure to gifted education programs and literature. Tirri and Tallent-Runnels described this difference as cultural; however, we would reinterpret their interpretation

as evidence for mediation of otherwise similar intercultural attitudes through positive educational interventions such as professional development courses in gifted education. Parallel results were found by Zhang and Sternberg (1998), whereby implicit theories of giftedness for both Chinese and American teachers could be similarly accounted for by the authors’ pentagonal model, but the applications of the model displayed cultural differences in the two settings under investigation.

The mean scores on our intellectual disaffection factors shifted significantly from positive to negative with completion of a professional development program in gifted education. That is, teachers who had completed a professional development program in gifted education were significantly less wary of their gifted students than their teacher colleagues who were still at the beginning of or even partway through such a CPD program. Conversely but consistently, the mean scores on the general giftedness factor shifted significantly from negative to positive with completion of a professional development program in gifted education. That is, teachers who had completed a professional development program in gifted education were significantly more positive toward gifted students than their teacher colleagues at the beginning of or even partway through such a program.

Limitations

This outcome is particularly pleasing as it seems to support an educational solution (CPD) to an educational problem—teachers’ disaffection with the potential anti-social applications of the intelligence of gifted students. However, there are some limitations to such an interpretation as some of the differences between the beginning CPD and completed CPD groups might be attributable to uncontrolled variance in the motivation of the teachers participating in the COGE and EiC programs. The COGE is a full-cost recovery course, the fees being paid either by the participating teacher as student himself or herself or by the teacher’s school. Consequently, COGE attracts highly motivated teachers with strong professional interests in gifted education. In contrast, the gifted education strand of the EiC is a U.K. government initiative, and participants are directed to attend by their head teachers. Not all are especially interested in gifted education, so motivation is quite variable; some participants express a degree of hostility about their participation. Nevertheless, the fact that the factor scores shifted similarly for all groups suggests that the development of a less suspicious and more sympathetic attitude toward

gifted children is a noteworthy outcome of CPD programs in gifted education despite any evolved psychosocial tendencies otherwise.

That said, as with any statistical analysis, appropriate caution needs to be exercised in interpreting these findings. In reporting factor loadings ≥ 0.32 , we followed the recommendation of Tabachnick and Fidell (1996) that such a criterion allowed interpretations of “meaningful correlation” (p. 677). However, because the extent to which each loading is a pure measure of the factor, and can be qualitatively categorized excellent, good, and so on (Tabachnick & Fidell, 1996), it should be noted that of the total of 19 reported loadings (across the three factors), 3 factor loadings were ≥ 0.55 (good), 6 factor loadings ≥ 0.45 (fair), and 10 factor loadings ≥ 0.32 (poor). Another potential limitation arises from the use of negatively oriented target statements. Whereas having attitude statements of both positive and negative orientation is regarded as good practice in educational research design (Burns, 1990), there is the possibility that orientation itself might affect the resulting factor structure, as reported in a previous reanalysis of factors of a self-esteem scale (Kim & Muller, 1978). However, this seems an unlikely limiting confound here because across all of our target statements, the five semantic differential dimensions were presented equally in both positive and negative orientation. Consequently, the structures of our factors have similar contributions from responses to positively and negatively worded items.

Some readers might find Clark’s characteristics of gifted children rather stereotypical and somewhat dated, having been first published in 1979. However, our justification in using them for our target statements was that we wanted stereotypical statements because most of the participants whom we were testing were teachers who were unfamiliar with the various nuances of gifted behavior reported in the contemporary gifted education literature.

Finally, a limitation to much attitude judgment research is that target statements administered to a large sample are necessarily independent of the contexts of the individual respondents. Several teachers did comment that it was difficult to make a response because of individual differences between the gifted children whom they taught. Consequently, any follow-up study to this one might benefit from more contextualized target statements with an aim to improve ecological validity. Moreover, as any of the EiC participants in the United Kingdom were not a priori sympathetic to gifted children, there might well have been limits to the generalizability of the construct validity of our instrument. As Zhang and Sternberg

(1998) pointed out, one teacher’s gifted student is another’s dullard. Any follow-up study might therefore benefit from in-depth interviews with a subsample of respondents.

Concluding Remarks

Evolution is our past. Obviously, the evidence of our present psychology for the unfolding of that past can be interpreted in many ways—none of which can claim to be conclusive. Nevertheless, we believe that some evolutionary stories can realize testable hypotheses, as we have attempted in this study. Our claim is that the data presented here are evidence that support these hypotheses. We do not claim that our story is unique or that our data do not support other interpretations. But in the present era of human genome mapping, when educational orthodoxy continues to question the ontology of giftedness, we believe that proposing and testing this evolutionary story is a worthwhile endeavor.

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