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**Developing Creativity in Gifted
Children: The Central Importance
of Motivation and Classroom
Climate**

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ABSTRACT

This primary goal of this monograph is to promote the creativity of gifted students. Importantly, especially high levels of intelligence or other hallmarks of giftedness do not necessarily predict creative behavior (Stein, 1968; Wallach, 1971). Yet many gifted children do have the requisite "ingredients" to become highly creative adult contributors to the arts and sciences. If these gifted students are to realize their creative potential, particular attention must be paid to the promotion and maintenance of intrinsic motivation in the classroom. Creativity does not come about in a vacuum. Empirical work carried out by investigators trained in social psychology tells us that there is a direct link between the motivational orientation brought by a student to a task and the likelihood of her being creative at that task, and it is the environment that in large part shapes that motivational orientation. Giftedness can be nurtured if conditions are right for an appropriate interaction to take place between the individual and the environment. And intrinsic motivation and creativity flourish in situations free of extrinsic constraints. Close attention must be paid to school climate if student motivation, creativity, and special talents are to be developed. In fact, the influential effects of classroom environment on motivation and creativity of performance are staggering (Amabile, 1996; Hennessey, 2003; Hennessey & Amabile, 1988). Research is reviewed that reveals that the typical American classroom is fraught with killers of intrinsic interest and creativity. These findings are particularly relevant to gifted and talented classrooms or "pull-out" programs where the potential for student creativity is especially high. The argument is made that particular attention must be paid to the impact of extrinsic constraints on the motivation and performance of gifted children coming from linguistically and culturally diverse backgrounds and concrete suggestions are made as to how policy makers, administrators, and teachers can work together to create an inclusive school and classroom atmosphere that will promote the development of creativity and an excitement about learning for all gifted students.

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EXECUTIVE SUMMARY

The Study of Giftedness and Creativity—Two Separate But Parallel Trajectories

Rationale

This monograph has been designed to introduce researchers, curriculum developers, administrators, classroom teachers, and other groups who focus on gifted and talented populations to the Social Psychology of Creativity. The primary goal is to promote the creativity of gifted students. Importantly, unusually high levels of intelligence or other hallmarks of giftedness do not necessarily predict creative behavior (Stein, 1968; Wallach, 1971). Yet many gifted children do have the requisite "ingredients" to become highly creative adult contributors to the arts and sciences. If these gifted students are to realize their creative potential, particular attention must be paid to the promotion and maintenance of their intrinsic motivation in the classroom.

The Study of Creativity

The empirical study of creativity has long been dominated by an emphasis on the individual difference variables that contribute to high levels of creative performance. Implicit in much of this work has been a focus on the internal determinants of creativity, to the exclusion of external factors such as the environmental circumstances conducive to creativity. Researchers interested in the psychology of creativity have typically chosen to decontextualize the creative process. Yet creativity does not come about in a vacuum. A large number of investigations carried out by social psychologists over the past two and one half decades have now established that there is a direct link between the motivational orientation brought by an individual to a task and the likelihood of creativity of performance on that task. And we now understand that the environment plays a large part in determining that motivational orientation.¹

¹ Much of the ground-breaking work linking environmental factors to creativity of performance has, in recent years, been grounded in research focused on the creativity of adults in the workplace. Amabile (1993) proposes an ecological model that highlights situational and interpersonal factors necessary to promote innovation in the corporate setting, and a similar theory is offered by Sternberg and Lubart (1991). Ekvall (1996, 1999) examines the features of organizational climates that promote creativity and innovation and Gruber (1988, 1999) and Csikszentmihalyi (1996) also take a global approach to their study of creativity in the workplace. Ford (1996) presents a theory of individual creative action within

The Study of Gifted and Talented Populations

As described by Renzulli (1986), the standard approach to the study of gifted persons has also generally reflected the notion that giftedness is a condition somehow magically bestowed. Recently, however, some researchers have advanced the argument that it makes more sense to shift the emphasis from *being gifted* to the question of how to *develop gifted behaviors* in children in the classroom (e.g., Feldhusen, 1995; Houtz, 2003; Renzulli 1986, 1999a, 2002; Sternberg, 1998, 2000; Torrance & Sisk, 1997; Treffinger, 1988; Treffinger, Isaksen, & Dorval, 1996; Treffinger, Young, Nassab, & Wittig, 2003). Social psychologists working to specify the environmental conditions most conducive to creativity have much in common with investigators whose goal it is to help foster gifted behaviors in children. This monograph attempts to bridge these two disciplines. The two fields have much to offer one another and it is high time that a systematic exchange of theories, models, research findings, and practical applications take place.

Renzulli's Three-Ring Model

Historically, definitions and assessments of giftedness have been directly linked to tests of intelligence, most especially the IQ score (Renzulli, 1986). But are giftedness and intelligence as closely related as many of the experts would have us believe? There is growing concern that the prevailing conceptions of giftedness (and, as a result, our measurement techniques) are far too narrow. Renzulli (1986), for example, proposes that, at the very least, we must recognize two distinct categories of giftedness: schoolhouse giftedness and creative-productive giftedness (Renzulli, Smith, & Reis, 1982). Both types, he argues, are important and the two categories often interact. But it is not unusual for children (and persons of all ages) to demonstrate an "unevenness" in their giftedness profile—with their strengths in one of the two areas far outweighing their abilities in the other.

What Renzulli terms "schoolhouse giftedness" might also be thought of as test-taking or lesson-learning giftedness. This form of giftedness is fairly well served by standard IQ and other indices of cognitive ability. And because schoolhouse giftedness is relatively easy to recognize and test, it is high scores in this realm that most often lead to students being identified as gifted and invited to participate in special programs. The hallmarks of what Renzulli terms creative-productive giftedness are often more difficult to recognize in students. Creative-productive giftedness results in the production of original material and tangible products that are intended to be shared with and to impact others (Renzulli, 2002). Research shows that this second type of giftedness is not all that closely tied to intelligence and traditional tests of IQ. While it is true that persons with relatively low levels of intelligence exhibit almost uniformly low levels of creativity, there is great variability in the creativity of individuals earning average to well-above-average intelligence scores. Simply stated, the IQ-creativity correlation is quite low

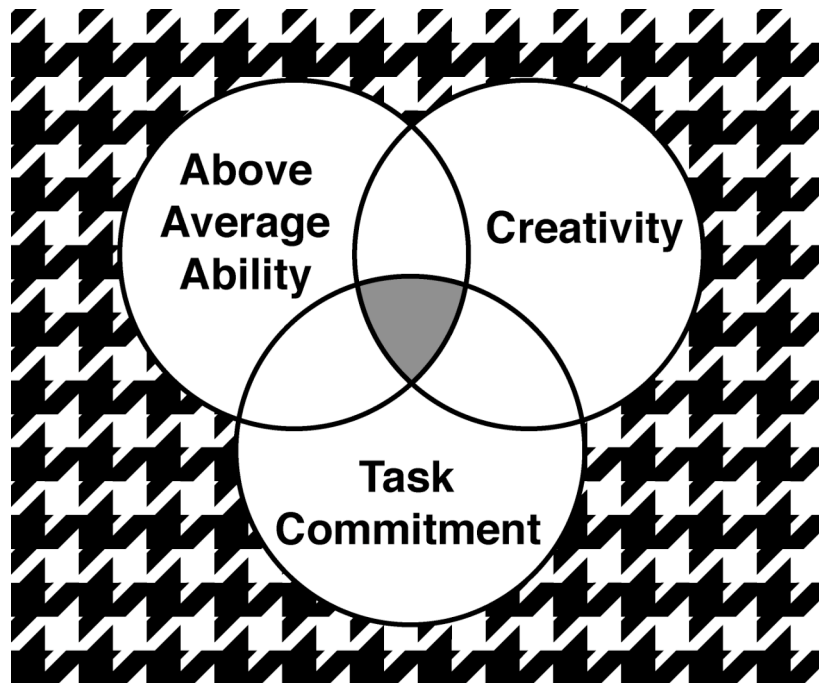
organizational settings and Policastro and Gardner (1999) see creativity as the result of a dynamic interaction between the individual, the domain in which she works, and the judges who assesses the quality of products produced (the "field").

(Stein, 1968; Wallach, 1971) and creative-productive giftedness is far too complex, far too multi-faceted, to be captured by a numerical score on a test of intelligence, aptitude, or achievement.

This recognition that creative-productive giftedness cannot always be quantified with a test score calls for a shift of emphasis among educators toward an exploration of "potential giftedness" and the concomitant question of how such potential might best be fostered. In psychological terms, the focus of attention must move away from an emphasis on giftedness as a stable *trait* toward an understanding that creative-productive giftedness may, in many respects, be better conceptualized as a situation-specific *state*. Creative-productive giftedness can be nurtured if conditions are right for an appropriate interaction to take place between the gifted student and the environment (Renzulli, 1986). But what are the conditions under which giftedness is most likely to blossom?

While no single criterion has been found to determine creative-productive giftedness, individuals who have achieved recognition because of their outstanding accomplishments and creative breakthroughs tend to possess a fairly well-defined set of three traits (Renzulli, 1986):

Above average, although not necessarily superior, ability; task commitment, and creativity. Importantly, no one component of this three-part model can, on its own, make for high levels of accomplishment. Rather, it is the interaction between the three clusters that leads to creative-productive giftedness.²



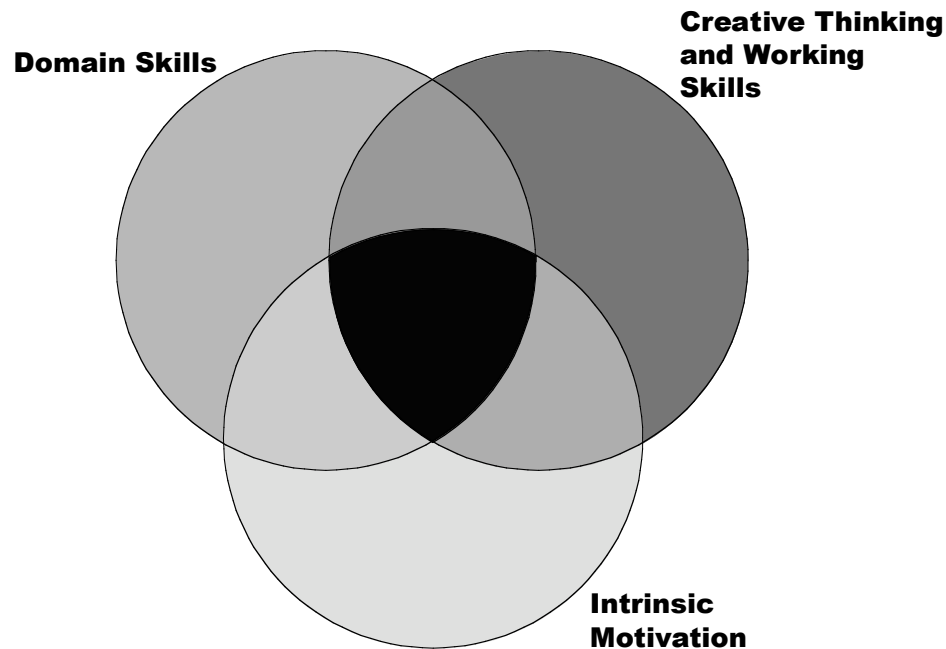
² Somewhat similar componential models have also been suggested by Csikszentmihalyi (1996), Guilford (1967), Treffinger (1992), Sternberg (1985) and others.

In the process of developing this model, Renzulli and colleagues conducted a large number of research studies that focused on various aspects of this three-part conceptualization and these findings have been summarized in a variety of venues (see (Renzulli, 1998, Renzulli & Reis, 1994). Work done by Winner (2000) and Gallagher (1990) reveals the intense drive and unusually high levels of intrinsic motivation often demonstrated by gifted children and there are a number of important parallels between Renzulli's theory and the biographical and autobiographical accounts of the lives and creative breakthroughs of eminent individuals representing a variety of fields (e.g., Bloom, 1985; Csikszentmihalyi, 1997; Gardner, 1993; Gruber, 1981; Renzulli, 2002). Across history, high levels of intelligence or especially developed skills in one or more areas have often not, in and of themselves, been sufficient for product-based creativity to flourish (Winner, 2000). The capacity for creative thinking coupled with a single-minded determination to persevere until a solution is reached are also necessary ingredients (Amabile, 1996).

Renzulli presents compelling evidence to support this three-part model, yet absent from his writing is any mention of the empirical research spearheaded by social psychologist Teresa Amabile. While other researchers and theorists interested in gifted populations (e.g., Treffinger, Isaksen, and Feldhusen) have occasionally referenced studies carried out by Amabile and colleagues, very few attempts have been made to directly integrate this work that comes from the mainstream social psychological literature with research that specifically targets gifted students. By the same token, Amabile and her collaborators, myself included, have for 25 years or more been publishing findings that speak directly to models of creative production among gifted children, yet they too have failed to make the connection. It would appear that these two longstanding programs of research have evolved completely separately of one another. A melding of the two perspectives is long overdue.

Amabile's Creative Intersection

Like Renzulli, Amabile too offers a three-part model—this time focused specifically on the antecedents of creative performance. Amabile and colleagues (Amabile, 1996; Hennessey, 2003; Hennessey & Amabile, 1988) have long argued that it is a mistake to stop at the individual level of analysis: the person doing the creating. This work emphasizes the fact that the confluence of a variety of environmental and person variables are necessary for creativity. More formally, this research is built on a three-part conceptualization of creative performance. For a creative solution to be found or a creative idea or product generated, an individual must approach a problem with the appropriate domain skills (background knowledge), creativity skills (willingness to take risks, experiment, etc.) and task motivation. Under ideal circumstances, the coming together of these three factors forms what Amabile (1997) terms the "creative intersection."



While it is certainly possible to teach (and learn) domain skills and perhaps even creativity skills, motivational orientation is much more ephemeral. Motivational state is highly variable and largely situation-dependent. It is on this question of how the environment helps to shape motivational orientation that Amabile and colleagues have focused their attention. In this research and theorizing, the distinction is made between two types of motivation. Intrinsic motivation is the motivation to do something for its own sake, for the sheer pleasure and enjoyment of the task itself. Extrinsic motivation, on the other hand, is the motivation to do something for some external goal.

Empirical Investigations in the Classroom

The Intrinsic Motivation Principle of Creativity

Over 25 years of social psychological investigation into these motivational orientations have led to the Intrinsic Motivation Principle of Creativity:

- **Intrinsic motivation is conducive to creativity, and extrinsic motivation is usually detrimental.**

In a basic research paradigm designed to test this proposition, study participants are randomly assigned to either constraint or no-constraint conditions. For instance, individuals are either led to expect a reward for their participation or no reward is mentioned, and then they are asked to produce some sort of observable product that can be assessed for level of creativity. Their motivational orientation (i.e., whether intrinsic or extrinsic) is also measured. Whether the targets of an investigation are preschoolers,

fifth graders, or college students, the findings are consistent. Over the years, five environmental constraints have consistently proven to be sure-fire killers of intrinsic motivation and creativity (Amabile, 1983a, 1996; Hennessey, 1996): (a) Expected Reward (b) Expected Evaluation (c) Competition (d) Surveillance and (e) Time Limits.

A Recipe for the Typical American Classroom?

Might this list of killers be just as well be labeled as a recipe for the typical American classroom? As unbelievable as it may seem, we have somehow managed to structure educational environments in such a way that intrinsic motivation and creativity are bound to suffer, if not be completely destroyed. The all-important question that must be addressed is how this situation can be turned around. How can teachers and administrators be helped to nurture the intrinsic motivation of their students? How can children be helped to develop an excitement about learning and the playfulness and the willingness to take risks that many researchers believe are crucial to creativity (e.g., Amabile, 1983a, 1996; Dansky & Silverman, 1975)?

Teacher Behavior in the Classroom

The key element seems to be the preservation of a sense of self-determination. Rewards, evaluations, or other extrinsic constraints that are perceived as informational, useful and informative as to the quality of one's performance rather than as controlling instruments of coercion can serve to increase task involvement and should not be expected to have detrimental effects. The expectation that one's performance will be evaluated or rewarded will only be detrimental if the interpersonal atmosphere of the setting causes the individual to feel intimidated or self-conscious. In situations where the individual feels in control of her own destiny, motivation and creativity need not suffer (Deci & Ryan, 1985).

When children experience the interpersonal context of the classroom as supporting of self-determination, they will be more intrinsically motivated (Deci, Nezlek, & Sheinman, 1981). Dozens of investigations conducted in both heterogeneous and gifted classrooms (e.g., Esquivel, 1995; Torrance, 1962) have revealed strong, positive correlations between teachers' orientations and their students' motivational outcomes. Moreover, teachers' orientations have been found to impact children's motivation within the first 6 to 8 weeks of the school and this influence remains strong throughout the year. Thus, it is the functional significance of one's environment (i.e., the individual's perception of the reward or evaluation as well as perceptions of the motivations of the teacher imposing these contingencies), rather than its objective properties, which affects motivational processes (see also deCharms, 1976; Ryan & Grolnick, 1986).

Based on these studies and others like them, it appears that gifted and talented students who consistently approach their class work with high levels of skill may be especially impacted by the negative effects of extrinsic constraints that threaten perceptions of self-determination. Gifted children are often well aware of their unusual talents. Drawing on past experience, they can be relatively sure that they will outperform

their more typically developing peers; and, as a result, they tend not to be especially dependent on the informational feedback that sometimes accompanies reward or evaluation contingencies. What many gifted students do need, however, is assistance in maintaining their intrinsic motivation.

Despite the fact that some widely accepted hallmarks of giftedness include the tendency to be highly motivated, have a long attention span and become entirely immersed in a problem (Winner, 1996a, 1997), research shows that gifted children often struggle with motivation in the classroom (e.g., Delisle & Berger, 1990; Reis & McCoach, 2000). These motivational difficulties may stem from the fact that gifted students tend to be self-motivated, rather than teacher-motivated. They typically perform better with unstructured, flexible assignments and they prefer to select their own learning experiences, rather than being given a set task (Winner, 1996a, 1997).

Rather than being bolstered by their unusual abilities and talents, many gifted children appear to be particularly vulnerable to classroom environmental influences. Too often their enthusiasm and motivation are stifled by teachers invested in seeing that they conform to accepted practices. In addition, some gifted students have been found to have a tendency toward social and emotional problems (Janos & Robinson, 1985; Winner, 1996a) and become easily bored. They often do not know how to set appropriate goals or to deal effectively with interpersonal situations or adults' high expectations. Taken together, these difficulties often result in underachievement in school, one of the most common problems faced by the gifted student population (Webb, Meckstroth, & Tolan, 1989; Winner, 1996b).

Gifted Children and the Creative Intersection

Given their obvious talents and intellectual superiority early in life, surprisingly few gifted children grow up to be creative adults (Winner, 1996a). At issue here is the fact that while much of the research and theorizing that has been done on creativity and the gifted has concentrated on the role played by these children's academic superiority in the creative process, a high level of intelligence is but one of the necessary ingredients for creative performance.

Researchers have tended to investigate only the largely innate, or at least largely immutable, differences between creative and uncreative or gifted and less academically talented students. The Creative Intersection Model presented here (Amabile, 1997), on the other hand, focuses on "creative situations"—the particular social and environmental conditions that can positively or negatively impact the creativity of most any individual.

How might the gifted child be characterized according to the intersection model? Hunsaker and Callahan (1995) report that the majority of schools have adopted definitions of and criteria for giftedness that include creativity; and it might seem reasonable to expect that where creative behavior is concerned, gifted children can be expected to fare particularly well. Yet the overwhelming majority of students identified as gifted have earned that designation because of above average general ability and

knowledge (what Amabile terms domain-relevant skills) (Renzulli, 1986). Importantly, over 25 years of empirical research tell us that no amount of domain-relevant (or even creativity-relevant skills) can compensate for a lack of intrinsic motivation to perform an activity. Task motivation makes the difference between what an individual can do and what she will do (Amabile, 1983b). It is task motivation that determines whether domain skills and creativity skills will be adequately and efficiently tapped in the service of creative performance.

While some research has revealed that intellectually gifted children can display strong levels of intrinsic motivation (Gallagher, 1990; Winner, 2000), educators must be careful not to take this tendency for granted. As reported earlier, studies show that gifted children often struggle with motivation in the classroom (e.g., Delisle & Berger, 1990; Reis & McCoach, 2000). Teachers of the gifted must remember that their students' advanced intellectual capacities and problem solving skills will often not be enough to ensure that creativity will flourish within the classroom. It is essential to also consider students' motivation and to conceptualize their motivational orientation as both a relatively enduring trait *and* as a temporary situation-specific state. Intrinsic motivation is a most delicate and often fleeting entity. Even especially gifted students, who may be generally more highly intrinsically motivated toward what they do, can quickly fall prey to outside influences. Intrinsic motivation cannot be taught. It cannot be coerced, but it is easily squelched. Intrinsic interest must come from *within* the individual and some classroom environments are much more conducive to this happening than are others.

Relevance of the Research for Underrepresented Populations

Prominent researchers and theorists have spent the better part of their careers gathering evidence that refutes what has been termed the "instant-eminence model of giftedness." The argument they set forth is that giftedness in children is not an already developed capacity as many educators and psychologists would lead us to believe. Rather, it is a capacity that needs nurturance and environmental support to blossom. The essential problem is this: If the motivation of many privileged students whose gifts have long been recognized and nurtured by families and schools can fall prey to the undermining effects of environmental influences, what about the motivational orientation of gifted students who might have the potential to make creative-productive contributions but who have not enjoyed the benefits of specially funded enrichment programs or high expectations from parents and teachers? Educators must be sensitized to these issues. They must question whether a gifted child who comes from an economically disadvantaged and/or minority background can be expected to attempt a creative solution to a problem or to maintain an interest in learning. Gifted students belonging to more marginalized groups are particularly in need of help if they are to find their own creative intersection.

A close examination of investigations into the psychology of creativity reveals that very little empirical work has been specifically targeted at either non-Western cultures or persons of color or other racial-minority or linguistic-minority groups within the U.S. and Europe. Investigators contributing to the gifted and talented research base

have also generally targeted White, middle-class, suburban students. While Torrance (1978) and Renzulli (1973) have long argued for the consideration of LCD (Linguistically and Culturally Diverse) populations in the gifted and talented literature, it is only in recent years that a small but growing number of gifted and talented experts have systematically advocated for a consideration of all children: Rich and poor, native English speakers and bilinguals, Blacks, Hispanics, Asians, and Whites. For example, Renzulli questions whether it makes sense to take a program that has proven successful in an affluent suburb and impose it on an inner-city or rural school district (Renzulli & Reis, 1994). As an alternative, Renzulli has developed an all-inclusive School Enrichment Model (SEM) (Renzulli & Reis, 1994, 1997, 2002) that he believes can be readily adapted to any student population or school situation. SEM moves away from a strict adherence to an arbitrary "cut off" score or other entrance requirement and makes it possible to include a variety of students who might otherwise never have been considered gifted (or potentially gifted). As Renzulli explains, programs that rely on traditional identification procedures may not be serving the wrong students, but they are certainly excluding substantial numbers of especially able but underachieving pupils—students who, if given the right classroom circumstances, could also demonstrate stellar achievements and signs of giftedness (Renzulli, 1999b).

Practical Applications

Promoting Intrinsic Motivation and Creativity in Gifted Populations

In their present form, the majority of American classrooms, from preschools through high schools and colleges, are fraught with killers of intrinsic interest and creativity. Nowhere is this situation more dire than in the gifted and talented classroom or "pull-out" program where the promotion of students' intrinsic motivation and creativity of performance must be top priority. Modifications of curriculum or materials, modules aimed at creativity enhancement or lessons in techniques for brainstorming or "thinking outside the box" are not enough. Administrators, teachers, parents, and students must work together to change both individual classroom environments and the overall *climate* of their educational institutions. If gifted students are to be helped to find their creative intersection, significant and fundamental changes must be made to the way that educators think about teaching and learning.

Towards this end, a few researchers in the area of gifted and talented education have, in recent years, turned their attention to programs that can be individualized to meet a particular child's interests and needs. Rather than singling out only a few students who might demonstrate exceptional ability in one or more narrowly-defined, traditional subject areas, this alternative approach recognizes student strengths and talents along a wide variety of dimensions. Treffinger's (1986) individualized model (LoS) or Feldhusen's (1992, 1995) TIDE program for talent identification and development are two primary examples of programs that strive to help students to reach higher levels of accomplishment and productivity, each at their own pace and in their own way.

The suggested actions outlined below are based on 30 years of empirical data gathered by social psychologists interested in promoting intrinsic motivation and creativity in the classroom (for extensive reviews of the literature, see Hennessey, 2003; Hennessey & Amabile, 1988). While many of the earlier investigations in this genre tended to target White, middle-class, suburban school students, there is a growing body of evidence to indicate that all children, both gifted and more typically developing, can benefit from these changes. And, in fact, the intrinsic motivation and creativity of economically disadvantaged children and culturally different students have been shown to be particularly vulnerable to classroom environmental factors (Lopez, 2003; Lopez, Esquivel, & Houtz, 1993). None of these suggested reforms necessitate large budgets or a major reallocation of funds. Instead, what are needed are a deep commitment to change and a willingness on the part of the entire educational community to band together to make the school environment conducive to the development of intrinsic motivation and creativity.

Suggested Steps

- **Teachers must work diligently to create an interpersonal atmosphere that allows students to feel in control of their learning process.**
- **Teachers and administrators must step back and critically review the incentive systems that are currently in place.**
- **In situations where extrinsic incentives are being used, students must be helped to distance themselves from those constraints as much as possible.**
- **Students must be helped to become more proficient at recognizing their own strengths and weaknesses.**

Clearly, these fundamental changes in attitude and behavior will not happen overnight. But our experience as researchers tells us that teachers, parents, and students are hungry for the opportunity to view education in this new light. Our message that students' own intrinsic interest, curiosity, and excitement about learning must not take a back seat to concerns about grades or the need to outperform one's peers resonates with educators. And if given the license to effect these changes, we believe that schools can, in fact, make great strides towards fostering the intrinsic motivation and creativity of their gifted students as well as the general population.

References

- Amabile, T. M. (1996). *Creativity in context*. Boulder, CO: Westview.
- Amabile, T. M. (1997). Motivating creativity in organizations: On doing what you love and loving what you do. *California Management Review*, 40, 39-58.
- Amabile, T. M. (1983a). *The social psychology of creativity*. New York: Springer-Verlag.
- Amabile, T. M. (1983b). Social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45, 357-377.
- Bloom, B. (1985). *Developing talent in young people*. New York: Ballantine.
- Csikszentmihalyi, M. (1997). *Creativity: Flow and the psychology of discovery and invention*. New York: HarperCollins.
- Dansky, J., & Silverman, I. (1975). Play: A general facilitator of fluency. *Developmental Psychology*, 11, 104.
- deCharms, R. (1976). *Enhancing motivation: Change in the classroom*. Oxford, England: Irvington.
- Deci, E. L., Nezlek, J., & Sheinman, L. (1981). Characteristics of the rewarder and intrinsic motivation of the rewardee. *Journal of Personality and Social Psychology*, 40, 1-10.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Delisle, J. R., & Berger, S. L. (1990). *Underachieving gifted students*. ERIC EC Digest #E478. (Available from ericadr.piccard.csc.com/extra/ericdigests/ed321483.html)
- Esquivel, G. B. (1995). Teacher behaviors that foster creativity. *Educational Psychology Review*, 7, 185-202.
- Feldhusen, J. F. (1992). *TIDE: Talent identification and development in education*. Sarasota, FL: Center for Creative Learning.
- Feldhusen, J. F. (1995). *Talent identification and development in education (TIDE)* (2nd ed.). Sarasota, FL: Center for Creative Learning.
- Gallagher, A. (1990). Personality patterns of the gifted. *Understanding Our Gifted*, 3, 11-13.

- Gardner, H. (1993). *Creating Minds: An anatomy of creativity seen through the lives of Freud, Einstein, Picasso, Stravinsky, Eliot, Graham, and Gandhi*. New York: Basic Books.
- Gruber, H. E. (1981). *Darwin on man: A psychological study of scientific creativity* (2nd ed.). Chicago: University of Chicago Press.
- Hennessey, B. A. (1996). Teaching for creative development: A social-psychological approach. In N. Colangelo & G. Davis (Eds.), *Handbook of Gifted Education* (2nd ed., pp. 282-291). Needham Heights, MA: Allyn and Bacon.
- Hennessey, B. A. (2003). The Social Psychology of Creativity. *Scandinavian Journal of Educational Psychology*, 47, 253-271.
- Hennessey, B.A., & Amabile, T. M. (1988). The conditions of creativity. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 11-38). New York: Cambridge University Press.
- Houtz, J. (Ed.). (2003). *The educational psychology of creativity*. Cresskill, NJ: Hampton.
- Hunsaker, S. L., & Callahan, C. M. (1995). Creativity and giftedness: Published instrument uses and abuses. *Gifted Child Quarterly*, 39, 110-114.
- Janos, P., & Robinson, N. (1985). Psychosocial development in intellectually gifted children. In F. D. Horowitz & M. O'Brien (Eds.), *The gifted and talented: Developmental perspectives* (pp. 149-195). Washington, DC: American Psychological Association.
- Lopez, E. C. (2003). Creativity issues concerning linguistically and culturally diverse children. In J. Houtz, (Ed.), *The educational psychology of creativity* (pp. 107-127). Cresskill, NJ: Hampton.
- Lopez, E. C., Esquivel, G. B., & Houtz, J. C. (1993). The creative skills of culturally and linguistically diverse gifted students. *Creativity Research Journal*, 6, 401-412.
- Reis, S. M., & McCoach, D. B. (2000). The underachievement of gifted students: What do we know and where do we go? *Gifted Child Quarterly*, 44, 152-170.
- Renzulli, J. S. (1973). Talent potential in minority groups students. *Exceptional Children*, 39, 437-444.
- Renzulli, J. S. (1986). The three-ring conception of giftedness: A developmental model for creative productivity. In R. J. Sternberg & J. Davidson (Eds.), *Conceptions of giftedness* (pp. 53-92). New York: Cambridge University Press.

- Renzulli, J. S. (1998). The three-ring conception of giftedness. In S. M. Baum, S. M. Reis, & L. R. Maxfield (Eds.), *Nurturing the gifts and talents of primary grade students* (pp. 1-27). Mansfield Center, CT: Creative Learning Press.
- Renzulli, J. S. (1999a). Reflections, perceptions, and future directions. *Journal for the Education of the Gifted*, 23, 125-146.
- Renzulli, J. S. (1999b). What is this thing called giftedness, and how do we develop it? A twenty-five year perspective. *Journal for the Education of the Gifted*, 23, 3-54.
- Renzulli, J. S. (2002). Expanding the conception of giftedness to include co-cognitive traits and to promote social capital. *Phi Delta Kappan*, 84, 33-40, 57-58.
- Renzulli, J. S., & Reis, S. M. (1994). Research related to the schoolwide enrichment triad model. *Gifted Child Quarterly*, 38, 7-20.
- Renzulli, J. S., & Reis, S. M. (1997). *The schoolwide enrichment model: A how-to guide for educational excellence*. Mansfield Center, CT: Creative Learning Press.
- Renzulli, J. S., & Reis, S. M. (2002). What is schoolwide enrichment?: How gifted programs relate to total school improvement. *Gifted Child Today*, 25, 18-25, 64.
- Renzulli, J. S., Smith, L. H., & Reis, S. M. (1982). Curriculum compacting: An essential strategy for working with gifted students. *Elementary School Journal*, 82, 185-194.
- Ryan, R. M., & Grolnick, W. S. (1986). Origins and pawns in the classroom: Self-report and projective assessments of individual differences in children's perceptions. *Journal of Personality and Social Psychology*, 50, 550-558.
- Stein, M. I. (1968). Creativity. In E. F. Borgatta & W. W. Lambert (Eds.). *Handbook of personality theory and research* (pp. 900-942). Chicago: Rand McNally.
- Sternberg, R. J. (1998). Principles of teaching for successful intelligence. *Educational Psychologist*, 33, 65-72.
- Sternberg, R. J. (2000). Identifying and developing creative giftedness. *Roeper Review*, 23, 60-64.
- Torrance, E. P. (1962). *Guiding creative talent*. Englewood Cliffs, NJ: Prentice-Hall.
- Torrance, E. P. (1978). Dare we hope again? *Gifted Child Quarterly*, 22, 292-312.
- Torrance, E. P., & Sisk, D. A. (1997). *Gifted and talented in the regular classroom*. Buffalo, NY: Creative Education Foundation Press.

- Treffinger, D. J. (1986). *Blending gifted education with the total school program*. Buffalo, NY: DOK Publishers.
- Treffinger, D. J. (1988, April). Cultivating potentials: Beyond the gifted program. *Teaching K-8*, 54-57.
- Treffinger, D. J., Isaksen, S. G., & Dorval, K. B. (1996). *Climate for creativity and innovation: Educational implications*. Sarasota, FL: Center for Creative Learning.
- Treffinger, D. J., Young, G. C., Nassab, C. A., & Wittig, C. V. (2003). *Talent development: The levels of service approach*. Waco, TX: Prufrock Press.
- Wallach, M. A.. (1971). *The creativity-intelligence distinction*. New York: General Learning Press.
- Webb, J. T., Meckstroth, E. A., & Tolan, S. S. (1989). *Guiding the gifted child: A practical source for parents and teachers*. Scottsdale, AZ: Great Potential Press.
- Winner, E. (1996a). *Gifted children: Myths and realities*. New York: Basic Books.
- Winner, E. (1996b, October 16). The miseducation of our gifted children. Retrieved May 5, 2003, from www.edweek.com/ew/vol-16/07winner.h16
- Winner, E. (1997). Exceptionally high intelligence and schooling. *American Psychologist*, 52, 1070-1081.
- Winner, E. (2000). The origins and ends of giftedness. *American Psychologist*, 55, 159-169.

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Developing Creativity in Gifted Children: The Central Importance of Motivation and Classroom Climate

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CHAPTER 1: The Study of Giftedness and Creativity—Two Separate But Parallel Trajectories

Rationale

This monograph has been designed to introduce researchers, curriculum developers, administrators, classroom teachers, and other groups who focus on gifted and talented populations to the Social Psychology of Creativity. The primary goal is to promote the creativity of gifted students. Importantly, unusually high levels of intelligence or other hallmarks of giftedness do not necessarily predict creative behavior (Stein, 1968; Wallach, 1971). Yet many gifted children do have the requisite "ingredients" to become highly creative adult contributors to the arts and sciences. If these gifted students are to realize their creative potential, particular attention must be paid to the promotion and maintenance of intrinsic motivation in the classroom.

The Study of Creativity

Researchers and theorists have long been interested in determining the roots of creative behavior. The empirical study of creativity began as early as 1870 with Galton's publication of a review of the biographies and autobiographies of well-known creative figures. It was Galton's goal to identify the unique constellation of intellectual and personality traits that differentiated this group from their less creative peers, and this emphasis on the individual difference variables that contribute to high levels of creativity has continued to dominate the creativity literature up to the present day. In 1950, for example, J. P. Guilford proclaimed in his presidential address to the American Psychological Association that "the psychologist's problem is that of creative personality" (p. 444). Over the years, a host of investigators have carried out intensive laboratory studies of creative persons (e.g., Helsen, 1965; Helsen & Crutchfield, 1970; MacKinnon, 1962; Wallach & Kogan, 1965). A second category of researchers and theorists have focused their attention on the creative process. Some in this group attempted, among other goals, to specify a universal sequence of steps involved in creative production (e.g., Isaksen, Dorval, & Treffinger, 2000; Isaksen & Treffinger, 1985; Osborn, 1967; Parnes, 1981; Torrance & Safter, 1990; Wallas, 1926). Others have sought to specify the cognitive skills necessary for creative performance (e.g., Newell, Shaw, & Simon, 1962). And a third contingent has worked to develop creativity enhancement techniques and

training programs (e.g., Osborn, 1967; Parnes, 1967; Treffinger & Isaksen, 1992). Implicit in much of this work has been a focus on the internal determinants of creativity, to the exclusion of external factors such as the environmental circumstances conducive to creativity. As Sternberg has pointed out, many psychologists have tended to view creativity as a gift from God, nature, the "Muses" or some other source over which one has no control (Sternberg, 1999, 2000a, 2000b). The majority of researchers interested in the psychology of creativity have chosen to decontextualize the creative process. As a result, the empirical study of this phenomenon has generally failed to include a consideration of anyone or anything beyond the individual doing the creating.³

Yet creativity does not come about in a vacuum. Spurred on by this realization, in the mid 1970's, a small group of psychologists began work that focused on the impact of situational factors on creative performance. A large number of investigations carried out over the past two and one half decades have now established that there is a direct link between the affective or motivational orientation brought by an individual to a task and the likelihood of creativity of performance on that task. We now understand that it is the environment, or at least certain aspects of the environment, that in large part determine that motivational orientation. Creative behavior, creative breakthroughs, are much more apt to be realized in some environments than they are in others.

The Study of Gifted and Talented Populations

Like their colleagues who investigate creative behavior, the majority of researchers and theorists who target gifted and talented populations have also focused their attention on issues of individual differences. As described by Renzulli (1986), the standard approach to the study of gifted persons generally reflects the notion that giftedness is a condition magically bestowed on a person in much the same way that nature or genetic inheritance determine hair or eye color. This premise that the gifted are somehow "blessed" and qualitatively different from the rest of us has been the backdrop for the gifted and talented literature right from the start (see Terman, 1925; Hollingworth, 1942). Yet in recent years, some theorists and researchers have begun to advance the argument that from both a theoretical and practical (educational practitioner) standpoint, it makes more sense to shift the emphasis from "*being gifted*" to the question of how to *develop gifted behaviors* in children in the classroom (e.g., Feldhusen, 1995; Houtz, 2003; Renzulli 1986, 1999a, 2002; Sternberg, 1998, 2000b; Torrance & Sisk, 1997; Treffinger, 1988b; Treffinger, Isaksen, & Dorval, 1996; Treffinger, Young, Nassab, & Wittig, 2003).

³ Exceptions to this rule include work done on the Four "P's" of Creativity. In addition to investigating the creative **p**erson, **p**rocess, and **p**roduct, a small number of researchers have set out to explore what they term "**p**ress," meaning all the environmental factors that might influence creative development, from deliberate training efforts and general work or learning climate to interpersonal behaviors. One example of this approach comes from studies based on Treffinger's COCO (Characteristics, Operations, Context, Outcomes) model (Treffinger, 1988a, 1991, 1996).

In sum, social psychologists working to specify the environmental conditions most conducive to creativity have much in common with investigators whose goal it is to help develop gifted behaviors in children. Yet as a discipline, psychology has traditionally overlooked the gifted population. As Sternberg has observed (1996), psychologists have been largely indifferent to and in some respects have worked to marginalize this group. There is no field recognized as the "psychology of the gifted," and even the major figures in the National Association for Gifted Children are, for the most part, virtual unknowns in the field of academic psychology (and vice versa) (Sternberg, 1996).

Yet, importantly, the two disciplines have much to offer one another. The "marriage" between work being done on the social psychology of creativity and the movement in the schools to *develop* gifted behaviors in children need not be forced. The parallels are many. Despite the fact that they have taken very different paths, researchers in these two areas have evolved strikingly similar models as well as complimentary lists of recommendations for classroom teachers and other educational practitioners hoping to promote creativity in the classroom. What follows is an overview of some of these parallels as well as a proposal as to how the two fields might work more profitably together in the future.

Issues of Definition—Moving Away From Unitary Constructs

Creativity

If the gifted and talented literature and work being done on the social psychology of creativity are to be bridged, the first hurdle must be to address problems of definition and the measurement of constructs. What do we mean by creativity? Can we measure it? If so, how? How will we identify highly creative students? And what is the relation between creativity and giftedness?

Researchers and practitioners wishing to assess an individual's level of creativity have a wide range of options from which to choose. A variety of personality checklists developed by Gough, Torrance, Cattell, and others have often been used to identify highly creative persons. Even more common are creativity indices that focus on behavioral factors. These assessments typically include a series of scales similar in administration and form to traditional intelligence tests. In fact, many of the items that Guilford originally developed to target the divergent thinking component of his structure-of-intellect theory (Guilford, 1956) have served as the prototypes for the most popular creativity measures. Guilford's Unusual Uses Test (Guilford, 1950) asks respondents to generate as many unusual uses as they can for a common object such as a brick. And the Remote Associates Test (RAT) (Mednick & Mednick, 1966) operationalizes creativity as the ability to supply a term that is associated in some way with each of a series of three words. But by far the lion's share of creativity research has utilized the Torrance Tests of Creative Thinking (TTTC, also known as the Minnesota Tests of Creative Thinking, Torrance, 1966, 1974) as its primary dependent measure. Test-takers give oral, written

and drawn (non-verbal, figural) responses that are scored in terms of four criteria: (a) fluency, the production of a large number of ideas; (b) flexibility, the production of a wide variety of ideas; (c) elaboration, the development or filling out of ideas; and (d) originality, the generation of ideas that are statistically infrequent.

What does it mean when someone scores high (or low) on these creativity tests? Should high scorers be considered creative persons? There is evidence that some creativity tests do accurately tap one or more creative components or predispositions. But it is unlikely that a single, objective scoring system that captures the full range of creative abilities across domains, the many facets of creative problem-finding and problem solving, can ever be developed. Also problematic is the fact that a variety of social and environmental factors involved in the administration of the Torrance Tests and other similar measures have been found to influence test results; and the construct validity of many of these tests has also been seriously questioned. This validity issue is particularly worrisome given the fact that many of the leading creativity tests have been validated against one another. Another difficulty is that, like the majority of IQ tests, existing quantitative measures of creativity raise the potential of cultural, problem-solving style or linguistic bias; and one additional criticism involves the fact that while the scoring procedures utilized in the majority of published creativity tests are purported to be objective, performance is often rated according to criteria based upon the test constructor's own, intuitive notion of what is creative.⁴

In their 2002 publication (Treffinger, Young, Selby, & Shepardson), Treffinger and colleagues offer an especially thorough review of available creativity assessment tools and the thorny issues faced by educators who set out to employ them. This monograph then goes on to discuss the interface between assessment and actual classroom instruction and ends with the authors' admonition that teachers and counselors adopt a specific definition of creativity and be clear about its implications for the student characteristics they plan to assess. Creativity can take many forms. Some operationalizations of this construct rely on observable creative *behaviors* or *attitudes*. Others focus on the production of one or more creative *ideas*. And a third school of thought maintains that true creativity must result in the production of an actual tangible *product*. No matter which definition is adopted, the measurement and identification of creativity is rarely, if ever, easy.

Intelligence

Importantly, many of the same difficulties associated with the identification and measurement of creativity also plague tests of intelligence. A substantial number of educational researchers, theorists and practitioners no longer believe that intelligence is, itself, a unitary construct that can be captured by a single, numerical IQ score. The perceived inadequacies of present day models of intelligence and resulting measurement techniques have led some theorists to propose multi-dimensional theories and assessment

⁴ For an in-depth discussion of some of these issues see: Treffinger, D. J., Young, G. C., Selby, E. C., & Shepardson, C. A. (2002). *Assessing creativity: A guide for educators* (pp. 51-56). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.

tools. Gardner (1993a, 1999) proposes that there are nine separate dimensions of intelligence, and Sternberg offers triarchic models of both intelligence (Sternberg, 1985, 1988) and creativity (Sternberg, 1988). In addition, these and other influential thinkers argue that the attributes of intelligent behavior must be considered in relation to a number of situational and cultural factors.

Renzulli's Three-ring Model

The many complexities surrounding the identification and measurement of intelligence are particularly problematic for researchers and practitioners working in the area of giftedness because, historically, definitions and assessments of giftedness have been directly tied to tests of intelligence, most especially the IQ score. But are giftedness and intelligence as closely related as many of the experts would have us believe? A small group of theorists have advanced the argument that the prevailing conceptions of giftedness (and, as a result, our measurement techniques) are far too narrow. For example, Feldhusen (1986) advocates that models of giftedness should include both general intellectual ability and achievement motivation and Treffinger and Selby (1993) suggest that a conceptualization of giftedness also include a consideration of creativity and learning style. Finally, Renzulli (1986) proposes that, at the very least, we must adopt a two-pronged view. According to his model, there are two distinct categories of giftedness: schoolhouse giftedness and creative-productive giftedness (Renzulli, Smith, & Reis, 1982). Both types, he argues, are important and the two categories often interact. But it is not unusual for children (and persons of all ages) to demonstrate an "unevenness" in their giftedness profile—with their strengths in one of the two areas far outweighing their abilities in the other.

What Renzulli labels "schoolhouse giftedness" might also be thought of as test-taking or lesson-learning giftedness. It can be argued that this form of giftedness is fairly well-served by standard IQ and other indices of cognitive ability. And because schoolhouse giftedness is relatively easy to recognize and test, it is high scores in this realm that is most often lead to students being identified as gifted and invited to participate in special programs. The hallmarks of what Renzulli terms creative-productive giftedness are often more difficult to recognize in students, much less test. Creative-productive giftedness results in the production of original material and tangible products that are intended to be shared with and to impact others (Renzulli, 2002). The emphasis here is on real-world problems and their solutions. And it is questionable whether any one test, or even a whole battery of tests, could ever be developed that would adequately capture talent or potential in this area. Simply stated, giftedness is far too complex, far too multi-faceted, to be defined in terms of a numerical score on a test of intelligence, aptitude, or achievement.

In my own view, this broadening of our conceptions of giftedness is long overdue. Yet researchers and practitioners who have advocated for such change are learning that there is a price to be paid in the form of thorny issues of testing and identification. The movement away from a reliance on objective, numerical scores has forced many educators to abandon their "zone of comfort." These problems, however, are not

insurmountable and many believe that the difficulties are greatly overshadowed by a number of beneficial aspects. One especially positive, although perhaps somewhat subtle, result of this new multi-faceted approach rests in the fact that it allows for a shift of emphasis. The recognition that giftedness cannot always be quantified with a test score allows for an exploration of "potential giftedness" and the concomitant question of how such potential might best be fostered. In psychological terms, the focus of attention is moving away from an emphasis on giftedness as a stable *trait* toward an understanding that giftedness may, in many respects, be better conceptualized, at least in part, as a situation-specific *state*.

As Renzulli explains, giftedness can be nurtured in some people if conditions are right for an appropriate interaction to take place between the individual and the environment (Renzulli, 1986). But what are the conditions under which giftedness is most likely to blossom? While no single criterion has been found to determine giftedness, individuals who have achieved recognition because of their outstanding accomplishments and creative breakthroughs tend to possess a fairly well-defined set of three traits (Renzulli, 1986). Elaborating on this finding, Renzulli proposes a three-ring model composed of three inter-related clusters of strengths: Above average, although not necessarily superior, ability; task commitment, and creativity (see Figure 1). Importantly, no one component of this three-part model can, on its own, make for high levels of accomplishment. Rather, it is the interaction between the three clusters that leads to creative-productive giftedness (Renzulli, 1986).⁵

Renzulli and colleagues have conducted a number of research studies that focus on various aspects of this three-part conceptualization and these findings have been summarized in a variety of venues (see Renzulli, 1998, Renzulli & Reis, 1994). Work done by Winner (2000) and Gallagher (1990) that reveals the intense drive and unusually high levels of intrinsic motivation often demonstrated by gifted children also serves to support the model. And in addition, Renzulli is able to draw a number of important parallels between his theory and the biographical and autobiographical accounts of the lives and creative breakthroughs of a large number of eminent individuals representing a variety of fields (e.g., Bloom, 1985; Csikszentmihalyi, 1997; Gardner, 1993b; Gruber, 1981; Renzulli, 2002). These sources reveal that one of the most commonly shared features of these eminent individuals' personalities and their moments of creative insight was their ability to become immersed in a problem or pursuit, often to the exclusion of all else, for an extended period of time. Across history, high levels of intelligence or especially developed skills in one or more areas have often not, in and of themselves, been sufficient for product-based creativity to flourish (Winner, 2000). The capacity for creative thinking coupled with a single-minded determination to persevere until a solution is reached are also necessary ingredients (Amabile, 1996).

⁵ Somewhat similar componential models have also been suggested by Csikszentmihalyi (1997), Guilford (1967), Treffinger (1992), Sternberg (1985) and others.

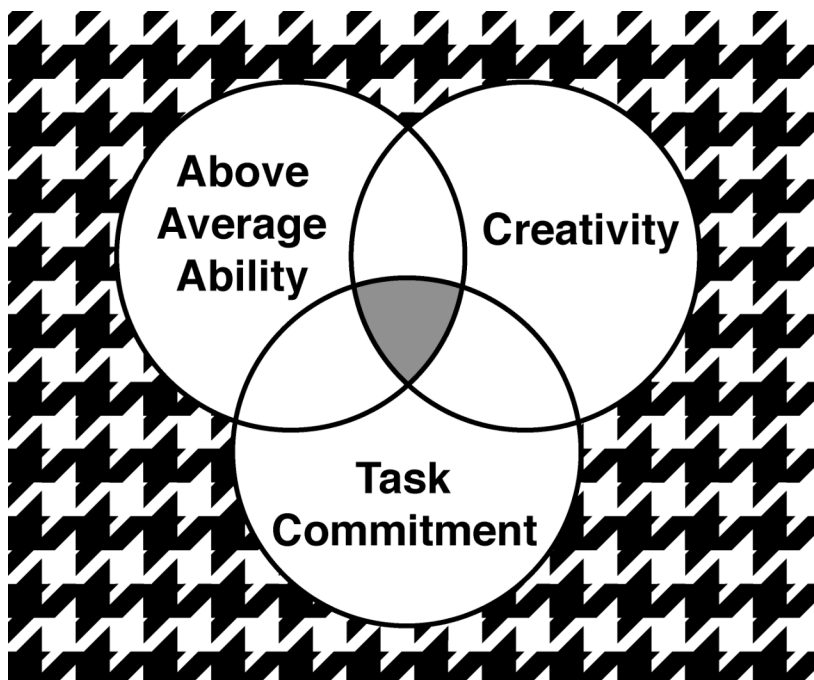


Figure 1. Renzulli's three-part conceptualization of giftedness.

In sum, a growing body of empirical evidence supports this exciting new three-pronged approach. Yet notably absent from Renzulli's writing is any mention of the empirical research spearheaded by social psychologist Teresa Amabile. While other researchers and theorists interested in gifted populations (e.g., Treffinger, Isaksen, & Feldhusen) have occasionally referenced studies carried out by Amabile and colleagues, very few attempts have been made to directly integrate this work that comes from the mainstream social psychological literature with research that specifically targets gifted students. This is an unfortunate omission, given the fact that Amabile and her collaborators have for 25 years or more been publishing findings that speak directly to the models and theories proposed by Renzulli and colleagues. In all fairness, Amabile and colleagues have also failed to integrate Renzulli's contributions and the work of many other researchers and theorists who focus on gifted and talented populations into their own thinking and model building. It would appear that these two longstanding programs of research have evolved completely separately of one another. But students of the social psychology of creativity have a lot to learn from investigators and theorists in the area of gifted education who focus on what Renzulli terms creative-productiveness. And by the same token, educators and researchers who hope to discover the classroom conditions under which the creativity of gifted children is most likely to blossom can benefit greatly from the social psychological literature. A melding of the two perspectives is long overdue.

Amabile's Creative Intersection

Like Renzulli, Amabile, too, offers a three-part model—this time focused specifically on the antecedents of creative performance (see Figure 2). Drawing on her training in social psychology, Amabile and colleagues (Amabile, 1996; Hennessey, 2003a; Hennessey & Amabile, 1988a), have long argued that it is a mistake to stop at the individual level of analysis: the person doing the creating. In our work we emphasize the fact that the confluence of a variety of environmental and person variables are necessary for creativity. More formally, this research is built on a three-part conceptualization of creative performance. For a creative solution to be found or a creative idea or product to be generated, an individual must approach a problem with the appropriate domain skills (background knowledge), creativity skills (willingness to take risks, experiment, etc.) and task motivation. Under ideal circumstances, the coming together of these three factors forms what Amabile (1997) terms the "creative intersection."

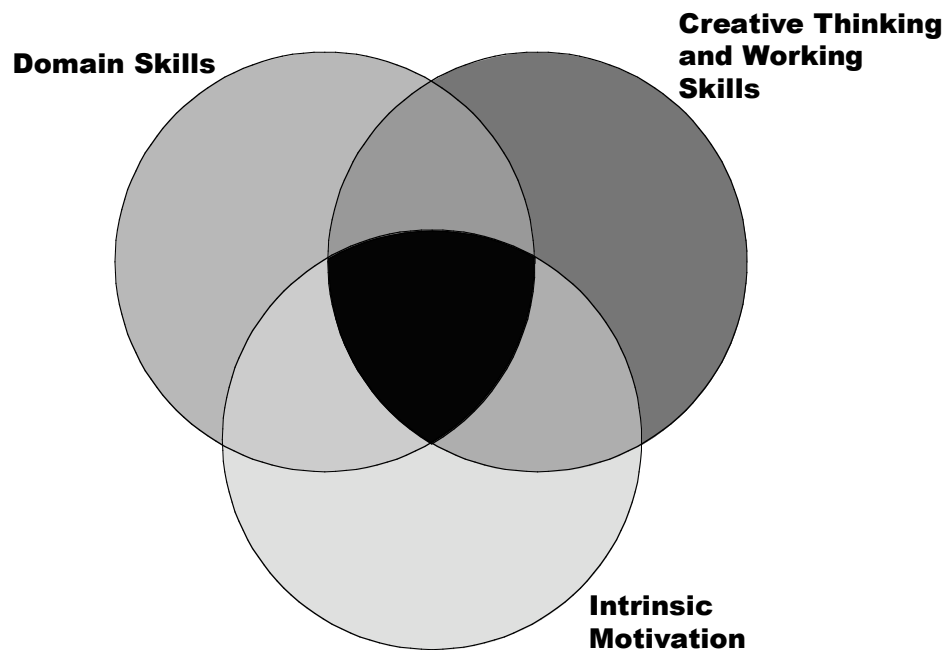


Figure 2. Amabile's creative intersection.

While it is certainly possible to teach (and learn) domain skills and perhaps even creativity skills, motivational orientation is much more ephemeral. In other words, while creativity skills (e.g., familiarity with brainstorming and related techniques or the ability to temporarily suspend judgment) or domain skills (e.g., knowledge of chemistry, physics or engineering, or facility with a paint brush) may be fairly stable, motivational state is highly variable, and largely situation-dependent. Each of us finds some activities more interesting or enjoyable than we do others. No one approaches every task with the same degree of excitement; and to some degree, our level of enthusiasm and task commitment

is determined by the circumstances we find ourselves in. Social psychologists like myself have focused attention on this question of how the environment helps to shape motivational orientation. The model upon which our work is built maintains that there is a direct relation between the motivational orientation brought by an individual to a task and creativity of performance on that task, and it is the environment that in large part determines that motivational orientation.

In our research and theorizing, we distinguish between two types of motivation. Intrinsic motivation is the motivation to do something for its own sake, for the sheer pleasure and enjoyment of the task itself. Extrinsic motivation, on the other hand, is the motivation to do something for some external goal. These operationalizations are not all that different from the variety of motivational approaches that have been offered over the years. For example, Hebb (1955) and Berlyne (1960) proposed that enjoyable (intrinsically motivating) activities are those that present an optimal level of novelty. White (1959) and Harter (1978) suggested that a sense of competence and mastery are central components of intrinsic motivation. And deCharms (1968), Deci (1971), and Lepper and colleagues (Lepper, Greene, & Nisbett, 1973) placed their emphasis on a sense of control: When a person perceives her task engagement as externally controlled, she is extrinsically rather than intrinsically motivated. Most recently, as described by Csikszentmihalyi (1993, 1997), the intrinsic motivational state has come to be seen as one of "optimal experience" or "flow." For the majority of persons, flow is not an everyday occurrence, but when it does come, it is characterized by feelings of intense concentration and deep enjoyment . . . feelings that transport the individual into a new reality to "previously undreamed-of states of consciousness" (Csikszentmihalyi, 1990, p. 74).

In sum, researchers and theorists tell us that a large number of features of task engagement contribute to an intrinsically motivated orientation. The individual may be curious about or in some other way stimulated by the presentation of the activity. With task participation come feelings of competence, mastery, or self-efficacy. And, perhaps most significantly, while engaging in a task that they find intrinsically interesting, individuals feel that their involvement is free of strong external control. They get the sense that they are playing rather than working. Importantly, each of these hallmarks of intrinsic motivation focuses on the individual's inner phenomenological state. Whether prompted by just the right amount of novelty, feelings of competence, or a sense of control, the intrinsically motivated state comes about as the result of an internal, very individualized process—the complexities of which we are only beginning to appreciate.

CHAPTER 2: Empirical Investigations in the Classroom

The Intrinsic Motivation Principle of Creativity

Over 25 years of social psychological investigation into these motivational orientations have led to the Intrinsic Motivation Principle of Creativity:

- **Intrinsic motivation is conducive to creativity, and extrinsic motivation is usually detrimental.**

In its earlier incarnations, this proposed relation between motivational state and creativity of performance was advanced as a tentative research hypothesis. But investigators working within this tradition have now gathered so much unequivocal empirical evidence (see Amabile, 1996; Hennessey, 2003a) that this proposition has been elevated to the status of an undisputed principle.

In a basic research paradigm, study participants are randomly assigned to either constraint or no-constraint conditions. This use of random assignment assures the experimenter that, if experimental instructions and environment are held constant, each group should be expected to perform similarly on indices of creativity or motivation, or for that matter any other psychological construct that might be measured. While some individuals will undoubtedly be more (or less) creative or intrinsically motivated than will others, chance alone will dictate that persons who fall at the extremes of these continua will be evenly distributed across experimental conditions. In the prototypical investigation, participant groups are either led to expect a reward for their study involvement or no reward is mentioned. They are then asked to produce some sort of observable product that can be later assessed for level of creativity. Motivation (i.e., whether intrinsic or extrinsic) is also measured.

Because these experimental groups have been randomly formed, any significant between-group differences in motivational orientation or creativity of performance can be attributed to the fact that study participants were working under very different sets of circumstances. In fact, researchers have at their disposal straightforward statistical tests that can be used to calculate the probability that these between group differences were due to chance alone (with probabilities often falling at the .05 level or less).

Whether the targets of these investigation are preschoolers, fifth graders, or college students, the findings are consistent. Some environmental circumstances are far more conducive to the maintenance of intrinsic motivation and creativity of performance than are others. Over the years, researchers have identified five environmental constraints that have consistently proven to be sure-fire killers of intrinsic motivation and creativity:

- Expected reward
- Expected evaluation

- Competition
- Time limits
- Surveillance

The message is clear. The impact of environmental factors on motivation and creativity is substantial and must be attended to if the creativity of students is to flourish. My own empirical work in this area has dealt almost entirely with creativity of performance in the elementary school classroom, but a number of other creativity researchers (see Amabile, 1996; Hennessey, 1996, 2003a) have also focused their attentions on a variety of ages and grade levels.

A paper published by my colleagues and myself in 1986 (Amabile, Hennessey, & Grossman, 1986, Study 1) outlines a prototypical investigation from this research tradition. In this study, the reward offered to elementary school children was not a tangible gift to be delivered afterward. Instead, it was an attractive activity—playing with a Polaroid camera—which the children were allowed to engage in before completing the target experimental task. In other words, children assigned to the reward condition signed a contract and promised to later tell a story in order to first have a chance to use the camera. A second group of children assigned to the no-reward condition were simply allowed to use the camera and then were presented with the storytelling instructions; there was no contingency established between the two tasks.

To examine the impact of reward expectation on children's verbal creativity, the children in this study were asked to tell a story into a tape recorder to accompany a set of illustrations in a book with no words (see Hennessey & Amabile, 1988b). This storytelling activity was designed with three specific goals in mind. First, it was necessary that individual differences in verbal fluency be minimized because these differences could lead to high variability in baseline performances. In the case of this storytelling task, this was accomplished with the stipulation that children say only "one thing" about each page. Second, to be appropriate for testing hypotheses about creativity, the task had to allow for a wide variety of responses. In other words, the target activity had to be an open-ended, one for which a wide variety of responses were possible (Amabile, 1982a; Hennessey & Amabile, 1999; McGraw, 1978). Finally, like all the creativity tasks used in research of this type, it was important that the storytelling procedure be pretested to ensure that children of this age group did, in fact, find it to be intrinsically interesting.

Elementary school teachers familiar with children's writing, later rated the stories relative to one another on creativity and a variety of other dimensions. A high level of inter-rater reliability was reached; and results indicated that, overall, stories produced by children in the no-reward condition were judged to be more creative than were stories produced by children in the reward condition. This main effect of reward was, in fact, statistically significant. Importantly, the only difference in the experience of the rewarded and non-rewarded children in this paradigm was their *perception* of the picture-taking reward as contingent or not contingent on the target storytelling activity.

The Consensual Assessment Technique (CAT)

In the investigation just described, the creativity of elementary school students was assessed based on their performance on a storytelling task not unlike many other language art activities being carried out in their classroom. In this respect, our definition of and measurement of creativity is different from that employed by a good many other researchers in the field. Rather than administer a paper-and-pencil creativity assessment, such as the Torrance Tests of Creative Thinking (Torrance, 1974), we ask participants in our studies to produce some sort of real-world product.

But how are investigators such as ourselves to decide whether products produced by persons working under the expectation of reward are more or less creative than products made by persons in a control/no-reward condition? The Consensual Assessment Technique (CAT) (Amabile, 1982a; Hennessey & Amabile, 1999) is based on the assumption that a panel of independent expert raters, persons who have not had the opportunity to talk with one another or with the researcher about possible hallmarks of product creativity, are best able to make such judgments. Over 20 years of research have, in fact, clearly established that product creativity can be reliably and validly assessed based on the consensus of experts.⁶ Although creativity in a product may be difficult to characterize in terms of specific features, it is something that people can recognize and agree on when they see it.

The CAT is grounded on two complementary definitions of creativity. The underlying conceptual definition that has been used in building a theoretical formulation of the creative process states that a product will be judged as creative to the extent that: (a) it is both a novel and appropriate, useful, correct, or valuable response to the task at hand, and (b) the task is heuristic rather than algorithmic (Amabile, 1996, p. 35). The operational definition upon which the CAT is based is readily applicable to empirical research: A product or response is creative to the extent that appropriate observers agree it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated (Amabile, 1983a, 1996). Importantly, this consensual definition is based on the creative *product* rather than the creative process. While a small group of researchers and theoreticians (e.g., Osborn, 1967; Parnes, 1967, 1992) have made great strides in this area, a clear and complete articulation of the creative process yet to be developed. More importantly, any identification of a thought process as "creative" must finally depend on the fruit of that process—a product or response.

Researchers employing the CAT (Amabile, 1982a; Hennessey & Amabile, 1999) seek tasks that leave room for considerable flexibility and novelty of response. These

⁶ Over the years, researchers employing the CAT have found that this notion of "expert" can often be fairly loosely defined. For example, when the products to be judged were artworks produced by very young children, both teachers working with preschool populations and college students with studio art experience were found to make reliable ratings. However, in the case of products representing more technical or specialized domains (e.g., computer programming or physics), it was necessary to recruit judges who had considerable experience in these areas (see Hennessey & Amabile, 1999).

activities are always heuristic in that all are open-ended with more than one solution and a variety of possible paths to those solutions; and in their instructions to study participants, investigators are careful to clearly identify the range of appropriate responses.

This consensual assessment approach has proven to be especially well suited to investigations of environmental influences on creativity. The majority of available assessment techniques resemble personality or IQ tests in that they view creativity as an enduring personality *trait*. Whether they request that a picture be completed, unusual uses for a brick be generated, adjectives describing the self be selected, or remote associations be discovered, most paper-and-pencil measures have been specifically constructed to maximize individual differences. They have been constructed to do exactly what investigators in the study described earlier were trying to avoid. Researchers like myself who take a social-psychological approach must control for and, as much as possible, eliminate within-group variability in their dependent measures in order that they might detect more global between-group differences produced by their direct experimental manipulations of social and environmental factors. In this investigation involving school children, individual differences constitute the error variance. We were not interested in whether a particular child was likely to consistently evidence greater levels of creativity than the majority of her peers. We were interested in creativity not as a relatively enduring and stable *trait*, but as the result of a fleeting and delicate motivational *state*: a state brought on by environmental factors such as the presence or absence of reward. What we needed was a measurement tool that de-emphasized individual differences between subjects, a measure that allowed for considerable flexibility and novelty of response and did not depend heavily upon the level of a child's skills or the range of her experience. The CAT fills each of these requirements.

Sure-fire Killers of Intrinsic Motivation and Creativity

Expected Reward

The picture-taking study described above (Amabile et al., 1986, Study 1) is but one example in a long line of empirically-based investigations focused on the effect of expected reward on motivation and performance. In recent years, in fact, much of this research has trickled down to persons involved in public education as well as the general public in the form of research reports and even popular press books bearing titles such as *Turning Play into Work* (Lepper & Greene, 1975) or *Punished by Reward* (Kohn, 1995). Pioneers in this research effort were Lepper, Greene, and Nisbett, who in 1973 revealed that the expectation of a "Good Player Award" significantly undermined the intrinsic task interest and quality of performance of preschoolers who were presented with a drawing activity. What made these results especially salient was the fact that these investigators had purposefully selected into their study only children who displayed an especially high level of intrinsic interest in drawing with magic markers. Yet even for this group who

were passionate about drawing, the expectation of a colorful certificate was enough to negatively impact their performance and kill their enjoyment of the task.

Like the picture-taking and magic marker investigations just described, the majority of early studies designed to explore the impact of environmental constraints on motivation and performance were focused on the effects of expected reward (e.g., Deci, 1971, 1972a; Garbarino, 1975; Greene & Lepper, 1974; Kernoodle-Loveland & Olley, 1979; Kruglanski, Friedman, & Zeevi, 1971; Lepper et al., 1973; McGraw & McCullers, 1979; Pittman, Emery, & Boggiano, 1982; Shapira, 1976). While, over the years, experimental approaches have become increasingly sophisticated, the basic findings have remained the same: The promise of a reward made contingent on task engagement can often serve to undermine both intrinsic task motivation and qualitative aspects of performance. This effect is so robust, in fact, that it has been found to occur across the entire life span, with preschoolers and seasoned professionals experiencing the same negative consequences.

Investigations focused specifically on creative aspects of performance reveal that creativity is especially vulnerable to environmental influence. Researchers have found not only that this construct we call intrinsic motivation is essential for creativity but also that it is especially ephemeral. In other words, while an individual's creativity skills (e.g., familiarity with brainstorming and related techniques or the ability to temporarily suspend judgment) or domain skills (e.g., knowledge of chemistry, physics or engineering, or facility with a paint brush) may be fairly stable, motivational orientation is highly variable, and largely situation-dependent. None of us are always intrinsically motivated under all conditions. And there are few social conditions more damaging to intrinsic interest than situations where rewards have been promised for task completion. (for a more complete review of the literature, see Amabile, 1983a, 1996; Hennessey, 2000; Hennessey & Amabile, 1988a).

When offered a reward for task participation, it appears that all of us, young and old alike, come to view that task as a means to an end. Whether they were asked to title a paragraph and write a story (Kruglanski et al., 1971), solve Duncker's set-breaking candle problem (Glucksberg, 1962, 1964), or attempt Luchin's water jar problems (McGraw & McCullers, 1979), persons expecting a reward for their task participation were significantly less creative than were their non-rewarded counterparts. Rewards "promised" and "delivered" by a computer have also been found to negatively impact the creativity of children performing a creative line-drawing task (Hennessey, 1989). So robust is this finding that expected reward undermines intrinsic interest and creativity, in fact, that one group of researchers (Lepper, Sagotsky, Dafoe, & Greene, 1982) was able to demonstrate that when children engaged in one intrinsically interesting activity in order to have a chance to engage in another, their interest in the first activity plummeted as well. This effect held regardless of which task was presented as the means and which task was presented as the reward. Thus, rewards will undermine intrinsic interest even if they are no more "reward-like" than the tasks upon which they have been made contingent.

Some Proposed Mechanisms

But what is the precise mechanism by which an expected reward undermines intrinsic task motivation and creativity of performance? Practitioners and researchers trained in the behaviorist tradition believe that they understand quite a lot about the reasons why rewards have the effects that they do.⁷ Yet because the focus of these psychologists is on straightforward, sometimes even rote *behaviors*, their work sheds very little light on issues of creativity. Creative performance results from a highly complex combination of past experience, accumulated knowledge, and *internal* processes and cognitions. Oftentimes, in fact, a creative idea or response to a problem can be generated without the help of any outwardly observable behavior whatsoever. Investigators seeking an understanding of creative performance must concentrate their attention on the cognitive and perhaps even the affective processes that make creativity possible, as well as on the overt behaviors. While this charge may sound fairly straightforward, it has proven itself to be extremely difficult.

What has been easy, too easy, has been a demonstration of how to kill motivation and creativity of performance with the promise of a reward. Intrinsic task interest and creativity have proven themselves to be especially vulnerable to the promise of a reward. What has not been as easy is understanding why expected reward can have such a negative impact. What are the internal mechanisms that bring about the undermining effects of reward? What we have come to learn is that most of us are not all that in touch with our own motivations. We do not always know why it is that we do the things we do. Almost as if we were outside observers of even our own actions, we seem to use essentially the same rubrics for explaining our own behaviors as we do for explaining why others behave in the ways that they do. In situations where both a plausible internal and external (intrinsic and extrinsic) cause of behavior are present, we tend to *discount* the internal cause in favor of the external cause. A preschooler in the seminal magic marker study (Lepper et al., 1973) thinks to herself: "I must be making this picture not because it's fun and I love using markers but because this man has told me that I will get a Good Player Award." And in the classroom, a middle schooler reasons: "I am working hard on this project not because I was intrigued by the assignment and excited about what I might come up with but because I know that the person who builds the strongest bridge out of paper (or who best captures the atmosphere of the Revolutionary War period in a performance/presentation, etc.) will receive a substantial number of bonus points to be applied to their final grade."

In these examples, when multiple explanations for their behavior are available, the adolescent and the preschooler discount their own intrinsic interest in favor of a purely external explanation for their task engagement; and in fact, some social

⁷ A handful of behaviorist researchers (e.g., Cameron & Pierce, 1994; Eisenberger & Cameron, 1996) have recently published findings which they believe demonstrate that the promise of a reward can have a positive impact on task interest and creativity of performance. However, the target tasks utilized in their investigations were not open-ended activities that allowed for creativity. The fact remains that for the majority of persons in the majority of circumstances, intrinsic motivation and creativity are bound to suffer in the face of an expected reward made contingent on task completion (see Hennessey & Amabile, 1998).

psychologists have come to refer to this process as the "discounting principle" (e.g., Kelley, 1973). Other theorists propose a related explanation termed the "overjustification" hypothesis, a formulation derived from the attribution theories of Bem (1972), Kelley (1967, 1973), and deCharms (1968). According to this model, when a behavior is overjustified (when there exists both a possible internal and external cause for one's own or another's behavior), each of us will tend to overlook the internal cause (the presence of intrinsic task motivation) in favor of the external cause (a reward was at stake). In effect, we discount the excess justification for explaining why we did something.

Whatever the particulars of the theoretical explanation evoked, the fact remains that in the face of expected reward made contingent on task completion, intrinsic motivation is bound to suffer. And without high levels of intrinsic motivation, creative performance is highly unlikely. Why is intrinsic motivation so necessary to creative performance? Researchers in the area of cognitive psychology offer empirical evidence and models that have proven useful in understanding how the type of motivation brought to a task can influence performance on that task. Simon (1967) has proposed that the most important function of task motivation is the control of attention. He postulates that task motivation determines which of many goal hierarchies will be activated, and goes on to suggest that the more intense the motivation to achieve a goal, the less attention will be paid to environmental aspects that are seemingly irrelevant to achieving that goal. This formulation can be used to explain the widely reported finding that incidental or latent learning is impaired when a reward is promised for task completion (e.g., Kimble, 1961; Spence, 1956). It can also help to explain the negative effects of reward on creativity.

Amabile has constructed a maze metaphor that is helpful in illustrating these undermining effects of reward. She asks that we think of an open-ended "creativity-type" task as a maze. There is one starting point, one entrance, into this maze but there are a variety of exit points and many different paths to those exits. Most importantly, some of those exits, or solutions, are more "elegant" or creative than others. In the face of an expected task-contingent reward, the goal is to get in and out of the maze as quickly as possible. The "safest," most straightforward path will be chosen, as all behavior is narrowly directed toward attaining the reward. For a creative idea to be generated, however, it is often necessary to temporarily "step away" from the reward (Newell, Shaw, & Simon, 1962), to become immersed in the maze itself, to experiment with alternative pathways, and to direct attention toward more seemingly incidental aspects of the task and the environment. The more focused an individual is about a promised reward, the less likely it is that risks will be taken and that these alternative paths to solution will be explored.

Many theorists, including Eisenberger and Cameron (Cameron & Pierce, 1994; Eisenberger & Cameron, 1996, 1998; Eisenberger & Selbst, 1994), have suggested that this undermining effect of reward on intrinsic motivation and creativity of performance, this unwillingness or inability to experiment within the maze, can be explained by a simple "diffusion of attention" or "competing response" model (e.g., Reiss & Sushinsky, 1975). In other words, individuals who are promised a reward are distracted by their

excitement about a soon-to-be-delivered prize or gift. Their intrinsic motivation and enjoyment of the task at hand are directly blocked by the competing response of reward anticipation, and they rush through their work as quickly as possible.

Importantly, while this diffusion of attention or competing response hypothesis may explain the undermining impact of reward under some circumstances, these models fail to adequately explain the negative effects of rewards in all situations. Recall the picture-taking study described earlier (Amabile et al., 1986). In that investigation, even a reward promised and delivered *prior* to task engagement was found to undermine study participants' interest and performance. The mere labeling of the opportunity to use a camera as a reward contingency was enough to kill intrinsic motivation and creativity, while children in a control condition who also participated in the picture-taking but believed this was just one in a series of "things to do" suffered no such decrements. Furthermore, investigations examining the interactive effects of reward and choice (e.g., Amabile, Goldberg, & Capotosto, 1982; Amabile et al., 1986, Studies 2 & 3) also call into question the diffusion of attention explanation. These studies reveal that when subjects who perceive they have no choice but to participate in an investigation are offered a reward, their task motivation and creativity do not suffer the usual decrements.

When working under the expectation of reward, people have, on occasion, been shown to pay less attention to a task or less attention to aspects of their environment that might prove useful in generating a response to that task. However, this shift in focus need not always occur simply because they are distracted by the reward they are to receive or by their worries about what they have to do to attain that reward. Under reward conditions, people may simply *feel* less intrinsically involved. They may feel less positively toward the task and less inclined to devote their energy and attention to it.

There is good reason to believe, in fact, that affective processes can and do play an important role in the mediation of the impact of reward on interest and creativity. While cognitive models involving mechanisms of discounting or overjustification have proven useful for understanding the negative effects of reward in adults, they fail to adequately explain why young children have also been observed to suffer decreases in intrinsic motivation and creativity. Simply stated, children under the age of 7 or 8 years have consistently been shown to lack the cognitive capabilities necessary for weighing multiple sufficient causes and employing discounting (e.g., Shultz, Butkowsky, Pearce, & Shanfield, 1975; Smith, 1975). In fact, some studies have indicated that many young children seem to employ an additive algorithm and interpret the expectation of reward as an *augmentation* of intrinsic interest (e.g., DiVitto & McArthur, 1978; Morgan, 1981). How is it that, when working under the expectation of reward, young children frequently demonstrate decreases in intrinsic motivation and creativity of performance yet they seem cognitively incapable of engaging in the thought processes that underlie the overjustification paradigm?

One viable alternative to the discounting explanation is that the reduction of intrinsic interest in young children (and perhaps all of us) is driven primarily by the learned expectation that rewards are usually paired with activities that need to be done—

activities that are often not fun and sometimes even aversive. The undermining of intrinsic interest may result as much from emotion or affect as it does from thoughts or cognitive analysis. Children may learn to react negatively to a task as "work" when their behavior is controlled by socially imposed factors (such as rewards), and they may react positively to a task as "play" when there are no constraints imposed. Negative affect resulting from socially learned stereotypes or scripts of work (see Lepper et al., 1982; Morgan, 1981; Ransen, 1980) may be what leads to decrements in intrinsic interest (see Hennessey, 1999).

Classroom Climate

Much of the ground-breaking work linking environmental factors to creativity of performance has, in recent years, been based on research focused on the creativity of adults in the workplace. Amabile (1993) proposes an ecological model that highlights situational and interpersonal factors necessary to promote innovation in the corporate setting, and a complementary theory is offered by Sternberg and Lubart (1991). Ekvall (1996, 1999) examines the features of organizational climates that promote creativity and innovation and Gruber (1988) and Csikszentmihalyi (1996) also take a global approach to their study of creativity in the workplace. Ford (1996) presents a theory of individual creative action within organizational settings and Policastro and Gardner (1999) see creativity as the result of a dynamic interaction between the individual, the domain in which she works, and the judges who assesses the quality of products produced (the "field").

Similar work has also been carried out in school settings where classroom climate has been shown to have a major influence on children's motivation and creativity of performance. The important element here seems to be the preservation of a sense of self-determination. As Deci and Ryan (1985) explain, any classroom factors that support a sense of competence without undermining self-determination should positively contribute to student outcomes. Thus, the use of rewards, evaluations, or other classroom management techniques that are perceived as informational, useful, and informative as to the quality of one's performance rather than as controlling instruments of coercion can serve to increase involvement in the task at hand and should not be expected to have detrimental effects. In their studies of motivational influences, Tauer and Harackiewicz (1999) have also concentrated on the individual's phenomenological experience of the environment. These researchers report that the effects of evaluation, reward, and other behavioral contingencies are not universal. At issue is whether the classroom setting causes a child to feel intimidated or self-conscious. In situations in which a student feels in control of her own destiny, intrinsic motivation and performance need not suffer.

As early as 1968, deCharms had advanced this notion of self-determination in his analysis of perceptions of control and motivation in the classroom. Terming students who perceived themselves to be in control of the learning process as "origins" and those who perceived their achievement-related behaviors to be the direct result of their teachers' highly controlling behaviors as "pawns," this ground-breaking work set the stage for

Deci's (1975) Cognitive Evaluation Theory and Deci and Ryan's (2000; Ryan & Deci, 2000a) Self-determination Theory (SDT) that were to follow. At the core of SDT is the consideration of innate psychological needs and the degree to which people are able to satisfy these basic needs as they pursue and attain their valued goals. Individuals are seen to differ in their causality orientation, dictated in part by past experiences of need satisfaction or thwarting. Within SDT, motivation is not viewed as a simple interplay between intrinsic and extrinsic factors. Rather, Deci and Ryan and colleagues differentiate between a variety of types of motivation and contend that extrinsically motivated behaviors can vary in the degree to which they are self-determined vs. controlled. Both the content and the *process* of motivational orientation are considered, as the focus of investigation shifts from an individual's inner experience to a consideration of the influence of interpersonal contexts on motivational outcomes (e.g., Esquivel, 1995).

In one series of field studies designed to test this model, classroom climate was assessed (either via teacher questionnaires or in terms of children's verbal descriptions of their educational environments) and motivational outcomes were evaluated. In a second set of laboratory investigations, external events were presented within a variety of different interpersonal contexts and motivation was again assessed. More specifically, Deci, Nezlek, and Sheinman (1981) looked at teachers' orientation toward promoting children's autonomy versus controlling their behavior. These investigators reported that when children experienced the interpersonal context of the classroom as supporting of self-determination, they were more intrinsically motivated. In fact, analyses revealed strong, positive correlations between teachers' orientations and their students' motivational outcomes (motivation and perceived competence). Moreover, teachers' orientations were found to have impacted children's motivation within the first 6 to 8 weeks of the school and this influence remained strong throughout the year. Thus, Deci et al. conclude that, it is the functional significance of one's environment (i.e., the individual's perception of the reward or evaluation contingency), rather than its objective properties, that affects motivational processes (see also deCharms, 1976; Ryan & Grolnick, 1986).

Important Caveats:

Task-contingent vs. Performance-contingent Rewards

Related to this issue of the individual student's phenomenological experience of a classroom routine or other environmental constraint is the distinction between "task-contingent" and "performance-contingent" rewards. In the studies reviewed earlier, the undermining effect of reward occurred when "task-contingent" rewards have been promised. Task-contingent rewards are rewards made conditional simply on task completion. The impact of so-called "performance-contingent" rewards, rewards promised and delivered only if a certain level of competency or proficiency is reached, has been found to be far more complex. Under certain specific circumstances, in fact, the informational value implicit in performance-contingent rewards has been shown to *augment* feelings of self-efficacy, intrinsic task interest, and qualitative aspects of

performance (e.g., Deci, 1975; Deci & Ryan, 1980, 1985; Harackiewicz, Manderlink, & Sansone, 1984).

Yet research conducted by Karniol and Ross (1977) revealed that performance-contingent rewards can not always be expected to enhance intrinsic motivation above levels shown by individuals neither expecting nor receiving a reward. In many investigations, however, persons receiving informative rewards were at least able to maintain baseline levels of intrinsic task motivation, while study participants assigned to a task-contingent reward condition (where rewards were both nonevaluative and noninformative) showed the expected motivational decrements. Further, in several experiments, Deci and colleagues (Deci, 1971, 1972a; Deci, Cascio, & Krusell, 1975) have demonstrated that male subjects had higher levels of intrinsic motivation after receiving positive information about their performance rather than no feedback. (As expected, negative feedback was found to decrease intrinsic motivation.)

However, Deci (1972b) also found that performance-contingent rewards that convey external control through the use of evaluation can often undermine intrinsic motivation. Harackiewicz (1979) also reported data that supports this finding. Her results showed that while both task-contingent and performance-contingent rewards undermine task motivation, performance-contingent rewards can be particularly detrimental. In addition, study participants receiving performance-contingent rewards in the Harackiewicz study recalled fewer aspects of the task that were not obviously relevant to solving the problem.

Clearly, the impact of expected reward on task motivation and creativity of performance is both variable and highly complex. As early as 1983, experimental evidence that would eventually mandate a reconsideration of the relation between intrinsic motivation, extrinsic motivation, and creativity had already begun to mount. In a study that crossed the expectation of reward with choice about task engagement, participants who perceived their receipt of a reward as a kind of “bonus” were the most creative and most intrinsically motivated of any of the design groups, including a no-reward “control” condition (Amabile et al., 1986, Study 3). Since that time, researchers have gone on to discover an additive effect of intrinsic and extrinsic motivation in a variety of circumstances, including situations involving evaluation.

Expected Evaluation

Over the years, investigators employing variations on this same basic research methodology have found that the promise of reward is not the only extrinsic constraint that can undermine intrinsic interest and as a consequence, creativity of performance. For persons who initially display a high level of interest in a task, working under the expectation of an evaluation can also severely decrease their motivation and creativity. Like rewards, evaluations can be perceived as either controlling or competence affirming. When evaluation conveys external control over task engagement, intrinsic motivation can be expected to decrease. Evaluation conveying positive competence information, however, can increase intrinsic motivation; and according to the Intrinsic Motivation

Principle of Creativity, creativity of performance should show a similar pattern. Importantly, these data underscore a fundamental difference between expected and actual evaluation. As reported earlier in this chapter (Amabile, 1979, 1982b; Amabile, Goldfarb, & Brackfield, 1990), expected evaluation, evaluation that has not yet been delivered, can only convey external control over performance and must be predicted to undermine intrinsic interest and creativity. On the other hand, actual evaluation of performance can affect subsequent task motivation and creativity either negatively or positively, depending upon the nature of the information given.

As early as 1969, investigators interested in evaluation effects were already finding some suggestive evidence in support of the Intrinsic Motivation Principle of Creativity. In one clinical interview study (Garfield, Cohen, & Roth, 1969), undergraduates who were judged to have an internal locus of evaluation scored higher on standard paper-and-pencil tests of creativity than did undergraduates with an external locus. In a similar investigation (Poole, Williams, & Lett, 1977), elementary school children who earned high scores on the Torrance Tests of Creative Thinking (Torrance, 1966) performed significantly differently on a locus-of-evaluation test than did children with low creativity scores. Again in this instance, high creativity was associated with an internal locus of evaluation. Finally, in a more controlled, experimental investigation (White & Owen, 1970), boys assigned to a classroom setting stressing self-evaluation scored significantly more creative on a standardized test than did boys assigned to classrooms stressing peer evaluation or teacher evaluation.

Taken together, these early investigations led to the conclusion that external evaluation will undermine creativity (and intrinsic motivation). However, other researchers offered evidence that contradicted this hypothesis. Most of these investigations showing a positive relation between evaluation and creativity of performance focused on competitive evaluation. Torrance (1964, 1965) found that competition (promising prizes for high scores) increased both the fluency and the flexibility of children's responses to his test items. Goetz (1981) conducted a prototypical behavior-modification study in which preschoolers who received verbal praise for novel block-building showed significant increases in innovation and creativity over baseline levels. And Raina (1968) assessed the effects of competition on children's performance on the Product Improvement and Unusual Uses Test (Torrance, 1966). Children assigned to the control group completed these tests without any mention of competition. In the experimental condition, however, study participants were told that their performance would be evaluated and that monetary prizes would go to the three highest scorers. In an effort to make this evaluative manipulation as salient as possible, the investigators prominently displayed the money during the testing session. In addition, the children expecting the evaluation were told that the names of the winners would be posted on the school bulletin board. Results indicated that the experimental-group children scored significantly higher on indices of both fluency and flexibility.

At first glance, the data presented here may appear to fall into two distinct and entirely contradictory camps. Nevertheless, there is a straightforward explanation for the fact that expected evaluation was shown both to enhance and severely undermine

performance. These seemingly contradictory results can be reconciled with a consideration of the nature of the experimental tasks employed. Over the years, creativity researchers have come to distinguish between two distinct task types: *heuristic* and *algorithmic*. Heuristic tasks are open-ended, creativity-type tasks. For these activities, there are many possible solutions (some more elegant or creative than others) and many different paths to solution. Algorithmic tasks, on the other hand, have only one correct solution and one clear, most straightforward, approach to that solution.

Importantly, each of the published studies demonstrating positive effects of evaluation employed tasks that should be categorized as algorithmic. Creativity was operationalized in terms of a score earned on a paper-and-pencil test; and high scores, while they might reflect originality, were determined in large part by "fluency" (number of responses made) or "flexibility" (number of different categories of responses made). McGraw (1978) has proposed a model that predicts that extrinsic motivation will undermine performance on heuristic tasks and enhance performance on algorithmic ones. According to this formulation, it should be expected that fluency and flexibility would improve under conditions of expected evaluation. Surely, individuals who are told that they can do well on a test by giving a large number of answers will generate a large number of answers—larger perhaps than the number given by individuals who are not competing for positive evaluations. Similarly, Wallach (1970) points out that high scores on a creativity test are to be expected if the test-takers have been explicitly told what they should do to perform well. Whether such performance should even be deemed "creative" is another issue.

In situations where the path to correct and positively evaluated solution(s) is straightforward, the promise of an evaluation can be predicted to enhance performance. However, this same facilitative effect should not be expected with heuristic, open-ended creativity-type tasks. Success at these types of activities requires sustained periods of intensely focused attention and a willingness to take risks; and the distractions brought by an impending evaluation can be expected to make such a motivational orientation unlikely, if not impossible.

In a 1979 investigation of evaluation expectation (Amabile), college students were asked to make a collage. For study participants assigned to an expected evaluation group, this task was entirely heuristic (open-ended). The path to a creative solution was neither clear nor straightforward, and they were given no guidance or restrictions as to how to use their materials. All they were told was that they could expect that their finished products would later be assessed. For study participants in the evaluation/creativity instruction group, however, this same collage task was rendered algorithmic, as the experimenter delivered specific advice as to how to make a collage that would be judged creative. This manipulation was included in an effort to test the possible differential effects of evaluation on heuristic and algorithmic tasks. Amabile predicted that students working under an evaluation expectation on the heuristic collage-making task would evidence lower levels of both creativity and intrinsic interest than would no-evaluation control group members. Further, in accordance with McGraw's (1978) theory, it was expected that the group working under an evaluation constraint but

given explicit instructions on "how to be creative" would show higher levels of creativity but lower levels of intrinsic interest than would the controls.

To ensure that participants would be unaware of the study's true purpose, a cover story was employed. Participants in the control condition were told that the investigators were pretesting a variety of measures that would be used in investigations the following semester. It was explained that they had been randomly chosen to make a collage and that the collage, itself, would not be viewed as a source of data. Rather, after engaging in this artistic activity, participants would complete a mood questionnaire. When explaining the collage activity to these students, the experimenter stressed that they had complete freedom as to how they might use the materials to make a design; however, they were reminded that only the materials provided could be used.

The instructions for the experimental (evaluation) groups were very different. These study participants were told that in addition to the questionnaire, researchers would be looking at their finished designs as an important source of data. Students assigned to the evaluation conditions were led to expect that experts would make a detailed evaluation of their collages and that they would receive a written evaluation, emphasizing their designs' strengths and weaknesses, in the mail.

The collages were rated by artists according to the provisions of the CAT (Amabile, 1982a; Hennessey & Amabile, 1999) and analyses revealed that products made by the control (nonevaluation) group were judged to be significantly higher on creativity than were products produced by the experimental (evaluation) groups. In addition, McGraw's (1978) hypothesis that extrinsic constraints like evaluation will have differential effects on algorithmic and heuristic tasks was also supported. As predicted, the expectation of evaluation only boosted the creativity of persons who had been given specific instructions as to how to make a creative design. In all other cases, the creativity of the nonevaluation group was significantly higher than that of the comparable evaluation group. Finally, six items on the "Art Activity Questionnaire" administered to participants were specifically constructed to measure attitudes toward the collage-making activity. It was expected that, as a group, subjects in the control (nonevaluation) group would be higher in self-rated interest than would subjects in the experimental (evaluation) conditions. Results supported this prediction.

In summary, these data demonstrate a negative effect of evaluation expectation on intrinsic motivation and creativity. The only exception to this rule appeared to be a positive effect of evaluation expectation for persons who had been given specific instructions as to how to produce a creative product. Realistically speaking, however, it is unlikely that creativity could be enhanced by telling people exactly what will be deemed a creative product or performance. In a real-world setting, we cannot know beforehand exactly how to go about producing a novel and appropriate response. In this study, the specific creativity instructions that were given rendered the collage activity algorithmic. Yet for the control and evaluation/no instruction groups, the collage making remained a heuristic task.

In an effort to further explore the finding that evaluation expectation has a negative effect on creativity, Amabile undertook two experimental replications. In both studies, participants either expected or did not expect an evaluation of their performance and they worked either alone or in the presence of others. In an investigation focused on artistic creativity (Amabile et al., 1990, Study 2), undergraduates were randomly assigned to one of four conditions: nonevaluation-no audience, nonevaluation audience, evaluation-no audience, evaluation-audience. In this investigation, none of the participants were instructed to focus on particular aspects of their collage-making; they were simply told that the experiment examined the effects of performing various activities on mood.

Participants in the evaluation groups were told that their art works would be used as an important source of data. Evaluation was not mentioned to the subjects in the two nonevaluation conditions. Those in the evaluation-audience condition were told that on the other side of a one-way mirror in the experimental room were four student artists who had been hired to watch subjects and make expert evaluations of the collage-making and the finished products. It was explained that these judges would note the good points and criticize the weaknesses, and that subjects would see these evaluations before leaving the experimental session. Students in the nonevaluation-audience group also were led to believe that there were students on the other side of the one-way mirror. However, study participants in this condition were told that these people were waiting in the dark for a vision experiment. Students in the no-audience conditions were told nothing about an audience, and the one-way mirror was covered. Regardless of the condition to which they had been assigned, all study participants were individually run.

Artist-judges again rated the collages for creativity. These data lent strong support to the Intrinsic Motivation Principle, as there was a significant negative effect of evaluation on creativity. Nonevaluation groups created products that were judged as significantly more creative than products produced by students expecting an evaluation of their work. There was also observed a tendency for the audience variable to undermine creativity. These results parallel nicely the findings of the earlier study on artistic creativity (Amabile, 1979). When given no particular focus for their artwork, college students who expected an evaluation produced less creative products than did students unconcerned with evaluation. Importantly, there was no undermining effect of evaluation expectation on the technical goodness of products produced in this study. This result is in keeping with the premise that technical goodness involves largely algorithmic processes, while creative aspects of products are largely heuristic (Amabile, 1983a, 1996).

When asked to rate the extent to which they felt anxious while making their collages, study participants assigned to the evaluation conditions made significantly higher ratings than did nonevaluation participants. A similar damaging effect of evaluation was found on an item asking how concerned students felt about possible evaluations of their performance. Finally, evaluation participants reported feeling significantly more distracted while making their collages than did nonevaluation participants; and there was a significant negative correlation between students' rated concern with evaluation and the creativity of their products.

In a related investigation, Amabile and colleagues (Amabile et al., 1990, Study 1) again examined the impact of evaluation expectation—contrasting situations in which study participants were being watched by an audience with situations in which no audience was present. In this study, however, the audience was composed of peers participating in the same target activity and the target experimental task had been designed to examine verbal, rather than artistic, creativity.

Once again, participants in this investigation were undergraduates. All were told that the experiment in which they were taking part involved an analysis of handwriting, and they were asked to compose an American Haiku poem that would be used as a handwriting sample with "original content." Students in the evaluation condition were told that the experimenter wished to examine the relation between handwriting features and poem content and that both would be evaluated by expert judges. In addition, these young women believed that they would receive a copy of the judges' evaluations of their poems. Participants in the nonevaluation condition were told that the experimenter was only interested in their handwriting, and evaluation was not mentioned. As an added variable, participants worked either alone or in a room with three others. In addition, each participant completed a postexperimental questionnaire to assess intrinsic interest.

Poem creativity was again assessed via the CAT. Once again there emerged a significant negative effect of evaluation expectation on the creativity ratings. Nonevaluation participants produced poems that were judged to be significantly more creative than those written by evaluation subjects. There was no significant effect of the audience manipulation. On the postexperimental questionnaire, nonevaluation participants reported greater satisfaction with their poems than did evaluation participants. In addition, evaluation participants reported higher levels of concentration on the "rules" of American haiku, and they were more likely to report that the haiku task was more like work than like leisure.

Finally, in a third investigation, Hennessey (1989) set out to explore the possible differential effects of expected evaluation delivered by a teacher compared to a non-human (computer) source. Participants in this investigation were elementary school students ranging in age from 7 to 13 years who had been specifically selected because they were relatively inexperienced with computers. After participating in a brief session that allowed them to become acquainted with the workings of an Apple computer, children were randomly assigned to one of three experimental conditions: evaluation-computer, evaluation-experimenter or nonevaluation-control.

All students met individually with the experimenter and were asked to produce a simple geometric design. This task required only that the children choose between 16 clearly marked keys corresponding to line color choices and the points of a grid appearing on the computer screen. It was explained to the children in the evaluation-experimenter condition that after they had finished their design, the experimenter would fill out a report card according to how well she felt they had completed the computer activity. A sample report card bearing a fictitious child's name and a grade of *Very Good* and the experimenter's and classroom teacher's signatures were then shown.

For a child assigned to the evaluation-computer condition, the experimenter explained that after the design task had been completed, the computer would figure out how well the child had done and register a grade for the activity. A sample report card in the same format as the written version employed in the experimenter-evaluation condition was then displayed on the computer screen. For a child assigned to the nonevaluation-control condition, no mention was made of a report card or evaluation contingency.

Ratings of the creativity of the computer products produced revealed that children assigned to the evaluation conditions created products that were generally judged to be lower in creativity than those produced by children who did not expect an evaluation. However, this was not a significant difference between groups. When only the older students (ages 10-13) were considered separately, however, the deleterious effect of evaluation was statistically significant and particularly pronounced. In fact, evaluation expected to be delivered by a computer source was equally as detrimental as was expected evaluation coming from an experimenter or teacher figure.

Actual Evaluation

Taken together, the studies described above demonstrate that the effects of evaluation on intrinsic motivation are especially complex. Like rewards, evaluations can be perceived as either controlling or competence affirming. When evaluation conveys external control over task engagement, intrinsic motivation can be expected to decrease. Evaluation conveying positive competence information, however, can increase intrinsic motivation; and according to the Intrinsic Motivation Principle of Creativity, creativity of performance should show a similar pattern. Importantly, these data underscore a fundamental difference between expected and actual evaluation. Expected evaluation, evaluation that has not yet been delivered, can only convey external control over performance and must be predicted to undermine intrinsic interest and creativity. On the other hand, actual evaluation of performance can affect subsequent task motivation and creativity either negatively or positively, depending upon the nature of the information given. In one particularly elegant experiment, Amabile and colleagues (Berglas, Amabile, & Handel, 1981) investigated the effects of actual prior evaluation on children's subsequent creativity of performance. Ninety-seven second through sixth graders participated in individual sessions. Half the students were told that their doing "well" on a spin-art activity would help to determine the potential job status of the experimenter (who was posing as a student teacher). For others, nothing was made contingent on their performance.

All children made art works. Children assigned to the experimental group were given positive evaluations after producing their spin-art product, with half receiving *task-based* information (which physical aspects of their product were good and why) and half receiving *person-based* feedback (information that they, themselves, appeared to be good artists). They then made a second artwork—a collage. Control-group members simply produced the two art works, without evaluation or information about possible external contingencies of their performance.

Judges employing the standard CAT rated the collage products. An examination of mean creativity scores indicated that feedback based on specific information about task performance did, in fact, lead to somewhat higher levels of creativity. In addition, there was some tendency for children who believed that the experimenter's professional future was dependent on their performance to produce less creative collages.

In terms of creativity, a contrast between the control and the experimental conditions revealed a clear superiority of the collages produced by control group members over all four experimental groups. However, there were no significant between-group differences on the technical goodness ratings of the collages. Thus, while some types of positive evaluation may at times be found to enhance motivation and qualitative aspects performance, the overall negative effects of prior evaluation appear to be much more influential. While all of the experimental group children had received positive competence information about their earlier performance, it is likely that they came to expect that their performance on the second, collage-making, activity would also be evaluated by the experimenter. It appears that this controlling aspect was more salient than the particular task-based or performance-based feedback they had received.

In fact, Amabile (1983a, 1996) hypothesizes that information on artistic performance may be especially likely to be perceived as external control. Activities such as drawing or collage-making are usually intrinsically interesting in their own right, and feedback is likely to be seen as superfluous. As Harackiewicz (1979) suggests, however, activities such as games are intrinsically motivating partly due to the feelings of competence they produce, and feedback about one's performance at these non-artistic type tasks is far more likely to be intrinsically motivating.

Competitive Evaluation

In each of the investigations reviewed thus far, study participants worked individually and were led to expect that the evaluation of their work would not be affected by the performance of other individuals. However, in the real world, the evaluation of an individual's performance is often based, at least in part, on comparisons with the work of others. Situations of expected evaluation often contain elements of competition, and sometimes expected reward as well.

In a 1982 study, Amabile (1982b) set out to investigate the impact of a competitive evaluation situation on the creativity of girls, ages 7 to 11. These elementary school aged study participants were randomly selected to attend either a Saturday or a Sunday "Art Party" held in the common room of their apartment complex. Girls attending the Saturday (noncompetition-control) session were greeted at the entrance by a table of desirable toys and gifts that they were told would be raffled off at the end of the party. They then spent the afternoon engaged in a variety of fun activities, including a collage-making task that they completed without any expectation of evaluation. Girls attending the Sunday (competition) session had an identical experience, with one important exception. They played the same games and were given the same materials with which to make their art works, but when they arrived at the party and saw the table

of prizes, they were told that these items would be awarded to those children who made the "best" collages.

Following the procedures outlined in the CAT, artist-judges assessed the collage designs on creativity and a variety of other product dimensions. Analyses revealed that those collages made by girls in the noncompetition condition were significantly more creative than those made by girls in the competition condition.

In a second study, adults worked on a set of water-jar problems (Amabile, 1987). These problems at first appear to be rather complicated, but they are all solved by the same equation—except for the final problem (see Luchins, 1942). The final problem can be solved either with the familiar equation or by employing a second equation that is considerably simpler. Although participants in this investigation worked alone, they attempted these problems in a large group setting. Half were given competitive instructions promising a prize to the individual who "did the best job." The other half received instructions that encouraged them to have fun with the problems. Results revealed that participants in the competition condition were less likely to discover the novel solution for the final problem, and they were more likely to make errors overall. In addition, those subjects exposed to this competitive atmosphere were less likely to try to solve some riddles that were included at the end of the session "to amuse themselves before time is called."

A Recipe for the Typical American Classroom?

Expected reward, expected evaluation, and competition are but three of the environmental constraints that have been demonstrated by researchers to severely undermine intrinsic task motivation and creativity of performance. Also detrimental are environmental factors such as time limits (Amabile, 1983a, 1996) and surveillance (Amabile, 1983a, 1996). Reward, evaluation, competition, surveillance, and time limits: Sometimes, when I'm presenting this research evidence to my students, I ask them to consider whether this list of killers might just as well be labeled as a recipe for the typical American classroom. As unbelievable as it may seem, we have somehow managed to structure educational environments in such a way that intrinsic motivation and creativity are bound to suffer, if not be completely destroyed.

The all-important question that needs to be addressed is how this situation can be turned around. One solution would be for educators to eliminate both task-contingent rewards and controlling systems of evaluation and situations of competition from the classroom. But old habits die hard and it is questionable whether these fundamental changes in the way that students are taught could be successfully mandated. Rather than trying to transform classroom practice, a second option would be change the way students react to situations of competition or to the promise of an upcoming reward or evaluation.

In a groundbreaking series of investigations, my colleagues and I set out to study whether creativity and motivation might be maintained even in the face of reward. In our

design of these experiments, we were guided by a medical metaphor. We decided to look at the extrinsic constraint of an expected reward as a kind of germ or virus and wondered whether it might be possible to "immunize" children against its usually negative effects on intrinsic motivation and creativity. Again drawing on a biological analogy, our goal was two-fold: (a) to strengthen intrinsic motivation and (b) to provide antibodies (techniques) for fighting extrinsic motivation.

The Immunization Studies

In the first of these research attempts (Hennessey, Amabile, & Martinage, 1989, Study 1), elementary school students (ages 7 to 11 years) were randomly assigned to intrinsic motivation focus or control groups and met with an experimenter over 2 consecutive days for the purpose of viewing videos and engaging in directed discussion. The tapes shown to students in the intrinsic motivation focus condition depicted two 11-year-olds talking with an adult about various aspects of their schoolwork. Scripts for this condition were constructed to help children focus on the intrinsically interesting, fun, and playful aspects of a task. Ways to make even the most routine assignment exciting were suggested, and participants were helped to distance themselves from socially imposed extrinsic constraints, such as rewards. Tapes shown to students in the control condition featured the same two young actors talking about some of their favorite things, including foods, music groups, movies, and seasons.

Following this training procedure, all students met individually with a second adult for testing. Half the children in each of the training conditions were told that they could take two pictures with an instant camera only if they promised to tell a story later for the experimenter. For children in the no-reward conditions, this picture taking was presented simply as the first in a series of "things to do."

In this design, presentation of reward was crossed with type of training received. It was expected that only those participants who had been specifically instructed in ways to overcome the usual deleterious effects of extrinsic constraints would maintain baseline levels of intrinsic motivation and creativity in situations of expected reward (i.e., they would be immunized against the effects of extrinsic constraints). The data from this initial investigation not only confirmed these expectations, but gave us reason to believe that our intervention had much more of an impact than we had expected. Intrinsic motivation-trained children tended to report higher levels of intrinsic motivation on a paper-and-pencil assessment than did children in the control (no-training) condition; and, in addition, we found that the offer of reward actually augmented the creativity of the trained group. This additive effect of intrinsic and extrinsic motivation was quite robust. In fact, the creativity of children who received intrinsic motivation training and expected a reward was significantly higher than that of any other design group.

In our initial discussion of these immunization study results, we conjectured that children who entered the creativity testing situation after having undergone intrinsic motivation training would have a much more acute awareness of their own intrinsic

interest in school-type tasks. Thus, the reward may have served to heighten their already positive feelings about the tasks they were doing. In an effort to test these hypotheses, two follow-up investigations of our intrinsic motivation focus techniques (Hennessey et al., 1989, Study 2; Hennessey & Zbikowski, 1993) were subsequently carried out. Each was designed as a conceptual replication of Study 1. Essentially the same experimental design was employed, and it was again the children who had received immunization training and who were expecting a reward who produced the most creative products. Yet, in these subsequent two studies, the effect of training was far less dramatic. In Studies 2 and 3, although children assigned to the intrinsic motivation focus/reward condition again produced the most creative products, their performance was only significantly different from that of the no training/reward group. Taken together, the results of Studies 2 and 3 indicate that we cannot expect that children exposed to our intrinsic motivation training and offered a reward for their performance will demonstrate unusually high levels of creativity. We can expect, however, that these children will be able to maintain baseline levels of intrinsic motivation and creativity under reward conditions.

What is it about our immunization procedures that allow children to maintain their creativity even when they expect a reward? It appears that our efforts to help them learn to de-emphasize the importance of extrinsic incentives and concentrate instead on their own intrinsic interest and task enjoyment paid off. Even in the face of reward, the children were able to maintain a positive, intrinsically motivated approach. They brought to our experimental tasks a playfulness and a willingness to take risks that many researchers believe are crucial to creativity (Amabile, 1983a, 1996; Barron, 1968; Campbell, 1960; Crutchfield, 1962; Dansky & Silverman, 1975; Lieberman, 1965; Stein, 1974).

Evidence from nonexperimental studies coupled with observations of and interviews with artists and other persons who rely upon their creativity for their life's work echo our "immunization" results. While many of the "killers" of motivation and creativity that have been isolated experimentally have also been found to be detrimental in the "real world" of work, these negative effects have not proven universal. For some people, certain extrinsic motivators have been shown to have either no effects or even a positive effect on task interest and creativity of performance. For example, in a study of commissioned and non-commissioned works done by professional artists, the extrinsic incentive of a commission was seen by some artists as a highly controlling constraint; and the creativity of their work plummeted. Yet for those who looked at the commission as an opportunity to achieve recognition or a confirmation of their competence by respected others, creativity was enhanced (Amabile, Phillips, & Collins, 1994).

How can these individual differences be explained? Our data on these professional artists and the children taking part in our immunization studies parallel nicely earlier work exploring the relevance of self-perception processes to the overjustification effect. In a 1981 investigation carried out by Fazio, the negative impact of expected reward was also mitigated in young children for whom initial intrinsic interest in the target activity had been made salient. In other words, it may not be the expectation of reward *per se* that undermines intrinsic motivation, rather it may be the

individual's interpretation of that reward and his or her role in the reward process that in large part determines whether task motivation will be undermined, enhanced, or remain unchanged.

Work carried out by Deci and Ryan and others (e.g., Deci, 1975; Deci & Ryan, 1980, 1985; Harackiewicz et al., 1984; Ryan & Deci, 2000b) and reported earlier in this monograph has further demonstrated that extrinsic motivation must not be automatically equated with perceptions of constraint. This research coupled with the intrinsic motivation training results make clear that while rewards are often experienced as externally controlling, they can under some circumstances serve to heighten feelings of competence or support autonomy.

While the informational aspect of reward may help to explain how professional artists working for a large commission were able to sustain task motivation, this formulation is not easily applied to the immunization study findings. Children in those investigations were promised a reward simply for task completion. The opportunity to take pictures with an instant camera (Studies 1 & 2) or to paint a tee shirt (Study 3) was not made contingent on quality of performance, and it is unlikely that study participants viewed these activities as a confirmation of their competence.

Amabile's (1993) discussion of "motivational synergy" has proven somewhat helpful in reconciling the training study results with the findings reported in the earlier task-contingent and performance-contingent reward literature. This model proposes that rewards can sometimes serve as "synergistic extrinsic motivators." In other words, rather than detract from initial interest, they can, under certain specific circumstances, combine in an *additive* fashion with intrinsic motivation and actually enhance task enjoyment and involvement. A revision of the Intrinsic Motivation Principle of Creativity (Amabile, 1996) explains the process this way:

Intrinsic motivation is conducive to creativity; controlling extrinsic motivation is detrimental to creativity, but informational or enabling extrinsic motivation can be conducive, particularly if initial levels of intrinsic motivation are high. (p. 119)

In keeping with Bem's (1972) suggestion that individuals' internal attitudes and states will be most subject to external influences when those initial internal states are vague or ambiguous, this synergistic effect has been found to occur only under circumstances in which initial task intrinsic motivation is especially strong and salient. For elementary school students who had undergone our intrinsic motivation training, their enjoyment of school-related work was exactly that. In each of the three immunization investigations, the data showed that children in the intrinsic motivation training condition scored significantly higher than did their non-trained peers on a questionnaire designed to tap motivation for learning.

In Training Study I, this high degree of intrinsic interest demonstrated by the children in the intrinsic motivation training condition appears to have allowed them to view our offer of reward as an added bonus, rather than as a source of external control.

The creativity of the products they produced was judged to be significantly higher than that of any of the other design groups. In what can be seen as an "extrinsics in service of intrinsic cycle" (Amabile, 1993, p. 194), the offer of a reward combined positively with intrinsic motivation and enabled these children to do exciting work.

In Studies 2 and 3, the impact of our training, while still significant, was not as dramatic. In these investigations, no synergistic effect was found. Children who had undergone intrinsic motivation training and were promised a reward did not demonstrate the highest levels of creativity. Unlike their peers in the control condition, they were, however, able to maintain baseline levels of performance even in the face of expected reward.

Importantly, the motivational synergy model (Amabile, 1993) fails to account for such outcomes as were shown in the last two immunization attempts. Rather than experiencing a true additive effect of intrinsic and extrinsic motivation, these children instead evidenced an immunity to the effects of reward but no enhanced intrinsic motivation. They were deeply involved in their work and their intrinsic motivation appears to have been relatively impervious to the negative effects of extrinsic motivators.

How can we predict whether an individual's motivation and creativity of performance will be undermined, enhanced, or relatively impervious to the promise of a reward? While a single model or theory accounting for all of these various outcomes has yet to be advanced, in recent years, some researchers have added to our understanding with the introduction of what they term Expectancy-Value Theory (Eccles, 1983; Eccles, Wigfield, & Schiefele, 1998). According to this model, the offer of a reward can, under specific circumstances, cause the individual to place increased value on performance, leading to deeper task involvement and interest. While many of the investigators subscribing to this view have tended to focus on the self-regulation of behavior rather than intrinsic motivation *per se*, others have worked to bridge the intrinsic motivation and expectancy-value approaches with a focus on the individual's phenomenal experience while working toward a goal.

In an exploration of the role played by affect in the regulation of behavior, Sansone and Harackiewicz (1996) contend that we must think about intrinsic or extrinsic motivation not only as an end-state but as a process. In other words, while outcome-derived motivation resulting from the promise of a reward may pull one into an activity, a self-regulated, process-derived motivation (e.g., cognitive and affective absorption in the task) may be necessary to maintain performance over time. Sansone and Harackiewicz believe that this self-regulation of behavior requires that the individual actively maintain both internal and external sources of motivation. If a task is to be brought to successful completion, expectancy and valuation processes must be oriented at compatible outcomes. In other words, like Amabile, they argue that extrinsic incentives and task motivation must combine in a synergistic, additive or complementary fashion.

This melding of the these two goal types, the individual's own goals for task engagement and the incentives introduced into the environment, is critical to the self-

regulatory process. External intervention has, under certain circumstances, proven effective in helping individuals to make this match and change their phenomenological experience from neutral or negative to a more positive state. And some persons have, themselves, been found to intervene and transform a task into something more positive to perform (Sansone & Harackiewicz, 1996).

Teacher Behavior in the Classroom

The key element seems to be the preservation of a sense of self-determination. Rewards, evaluations, or other extrinsic constraints that are perceived as informational, useful, and informative as to the quality of one's performance rather than as controlling instruments of coercion can serve to increase task involvement and should not be expected to have detrimental effects. The expectation that one's performance will be evaluated or rewarded will only be detrimental if the interpersonal atmosphere of the setting causes the individual to feel intimidated or self-conscious. In situations where the individual feels in control of her own destiny, motivation and creativity need not suffer (Deci & Ryan, 1985).

As early as 1968, deCharms had advanced this notion of self-determination in his analysis of perceptions of control and motivation in the classroom. Terming students who perceived themselves to be in control of the learning process as "origins" and those who perceived their achievement-related behaviors to be directed by their teachers' highly controlling behaviors as "pawns," this ground-breaking work set the stage for Deci's (1975) Cognitive Evaluation Theory and Deci and Ryan's (Ryan & Deci, 2000a) Self-determination Theory (SDT) that were to follow.

Like deCharms, Deci and Ryan have frequently focused their own research on the interpersonal arena of the classroom. In one series of field studies, classroom climate was assessed either via teacher questionnaires or in terms of children's verbal descriptions of their educational environments and motivational outcomes were evaluated. In a second set of laboratory investigations, external events were presented within a variety of different interpersonal contexts and motivation was again assessed. More specifically, Deci et al. (1981) looked at teachers' orientation toward promoting children's autonomy versus controlling their behavior. They reported that when children experienced the interpersonal context of the classroom as supporting of self-determination, they were more intrinsically motivated. Analyses revealed strong, positive correlations between teachers' orientations and their students' motivational outcomes (motivation and perceived competence). Moreover, teachers' orientations were found to have impacted children's motivation within the first 6 to 8 weeks of the school and this influence remained strong throughout the year. Thus, Deci et al. conclude that, it is the functional significance of one's environment (i.e., the individual's perception of the reward or evaluation as well as perceptions of the motivations of the teacher imposing these contingencies), rather than its objective properties, that affects motivational processes (see also deCharms, 1976; Ryan & Grolnick, 1986).

Refining the Model—Individual Differences

Must intrinsic motivation and creativity always suffer when evaluations are expected or delivered? As many of the studies reviewed above demonstrate, not necessarily. When investigations into what has come to be known as the "social psychology of creativity" were begun some 25 years ago, it was thought that the determinants of motivational orientation were pretty much the same for everyone. Intrinsic and extrinsic motivation were believed to combine in a sort of hydraulic fashion. In other words, high levels of extrinsic motivation were thought to preclude high levels of intrinsic motivation—as evaluations were imposed, intrinsic motivation (and creativity) would necessarily be decreased.

Now, a good many years and countless investigations later, most researchers taking a social-psychological approach to the study of creativity have come to appreciate the many complexities of both motivational orientation and the evaluation process. They have come to supplement their original hydraulic conceptualization with an additive model that recognizes that under certain specific conditions, both the delivery of a competence-affirming evaluation and the expectation of an impending evaluation can sometimes increase levels of extrinsic motivation without having any negative impact on intrinsic motivation or performance. In fact, some types of extrinsic motivation can actually enhance creativity of performance. One important individual difference variable that appears to mediate the impact of extrinsic constraint is a students' level of task expertise.

When Conti and Amabile (1995) examined the creativity of computer science students, they found that participants' skill levels mediated the impact of evaluation. Low-skill students wrote more creative programs when expecting an evaluation, and high-skill students wrote better programs in the no-evaluation condition. Similar effects are also reported by Pollak (1992) in a study where advanced art students were asked to produce a drawing; and Hill, Amabile, Coon, and Whitney (1994) also reported a skill level-evaluation interaction pattern. In this investigation, introductory psychology students composed a brief passage after undergoing a separate assessment of their prose writing skills. Half the participants expected that their work would be subject to immediate public evaluation, while the other half completed the writing activity without any evaluation expectation. No overall negative effect of evaluation expectation was found. In fact, low-skill participants were *more* creative under evaluation conditions. High-skill participants were more creative under non-evaluative conditions.

Based on these studies and others like them, it appears that gifted and talented students who consistently approach their class work with high levels of skill may be especially impacted by the negative effects of extrinsic constraints that threaten perceptions of self-determination. Gifted children are often well aware of their unusual talents. Drawing on past experience, they can be relatively sure that they will outperform their more typically developing peers; and, as a result, they tend not to be especially dependent on the informational feedback that sometimes accompanies reward or evaluation contingencies. What many gifted students do need, however, is assistance in maintaining their intrinsic motivation.

Despite the fact that some widely accepted hallmarks of giftedness include high levels of motivation, long attention spans, and the ability to become entirely immersed in a problem (Winner, 1996a, 1997), research shows that gifted children often struggle with motivation in the classroom (e.g., Delisle & Berger, 1990; Reis & McCoach, 2000). In fact, gifted students' innate tendency toward intrinsic motivation—to become entirely consumed in a problem or activity to the exclusion of everything and everyone else around them (as reported by Winner [2000] and Gallagher [1990] and described earlier in this monograph) may be particularly vulnerable to environmental influences. Because gifted students tend to be self-motivated, rather than teacher-motivated, they typically perform better with unstructured, flexible assignments and they prefer to select their own learning experiences, rather than being given a set task. Too often their enthusiasm and motivation are stifled by teachers invested in seeing that they conform to accepted practices. In addition, some gifted students have been found to have a tendency toward social and emotional problems (Janos & Robinson, 1985; Winner, 1996a) and become easily bored. They often do not know how to set appropriate goals or to deal effectively with interpersonal situations or adults' high expectations. Taken together, these difficulties often result in underachievement in school, one of the most common problems faced by the gifted student population (Webb, Meckstroth, & Tolan, 1989; Winner, 1996b).

As an example of this danger, consider a true story about an especially gifted young man. A high school freshman studying in Europe reflected about the pressures he felt as he prepared to be tested: "This coercion had such a deterring effect on me that, after I passed the final examination, I found the consideration of any scientific problems distasteful to me for an entire year" (Einstein, 1949, p. 18). This strong statement would worry any parent or teacher who cared about the academic performance and motivation of this student, but what makes this quote especially troubling is the fact that it is taken from the writing of the then 15-year-old Albert Einstein. In his autobiography, Einstein tells the story of how his interest in his studies, and apparently also his creativity, were undermined by classroom factors that exerted external control over his work. The heated competition among students and the rigid evaluation practices at his school had systematically served to kill his fascination with science. So overwhelming were these forces that, in the end, Einstein left this school to enroll in a Swiss institution noted for its emphasis on student-initiated learning and its humanistic orientation. With this change in classroom environments came a marked shift in the tone of Einstein's diary. He wrote fondly of its liberal spirit and the "simple earnestness of the teachers" (Holton, 1972, p. 106). Unencumbered by outside rules and regulations, Einstein's fascination with science was renewed. In fact, it was at this Swiss school that he devised his first "thought experiment" that would eventually lead to the theory of relativity (Holton, 1972).

While it is unlikely that extrinsic constraints in the learning environment will have such a profound effect on every gifted and talented student, the literature on the social psychology of creativity does make clear that we must pay careful attention to issues of school climate if classroom motivation and creativity of performance are to flourish within the gifted population.

CHAPTER 3: Gifted Children and the Creative Intersection

Much of the research and theorizing that has been done on creativity and the gifted has concentrated on the role played by these children's academic superiority in the creative process. While this work has proven helpful to educators, researchers have tended to investigate only the largely innate or at least immutable differences between creative and uncreative or gifted and less academically talented students. The Creative Intersection Model presented here (Amabile, 1997), on the other hand, focuses on "creative situations" (i.e., the particular social and environmental conditions that can positively or negatively impact the creativity of most any individual).

How might the gifted child be characterized according to the intersection model? Whatever definition of giftedness one subscribes to, it would seem that, where creativity is concerned, gifted children can be expected to fare especially well. Almost by definition, the majority of children identified as gifted have earned that designation because of above average general ability and knowledge (domain-relevant skills), their high level of task commitment or motivation to achieve in certain areas, and their high level of creativity-related skills. Yet importantly, over 25 years of empirical research tells us that no amount of domain-relevant or creativity-relevant skills can compensate for a lack of intrinsic motivation to perform an activity; while, to some extent, a high level of intrinsic motivation *has* been shown to make up for a deficiency in the other two component areas. Task motivation makes the difference between what an individual can do and what she will do (Amabile, 1983b). It is task motivation that determines whether domain skills and creativity skills will be adequately and efficiently tapped in the service of creative performance.

While Gallagher (1990), Winner (2000), and others report that intellectually gifted children typically have strong levels of intrinsic motivation, one must be careful not to take this tendency for granted. Teachers of the gifted would do well to remember that their students' advanced intellectual capacities and problem-solving skills will often not be enough to ensure that creativity will flourish within the classroom. As many contemporary theorists are quick to point out, it is important to also consider students' motivation and to conceptualize their motivational orientation as both a relatively enduring trait *and* as a temporary situation-specific state. As the large and ever-growing body of laboratory and field-based research reviewed earlier tells us, intrinsic motivation is a most delicate and often fleeting entity. Even highly gifted students, who are generally more highly intrinsically motivated toward what they do, can quickly fall prey to outside influences. Intrinsic motivation cannot be taught. It cannot be coerced, but it is easily squelched. Intrinsic interest must come from *within* the individual. This motivational state springs from a passion and excitement about the task itself and particularly susceptible to the undermining effects of extrinsic constraints. As the young Albert Einstein learned the hard way, some classroom environments are much more likely to fuel a passion for learning and discovery than are others.

Relevance of the Research for Underrepresented Populations

Prominent researchers and theorists like Joseph Renzulli and Robert Sternberg have spent the better part of their careers gathering evidence that refutes what some term the "instant-eminence model of giftedness." The argument they set forth is that giftedness in children is not an already developed capacity as many educators and psychologists would lead us to believe. Rather, it is a capacity that needs nurturance and environmental support to blossom.

The essential problem is this: If the motivation of students like Albert Einstein, students whose potential has long been recognized and who have access to progressive programs and abundant resources, can fall prey to the undermining effects of environmental influences, what about the motivational orientation of potentially gifted students who have not enjoyed the benefits of specially funded enrichment programs or high expectations from parents and teachers? Educators must be sensitized to these issues. They must question whether a gifted child who comes from an economically disadvantaged and/or minority background or a child who has been identified as learning disabled and placed in a remedial program can be expected to attempt a creative solution to a problem or to maintain an interest in learning. Even the young Einstein needed assistance from his parents and teachers and a change of school environment before he could regain his motivation and excitement about learning. Gifted students belonging to more marginalized groups are particularly in need of help if they are to find their own creative intersection.

A close examination of investigations into the psychology of creativity reveals, however, that very little empirical work has been specifically targeted at either non-Western cultures or persons of color or other minority groups within the U.S. and Europe. Importantly, this lack of diversity among study populations is in no way confined to research on creativity. Until very recently, the entire body of literature in the areas of cognitive, social, personality, developmental and educational psychology had been based almost entirely on the testing and observation of White, middle-class populations. The reasons behind this research bias are many (see Graham, 1992; Huff, Schlenker, & Graham, 1994). But probably the largest contributing factor has been subject availability. Simply stated, university-based investigators have relatively easy access to the predominantly White, relatively affluent college students on their campuses. And investigations focused on younger populations (such as the ground-breaking "magic marker study" described earlier) tend to be conducted at university "laboratory preschools" serving faculty families.

In the last decade or so, concerted efforts have been made by organizations such as the American Psychological Association (APA) or the Society for Research in Child Development (SRCD) to broaden the research agenda to include persons from a wide variety of backgrounds. Important strides in this area have been made, but at least within the empirically-based psychology literature, cross-cultural and cross-national work is still in its infancy. Can the Intrinsic Motivation Principle of Creativity be applied beyond college campuses to persons of all cultures and economic levels? Is the relation between

extrinsic constraints, motivational orientation, and creativity of performance essentially the same for everyone? Amazingly, these all-important questions are just now surfacing. While the jury is still out, preliminary data collected by myself and a handful of other creativity researchers indicate both important commonalities and marked differences in the link between environment, motivation, and creativity across groups (e.g., Hennessey, 2003b, 2004; Niu & Sternberg, 2002, 2003).

Investigators, theorists, and practitioners contributing to the gifted and talented research base have also generally targeted White, middle-class, suburban students. Yet for over 30 years, there have been at least a few voices arguing that issues of student diversity must be considered when making decisions about programming for the gifted. Research in the 1960's and 70's looked at the relation between creativity and bilingualism, explored the feasibility of "culture-free" tests and investigated the influence of a variety of cultural factors on creativity development. Torrance (1978) and Renzulli (1973) were among the first psychologists to encourage educators to develop the largely untapped creative potential of linguistically and culturally diverse (LCD) children. Some researchers and theorists emphasized what they believed were the creativity advantages of LCD children and argued that speaking two languages resulted in greater cognitive flexibility. For his part, Torrance has advocated that educators serving diverse student populations move away from the genius perspective and instead focus their attention on the solution of everyday real-life problems (Lopez, 2003).

Investigative efforts such as these continue into the present day. In the main, studies focused on LCD children have looked within cultural groups, rather than attempting comparisons across cultures or sub-cultures. While the bilingualism data remains muddled, there have been important strides made in the service of LCD students. Yet this population continues to be grossly underrepresented in programs for the gifted and talented (Mitchell, 1988; Richert, 1987; Smith, LeRose, & Clasen, 1991). In an attempt to rectify this situation, a growing number of researchers have become unrelenting in their call for a consideration of all children: Rich and poor, native English speakers and bilinguals, Blacks, Hispanics, Asians, and Whites. Renzulli, for example, questions whether it makes sense, any sense at all, to take a program that has proven successful in an affluent suburb and impose it on an inner-city or rural school district. As an alternative to this approach, he has developed an all-inclusive School Enrichment Model (SEM) (Renzulli & Reis, 1994, 1997, 2002) that he believes can be readily adapted to any student population or school situation. Over the years, SEM has been the subject of both the highest praise (e.g., Busse & Mansfield, 1980) and especially harsh criticism (e.g., Delisle, 2001; Jellen, 1985). For those theorists and practitioners who are concerned that children from more marginalized groups may be shortchanged by prevailing methods of identifying and instructing gifted students, SEM appears to be a promising alternative. And there have been other programs developed as well—each with the intent of moving away from a strict adherence to an arbitrary "cut off" score or other entrance requirement. Treffinger and colleagues, for example, report good success with their LoS (Levels of Service) individual programming approach (Treffinger, 1986; Treffinger, Young, Nassab, & Wittig, 2003) that makes it possible to include a variety of students who might otherwise never have been considered gifted (or potentially gifted).

As Renzulli explains, programs that rely on traditional identification procedures may not be serving the wrong students, but they are certainly excluding substantial numbers of especially able but underachieving pupils—students who, if given the right classroom circumstances, could also demonstrate stellar achievements and signs of giftedness (Renzulli, 1999b).

Renzulli and a number of other researchers (e.g., McCluskey, Baker, O'Hagan, & Treffinger, 1995) are currently involved with a variety of projects focused on underachieving students who have been labeled as gifted. And there have also been investigations of at-risk student populations with high potential and the differential effects of programmatic approaches on majority and minority groups (e.g., Baldwin, 1978; Ford, 1999; Ford & Harris, 1999; Frasier, 1992; Renzulli & Reis, 1997). For his part, Robert Sternberg is working on how his triarchic theory of intelligence (1985) applies to children from diverse backgrounds.

Investigations targeting LCD populations of students will continue; and without a doubt, our understanding of the specific issues and needs brought by children of diverse linguistic and cultural backgrounds will be substantially enriched. Importantly, educational practitioners and decision-makers need not wait for more research results before making changes in the approach they take to gifted and talented children. In schools all across the nation, a number of barriers are currently preventing gifted LCD students from receiving the services they need and deserve. Nowhere are these barriers more evident and more pervasive than in the area of identification.

The majority of educators in this country continue to rely on definitions of giftedness that emphasize scores that are significantly above average for tests of academic and cognitive measures. In fact, even those programs that claim to use a more expansive list of inclusion criteria have been found to base their selection process almost exclusively on considerations of IQ (Adderholdt-Elliott, Algozzine, Algozzine, & Haney, 1991; Lopez, 2003). While such practices are unfair to all groups, LCD children are put at a particular disadvantage because they often lack even basic familiarity with test-taking. They have never been given the opportunity to develop the skills necessary to perform well on standardized measures, and the measures themselves are typically insensitive to diversity in cultural and linguistic background (Richert, 1987).

Practical Applications: Promoting Intrinsic Motivation and Creativity Within Gifted Populations

In their present form, the majority of American classrooms, from preschools through high schools and colleges, are fraught with killers of intrinsic interest and creativity. As the research shows, nowhere is this situation more dire than in the gifted and talented classroom or "pull-out" program where the promotion of students' intrinsic motivation and creativity of performance is a top priority. Modifications of lessons or materials, modules aimed at creativity enhancement or sometimes costly and always time-consuming lessons in techniques for brainstorming or "thinking outside the box" are

not enough. Administrators, teachers, parents, and students must work together to change both individual classroom environments and the overall *climate* of their educational institutions. If gifted students are to be helped to find their creative intersection, significant and fundamental changes must be made to the way that educators think about teaching and learning.

Towards this end, a few researchers in the area of gifted and talented education have, in recent years, turned their attention to programs that can be individualized to meet a particular child's interests and needs. Rather than singling out only a few students who might demonstrate exceptional ability in one or more narrowly-defined, traditional subject areas, this alternative approach recognizes student strengths and talents along a wide variety of dimensions. Treffinger's (1986) individualized model (LoS) or Feldhusen's (1992, 1995) TIDE program for talent identification and development are two primary examples of programs that strive to help students to reach higher levels of accomplishment and productivity, each at their own pace and in their own way.

The suggested actions outlined below are based on 30 years of empirical data gathered by social psychologists interested in promoting intrinsic motivation and creativity in the classroom (for extensive reviews of the literature, see Hennessey, 2003a; Hennessey & Amabile, 1988a). While many of the earlier investigations in this genre tended to target White, middle-class, suburban school students, there is a growing body of evidence to indicate that all children, both gifted and more typically developing, can benefit from these changes. And, in fact, the intrinsic motivation and creativity of economically disadvantaged children and culturally different students have been shown to be especially positively impacted by alterations in classroom environment. For example, Torrance's (1967) cross-cultural studies indicated that the way in which a teacher presents a lesson and structures the learning situation can significantly influence the type of creativity behaviors that children will develop within the classroom. And Lopez and colleagues (Lopez, Esquivel, & Houtz, 1993) found that the creativity scores of LCD students placed in a gifted program were significantly, positively related to instructional environments that were characterized by self-initiated activities, self-evaluation experiences, opportunities to manipulate materials, and open discussions.

None of these suggested reforms necessitate large budgets or the reallocation of funds. Instead, what is needed is a deep commitment to change, a willingness on the part of the entire educational community (administrators, curricular specialists, teachers, parents, and children) to band together to make the school environment conducive to the development of intrinsic motivation and creativity.

Suggested Steps

- **Teachers must work diligently to create an interpersonal atmosphere that allows students to feel in control of their learning process.** Students must be made to feel like "origins" rather than "pawns." In other words, the classroom must be a place in which student behavior is self-

determined. There is no room in the classroom for intimidation or coercion.

- **Teachers and administrators must step back and critically review the incentive systems that are currently in place.**
When presenting lessons and subject matter that are inherently interesting to students, teachers should work to use tangible rewards as little as possible; and they also must avoid setting up competitive situations within the classroom or emphasizing the extrinsic incentives built into the myriad of city-wide, state-wide or nation-wide competitions available to students.
- **In situations where extrinsic incentives are in place, students must be helped to distance themselves from those constraints as much as possible.**
We must remember that each of us will be most creative when we enjoy what we are doing. Every effort should be made to encourage students to take risks, to experiment and to have fun with projects and assignments. Students must be given the opportunity to take pride in what they have already accomplished and to dream of what lies ahead. And at all times, teacher evaluation and surveillance of student work must be kept to a minimum.
- **Students must be helped to become more proficient at recognizing their own strengths and weaknesses.**
In addition, like any other students, gifted and talented children must be helped to identify the subject areas that give them the most pleasure and ignite their passion. Since the publication of the results of our own three attempts at immunization, intrinsic motivation training (Hennessey, Amabile, & Martinage, 1989; Hennessey & Zbikowski, 1993), a small number of research psychologists as well as practicing classroom teachers have experimented with our immunization techniques and replicated our results (e.g., Gerrard, Poteat, & Ironsmith, 1996). These investigators have consistently underscored the unexpected benefits accrued to students who are explicitly asked to consider and talk about their favorite subjects and activities in school.

Intrinsic motivation must be made a regular focus of class discussion because when left to their own devices, students engage in such conversations far too infrequently. Students must be helped to come in touch with their own excitement for learning. Rather than relying on the feedback of teachers, they must be taught to monitor their own progress; and whenever possible, they must be given choices about what they will do and how they will accomplish their goals. They must be encouraged to become active, independent learners confident in their ability to take control of their own learning process.

Clearly, these fundamental changes in attitude and behavior will not happen overnight. But our experience with the intrinsic motivation training/immunization procedures outlined earlier tells us that teachers, parents, and students are hungry for the opportunity to view education in this new light. They are eager to act on our recommendations. Our message that students' own intrinsic interest, curiosity, and excitement about learning must not take a back seat to concerns about grades or the need to outperform one's peers resonates with educators. And if given the license to effect fundamental changes in their schools, they will do so. Having witnessed the positive impact of our brief, and admittedly somewhat artificial, immunization training procedures, we are excited to think about the kind of impact that a more sustained, naturalistic approach directed by teachers could have on educational climate.

References

- Adderholdt-Elliott, M., Algozzine, K., Algozzine, B., & Haney, K. (1991). Current state practices in educating students who are gifted and talented. *Roeper Review*, *14*, 20-23.
- Amabile, T. M. (1979). Effects of external evaluation on artistic creativity. *Journal of Personality and Social Psychology*, *37*, 221-233.
- Amabile, T. M. (1982a). Social psychology of creativity: A consensual assessment technique. *Journal of Personality and Social Psychology*, *43*, 997-1013.
- Amabile, T. M. (1982b). Children's artistic creativity: Detrimental effects of competition in a field setting. *Personality and Social Psychology Bulletin*, *8*, 573-578.
- Amabile, T. M. (1983a). *The social psychology of creativity*. New York: Springer-Verlag.
- Amabile, T. M. (1983b). Social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, *45*, 357-377.
- Amabile, T. M. (1987). The motivation to be creative. In S. Isaksen (Ed.), *Frontiers in creativity research: Beyond the basics* (pp. 223-254). Buffalo, NY: Bearly.
- Amabile, T. M. (1993). Motivational synergy: Toward new conceptualizations of intrinsic and extrinsic motivation in the workplace. *Human Resource Management Review*, *3*, 185-201.
- Amabile, T. M. (1996). *Creativity in context*. Boulder, CO: Westview.
- Amabile, T. M. (1997). Motivating creativity in organizations: On doing what you love and loving what you do. *California Management Review*, *40*, 39-58.
- Amabile, T. M., Goldberg, N., & Capotosto, D. (1982). *Effects of reward and choice on adults' artistic creativity*. Unpublished manuscript, Brandeis University.
- Amabile, T. M., Goldfarb, P., & Brackfield, S. C. (1990). Social influences on creativity: Evaluation, coaction, and surveillance. *Creativity Research Journal*, *3*, 6-21.
- Amabile, T. M., Hennessey, B. A., & Grossman, B. (1986). Social influences on creativity: The effects of contracted-for reward. *Journal of Personality and Social Psychology*, *50*, 14-23.

- Amabile, T. M., Phillips, E. D., & Collins, M. A. (1994). *Creativity by contract: Social influences on the creativity of professional artists*. Unpublished manuscript, Brandeis University.
- Baldwin, A. Y. (1978). *Educational planning for the gifted. Overcoming cultural, geographic and socioeconomic barriers*. Reston, VA: Council for Exceptional Children.
- Barron, F. (1968). *Creativity and personal freedom*. New York: Van Nostrand.
- Bem, D. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. 1-62). New York: Academic Press.
- Berglas, S., Amabile, T. M., & Handel, M. (1981). *Effects of evaluation on children's artistic creativity*. Unpublished manuscript, Brandeis University.
- Berlyne, D. E. (1960). *Conflict, arousal, and curiosity*. New York: McGraw-Hill.
- Bloom, B. (1985). *Developing talent in young people*. New York: Ballantine.
- Busse, T. V., & Mansfield, R. S. (1980). Theories of the creative process: A review and a perspective. *Journal of Creative Behavior*, 14, 91-103,132.
- Cameron, J., & Pierce, W. D. (1994). Reinforcement, reward, and intrinsic motivation: A meta-analysis. *Review of Educational Research*, 64, 363-423.
- Campbell, D. (1960). Blind variation and selective retention in creative thought as in other knowledge processes. *Psychological Review*, 67, 380-400.
- Conti, R., & Amabile, T. M. (1995). *Problem solving among computer science students: The effects of skill, evaluation expectation and personality on solution quality*. Paper presented at the annual meeting of the Eastern Psychological Association, Boston, MA.
- Crutchfield, R. (1962). Conformity and creative thinking. In H. Gruber, G. Terrell, & M. Wertheimer (Eds.), *Contemporary approaches to creative thinking* (pp. 120-140). New York: Atherton Press.
- Csikszentmihalyi, M. (1990). The domain of creativity. In M. Runco & A. S. Robert (Eds.), *Theories of creativity* (pp. 190-212). Thousand Oaks, CA: Sage.
- Csikszentmihalyi, M. (1993). *Flow*. New York: HarperCollins.
- Csikszentmihalyi, M. (1997). *Creativity: Flow and the psychology of discovery and invention*. New York: HarperCollins.

- Dansky, J., & Silverman, I. (1975). Play: A general facilitator of fluency. *Developmental Psychology, 11*, 104.
- deCharms, R. (1968). *Personal causation*. New York: Academic Press.
- deCharms, R. (1976). *Enhancing motivation: Change in the classroom*. Oxford, England: Irvington.
- Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology, 18*, 105-115.
- Deci, E. L. (1972a). The effects of contingent and noncontingent rewards and controls on intrinsic motivation. *Organizational Behavior and Human Performance, 8*, 217-229.
- Deci, E. L. (1972b). Intrinsic motivation, extrinsic reinforcement, and inequity. *Journal of Personality and Social Psychology, 22*, 113-120.
- Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum.
- Deci, E. L., Cascio, W., & Krusell, J. (1975). Cognitive evaluation theory and some comments on the Calder and Staw critique. *Journal of Personality and Social Psychology, 31*, 81-85.
- Deci, E. L., Nezlek, J., & Sheinman, L. (1981). Characteristics of the rewarder and intrinsic motivation of the rewardee. *Journal of Personality and Social Psychology, 40*, 1-10.
- Deci, E. L., & Ryan, R. M. (1980). The empirical exploration of intrinsic motivational processes. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 13, pp. 39-80). New York: Academic Press.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227-268.
- Delisle, J. R. (2001). In praise of elitism. *Gifted Child Today, 24*, 14-15.
- Delisle, J. R., & Berger, S. L. (1990). *Underachieving gifted students*. ERIC EC Digest #E478. (Available from ericadr.piccard.csc.com/extra/ericdigests/ed321483.html)

- DiVitto, B., & McArthur, L. Z. (1978). Developmental differences in the use of distinctiveness, consensus, and consistency information for making causal attributions. *Developmental Psychology*, *14*, 474-482.
- Eccles, J. (1983). Expectancies, values and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motives: Psychological and sociological approaches* (pp. 75-146). San Francisco: W. H. Freeman.
- Eccles, J., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp. 1017-1096). New York: Wiley
- Einstein, A. (1949). Autobiography. In P. Schilpp (Vol. Ed.), *Albert Einstein: Philosopher-scientist* (Vol. VII). Evanston, IL: Library of Living Philosophers.
- Eisenberger, R., & Cameron, J. (1996). Detrimental effects of reward: Reality or myth? *American Psychologist*, *51*, 1153-1166.
- Eisenberger, R., & Cameron, J. (1998). Reward, intrinsic interest, and creativity: New findings. *American Psychologist*, *53*, 676-679.
- Eisenberger, R., & Selbst, M. (1994). Does reward increase or decrease creativity? *Journal of Personality and Social Psychology*, *66*, 1116-1127.
- Ekvall, G. (1996). Organizational climate for creativity and innovation. *European Journal of Work and Organizational Psychology*, *5*, 105-123.
- Ekvall, G. (1999). Creative climate. In M. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity* (pp. 403-412). New York: Academic Press.
- Esquivel, G. B. (1995). Teacher behaviors that foster creativity. *Educational Psychology Review*, *7*, 185-202.
- Fazio, R. H. (1981). On the self-perception explanation of the overjustification effect: The role of the salience of initial attitude. *Journal of Experimental Social Psychology*, *17*, 417-426.
- Feldhusen J. F. (1986). A conception of giftedness. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 112-127). New York: Cambridge University Press.
- Feldhusen, J. F. (1992). *TIDE: Talent identification and development in education*. Sarasota, FL: Center for Creative Learning.

- Feldhusen, J. F. (1995). *Talent identification and development in education (TIDE)* (2nd ed.). Sarasota, FL: Center for Creative Learning.
- Ford, C. (1996). A theory of individual creative action in multiple social domains. *Academy of Management Review*, *21*, 1112-1142.
- Ford, D. (1999). Renzulli's philosophy and program: Opening doors and nurturing potential. *Journal for the Education of the Gifted*, *23*, 117-124.
- Ford, D., & Harris, J. (1999). *Multicultural gifted education*. New York: Teachers College Press.
- Frasier, M. M. (1992). Ethnic/minority children: Reflections and directions. In Ohio State Department of Education (Ed.), *Challenges in gifted education: Developing potential and investing in knowledge for the 21st century* (pp. 41-48). Columbus, OH: Author.
- Gallagher, A. (1990). Personality patterns of the gifted. *Understanding Our Gifted*, *3*, 11-13.
- Galton, F. (1870). *Hereditary genius*. London: Macmillan, London, & Appleton.
- Garbarino, J. (1975). The impact of anticipated reward upon cross-age tutoring. *Journal of Personality and Social Psychology*, *32*, 421-428.
- Gardner, H. (1993a). *Multiple intelligences: The theory in practice*. New York: Basic Books.
- Gardner, H. (1993b). *Creating minds: An anatomy of creativity seen through the lives of Freud, Einstein, Picasso, Stravinsky, Eliot, Graham, and Gandhi*. New York: Basic Books.
- Gardner, H. (1999). *Intelligence reframed*. New York: Basic Books.
- Garfield, S. J., Cohen, H. A., & Roth, R. M. (1969). Creativity and mental health. *Journal of Educational Research*, *63*, 147-149.
- Gerrard, L. E., Poteat, G. M., & Ironsmith, M. (1996). Promoting children's creativity: Effects of competition, self-esteem, and immunization. *Creativity Research Journal*, *9*, 339-346.
- Glucksberg, S. (1962). The influence of strength of drive on functional fixedness and perceptual recognition. *Journal of Experimental Psychology*, *63*, 36-41.
- Glucksberg, S. (1964). Problem solving: Response competition and the influence of drive. *Psychological Reports*, *15*, 939-942.

- Goetz, E. M. (1981). The effects of minimal praise on the creative blockbuilding of three year olds. *Child Study Journal*, *11*, 55-67.
- Graham, S. (1992). "Most of the subjects were White and middle class": Trends in published research on African Americans in selected APA journals, 1970-1989. *American Psychologist*, *47*, 629-639.
- Greene, D., & Lepper, M. (1974). Effects of extrinsic rewards on children's subsequent interest. *Child Development*, *45*, 1141-1145.
- Gruber, H. E. (1981). *Darwin on man: A psychological study of scientific creativity* (2nd ed.). Chicago: University of Chicago Press.
- Gruber, H. E. (1988). The evolving systems approach to creative work. *Creativity Research Journal*, *1*, 27-59.
- Gruber, H. E. (1999). Evolving systems approach. In M. A. Runco & S. R. Pritzker (Eds.), *Encyclopedia of creativity* (pp. 689-693). New York: Academic Press.
- Guilford, J. P. (1950). Creativity. *American Psychologist*, *5*, 444-454.
- Guilford, J. P. (1956). The structure of the intellect. *Psychological Bulletin*, *53*, 267-293.
- Guilford, J. P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.
- Harackiewicz, J. M. (1979). The effects of reward contingency and performance feedback on intrinsic motivation. *Journal of Personality and Social Psychology*, *37*, 1352-1363.
- Harackiewicz, J. M., Manderlink, G., & Sansone, C. (1984). Rewarding pinball wizardry: The effects of evaluation on intrinsic interest. *Journal of Personality and Social Psychology*, *47*, 287-300.
- Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental model. *Human Development*, *21*, 34-64.
- Hebb, D. O. (1955). Drives and the CNS. *Psychological Review*, *62*, 243-254.
- Helson, R. (1965). Childhood interest clusters related to creativity in women. *Journal of Consulting Psychology*, *29*, 352-361.
- Helson, R., & Crutchfield, R. (1970). Mathematicians: The creative researcher and the average Ph.D. *Journal of Consulting and Clinical Psychology*, *3*, 250-257.

- Hennessey, B. A. (1989). The effect of extrinsic constraints on children's creativity while using a computer. *Creativity Research Journal*, 2, 151-168.
- Hennessey, B. A. (1996). Teaching for creative development: A social-psychological approach. In N. Colangelo & G. Davis (Eds.), *Handbook of Gifted Education* (2nd ed., pp. 282-291). Needham Heights, MA: Allyn and Bacon.
- Hennessey, B. A. (1999). Intrinsic motivation, affect and creativity. In S. Russ (Ed.), *Affect, creative experience and psychological adjustment* (pp. 77-90), Philadelphia: Taylor & Francis.
- Hennessey, B. A. (2000). Rewards and creativity. In C. Sansone & J. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 55-78). New York: Academic Press.
- Hennessey, B. A. (2003a). The social psychology of creativity. *Scandinavian Journal of Educational Psychology*, 47, 253-271.
- Hennessey, B. A. (2003b). Is the social psychology of creativity really social? Moving beyond a focus on the individual. In P. B. Paulus & B. A. Nijstad (Eds.), *Group creativity: Innovation through collaboration* (pp. 181-201). New York: Oxford University Press.
- Hennessey, B. A. (2004). The social psychology of creativity: The beginnings of a multi-cultural perspective. In S. Lau, A. N. N. Hui, & G. Y. C. Ng (Eds.), *Creativity: When east meets west* (pp. 201-226). Hong Kong: World Scientific Publishing.
- Hennessey, B. A., & Amabile, T. M. (1988a). The conditions of creativity. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 11-38). New York: Cambridge University Press.
- Hennessey, B. A., & Amabile, T. M. (1988b). Storytelling: A method for assessing children's creativity. *Journal of Creative Behavior*, 22, 235-246.
- Hennessey, B. A., & Amabile, T. M. (1998). Reward, intrinsic motivation, and creativity. *American Psychologist*, 53, 674-675.
- Hennessey, B. A., & Amabile, T. M. (1999). Consensual assessment. In M. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity* (Vol. 1, pp. 347-359). New York: Academic Press.
- Hennessey, B. A., Amabile, T. M., & Martinage, M. (1989). Immunizing children against the negative effects of reward. *Contemporary Educational Psychology*, 14, 212-227.

- Hennessey, B. A., & Zbikowski, S. (1993). Immunizing children against the negative effects of reward: A further examination of intrinsic motivation training techniques. *Creativity Research Journal*, 6, 297-307.
- Hill, K., Amabile, T. M., Coon, H. M., & Whitney, D. (1994). *Testing the componential model of creativity*. Unpublished manuscript, Brandeis University.
- Hollingworth, L. S. (1942). *Children above 180 IQ Stanford-Binet; origin and development*. Oxford, England: World Book.
- Holton, G. (1972). On trying to understand scientific genius. *American Scholar*, 41, 95-110.
- Houtz, J. (Ed.). (2003). *The educational psychology of creativity*. Cresskill, NJ: Hampton Press.
- Huff, D., Schlenker, B. R., & Graham, S. (1994). The field of social psychology. In W. A. Lesko (Ed.), *Readings in social psychology: General, classic, and contemporary selections* (2nd ed., pp. 2-39). Needham Heights, MA: Allyn and Bacon.
- Isaksen, S. G., Dorval, K. B., & Treffinger, D. J. (2000). *Creative approaches to problem solving: A framework for change*. Buffalo, NY: Creative Problem Solving Group-Buffalo.
- Isaksen, S. G., & Treffinger, D. J. (1985). *Creative problem solving: The basic course*. Buffalo, NY: Bearly Limited.
- Janos, P., & Robinson, N. (1985). Psychosocial development in intellectually gifted children. In F. D. Horowitz & M. O'Brien (Eds.), *The gifted and talented: Developmental perspectives* (pp. 149-195). Washington, DC: American Psychological Association.
- Jellen, H. G. (1985). Renzulli's enrichment scheme for the gifted: Educational accommodation of the gifted in the American context. *Gifted Education International*, 3, 12-17.
- Karniol, R., & Ross, M. (1977). The effects of performance relevant and performance irrelevant rewards on children's intrinsic motivation. *Child Development*, 48, 482-487.
- Kelley, H. (1967). Attribution theory in social psychology. In D. Levine (Ed.), *Nebraska symposium on motivation* (Vol. 15, pp. 192-238). Lincoln, NE: University of Nebraska.

- Kelley, H. (1973). The processes of causal attribution. *American Psychologist*, 28, 107-128.
- Kernoodle-Loveland, K., & Olley, J. (1979). The effect of external reward on interest and quality of task performance in children of high and low intrinsic motivation. *Child Development*, 50, 1207-1210.
- Kimble, G. (1961). *Hilgard and Marquis' conditioning and learning* (2nd ed.). New York: Appleton-Century-Crofts.
- Kohn, A. (1995). *Punished by rewards: The trouble with gold stars, incentive plans, A's, praise, and other bribes*. Boston: Houghton Mifflin.
- Kruglanski, A.W., Friedman, I., & Zeevi, G. (1971). The effects of extrinsic incentive on some qualitative aspects of task performance. *Journal of Personality*, 39, 606-617.
- Lepper, M., & Greene, D. (1975). Turning play into work: Effects of adult surveillance and extrinsic rewards on children's intrinsic motivation. *Journal of Personality and Social Psychology*, 31, 479-486.
- Lepper, M., Greene, D., & Nisbett, R. (1973). Undermining children's intrinsic interest with extrinsic rewards: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology*, 28, 129-137.
- Lepper, M., Sagotsky, G., Dafoe, J. L., & Greene, D. (1982). Consequences of superfluous social constraints: Effects on young children's social inferences and subsequent intrinsic motivation. *Journal of Personality and Social Psychology*, 42, 51-65.
- Lieberman, J. N. (1965). Playfulness and divergent thinking: An investigation of their relationship at the kindergarten level. *Journal of Genetic Psychology*, 107, 219-224.
- Lopez, E. C. (2003). Creativity issues concerning linguistically and culturally diverse children. In J. C. Houtz (Ed.), *The educational psychology of creativity* (pp. 107-127). Cresskill, NJ: Hampton Press.
- Lopez, E. C., Esquivel, G. B., & Houtz, J. C. (1993). The creative skills of culturally and linguistically diverse gifted students. *Creativity Research Journal*, 6, 401-412.
- Luchins, A. (1942). Mechanization in problem solving: The effect of Einstellung. *Psychological Monographs*, 6, 54.

- MacKinnon, D. W. (1962). The nature and nurture of creative talent. *American Psychologist, 17*, 484-495.
- McCluskey, K. W., Baker, P. W., O'Hagan, S. C., & Treffinger, D. J. (Eds.). (1995). *Lost prizes: Talent development and problem solving with at risk populations*. Sarasota, FL: Center for Creative Learning.
- McGraw, K. (1978). The detrimental effects of reward on performance: A literature review and a prediction model. In M. Lepper & D. Greene (Eds.), *The hidden costs of reward* (pp. 33-60). Hillsdale, NJ: Lawrence Erlbaum Associates.
- McGraw, K., & McCullers, J. (1979). Evidence of a detrimental effect of extrinsic incentives on breaking a mental set. *Journal of Experimental Social Psychology, 15*, 285-294.
- Mednick, S., & Mednick, M. (1966). *Manual: Remote Associates Test. Form 1*. Boston: Houghton-Mifflin.
- Mitchell, B. M. (1988). A strategy for the identification of the culturally different gifted talented child. *Roeper Review, 10*, 163-165.
- Morgan, M. (1981). The overjustification effect: A developmental test of self-perception interpretations. *Journal of Personality and Social Psychology, 40*, 809-821.
- Newell, A., Shaw, J., & Simon, H. (1962). The processes of creative thinking. In H. Gruber, G. Terrell, & M. Wertheimer (Eds.), *Contemporary approaches to creative thinking* (pp. 63-119). New York: Atherton.
- Niu, W., & Sternberg, R. J. (2002). Contemporary studies on the concept of creativity: The east and the west. *Journal of Creative Behavior, 36*, 269-288.
- Niu, W., & Sternberg, R. J. (2003). Societal and school influences on student creativity: The case of China. *Psychology in the Schools, 40*, 103-114.
- Osborn, A. F. (1967). *Applied imagination: Principles and procedures of creative problem solving*. New York: Charles Scribner's Sons.
- Parnes, S. (1967). *Creative behavior guidebook*. New York: Charles Scribner's Sons.
- Parnes, S. (1981). *The magic of your mind*. Buffalo, NY: Creative Education Foundation Press.
- Parnes, S. (1992). *Source book for creative problem Solving*. Buffalo, NY: Creative Education Foundation Press.

- Policastro, E., & Gardner, H. (1999). From case studies to robust generalizations: An approach to the study of creativity. In R. J. Sternberg (Ed), *Handbook of creativity* (pp. 213-225). New York: Cambridge University Press.
- Pittman, T. S., Emery, J., & Boggiano, A. K. (1982). Intrinsic and extrinsic motivational orientations: Reward-induced changes in preference for complexity. *Journal of Personality and Social Psychology*, *42*, 789-797.
- Pollak, S. (1992). *The effects of motivational orientation and constraint on the creativity of the artist*. Unpublished manuscript, Brandeis University.
- Poole, M. E., Williams, A. J., & Lett, W. R. (1977). Inner-centeredness of highly creative adolescents. *Psychological Reports*, *41*, 365-366.
- Raina, M. K. (1968). A study into the effect of competition on creativity. *Gifted Child Quarterly*, *12*, 217-220.
- Ransen, D. (1980). The mediation of reward-induced motivation decrements in early and middle childhood: A template matching approach. *Journal of Personality and Social Psychology*, *35*, 49-55.
- Reis, S. M., & McCoach, D. B. (2000). The underachievement of gifted students: What do we know and where do we go? *Gifted Child Quarterly*, *44*, 152-170.
- Reiss, S., & Sushinsky, L. W. (1975). Overjustification, competing responses, and the acquisition of intrinsic interest. *Journal of Personality and Social Psychology*, *31*, 1116-1125.
- Renzulli, J. S. (1973). Talent potential in minority group students. *Exceptional Children*, *39*, 437-444.
- Renzulli, J. S. (1986). The three-ring conception of giftedness: A developmental model for creative productivity. In R. J. Sternberg & J. Davidson (Eds.), *Conceptions of giftedness* (pp. 53-92). New York: Cambridge University Press.
- Renzulli, J. S. (1998). The three-ring conception of giftedness. In S. M. Baum, S. M. Reis, & L. R. Maxfield (Eds.). *Nurturing the gifts and talents of primary grade students* (pp. 1-27). Mansfield Center, CT: Creative Learning Press.
- Renzulli, J. S. (1999a). Reflections, perceptions, and future directions. *Journal for the Education of the Gifted*, *23*, 125-146.
- Renzulli, J. S. (1999b). What is this thing called giftedness, and how do we develop it? A twenty-five year perspective. *Journal for the Education of the Gifted*, *23*, 3-54.

- Renzulli, J. S. (2002). Expanding the conception of giftedness to include co-cognitive traits and to promote social capital. *Phi Delta Kappan*, 84, 33-40, 57-58.
- Renzulli, J. S., & Reis, S. M. (1994). Research related to the Schoolwide Enrichment Triad Model. *Gifted-Child-Quarterly* 38, 7-20.
- Renzulli, J. S., & Reis, S. M. (1997). *The schoolwide enrichment model: A how-to guide for educational excellence*. Mansfield Center, CT: Creative Learning Press.
- Renzulli, J. S., & Reis, S. M. (2002). What is schoolwide enrichment?: How gifted programs relate to total school improvement. *Gifted Child Today*, 25, 18-25, 64.
- Renzulli, J. S., Smith, L. H., & Reis, S. M. (1982). Curriculum compacting: An essential strategy for working with gifted students. *Elementary School Journal*, 82, 185-194.
- Richert, E. S. (1987). Rampant problems and promising practices in the identification of disadvantaged gifted students. *Gifted Child Quarterly*, 31, 149-154.
- Ryan, R. M., & Deci, E. L. (2000a). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
- Ryan, R. M., & Deci, E. L. (2000b). When rewards compete with nature: The undermining of intrinsic motivation and self-regulation. In C. Sansone & J. M. Harackiewicz, (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 13-54). San Diego, CA: Academic.
- Ryan, R. M., & Grolnick, W. S. (1986). Origins and pawns in the classroom: Self-report and projective assessments of individual differences in children's perceptions. *Journal of Personality and Social Psychology*, 50, 550-558.
- Sansone, C., & Harackiewicz, J. M. (1996). "I don't feel like it": The function of interest in self-regulation. In L. Martin & A. Tesser (Eds.), *Striving and feeling: Interactions among goals, affect and self-regulation* (pp. 203-228). Mahwah, NJ: Lawrence Erlbaum Associates.
- Shapira, Z. (1976). Expectancy determinants of intrinsically motivated behavior. *Journal of Personality and Social Psychology*, 39, 1235-1244.
- Shultz, T., Butkowsky, I., Pearce, J., & Shanfield, H. (1975). The development of schemes for the attribution of multiple psychological causes. *Developmental Psychology*, 11, 502-510.
- Simon, H. (1967). Motivational and emotional controls of cognition. *Psychological Review*, 74, 29-39.

- Smith, M. C. (1975). Children's use of the multiple sufficient cause schema in social perception. *Journal of Personality and Social Psychology*, 32, 737-747.
- Smith, J., LeRose, B., & Clasen, R. E. (1991). Underrepresentation of minority students in gifted programs: Yes! It matters! *Gifted Child Quarterly*, 35, 81-83.
- Spence, K. (1956). *Behavior theory and conditioning*. New Haven, CT: Yale University Press.
- Stein, M. I. (1968). Creativity. In E. F. Borgatta & W. W. Lambert (Eds.), *Handbook of personality theory and research* (pp. 900-942). Chicago: Rand McNally.
- Stein, M. I. (1974). *Stimulating creativity* (Vols. 1 and 2). New York: Academic Press.
- Sternberg, R. J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. New York: Cambridge University Press.
- Sternberg, R. J. (1988). A three-facet model of creativity. In R. J. Sternberg (Ed.), *The Nature of Creativity* (pp. 125-143). New York: Cambridge University Press.
- Sternberg, R. J. (1988). *The triarchic mind: A new theory of intelligence*. New York: Viking Press.
- Sternberg, R. J. (1996). The sound of silence: A nation responds to its gifted. *Roeper Review*, 18, 168-172.
- Sternberg, R. J. (1998). Principles of teaching for successful intelligence. *Educational Psychologist*, 33, 65-72.
- Sternberg, R. J. (1999). A propulsion model of types of creative contributions. *Review of General Psychology*, 3, 83-100.
- Sternberg, R. J. (2000a). Creativity is a decision. In B. Z. Presseisen (Ed.), *Teaching for intelligence II: A collection of articles* (pp. 83-103). Arlington Heights, IL: Skylight Training and Publishing.
- Sternberg, R. J. (2000b). Identifying and developing creative giftedness. *Roeper Review*, 23, 60-64.
- Sternberg, R. J., & Lubart, T. I. (1991). An investment theory of creativity and its development. *Human Development*, 34, 1-32.
- Tauer, J., & Harackiewicz, J. M. (1999). Winning isn't everything: Competition, achievement orientation, and intrinsic motivation. *Journal of Experimental Social Psychology*, 35, 209-238.

- Terman, L. M. (1925). *Genetic studies of genius. Vol. 1: Mental and physical traits of a thousand gifted children.* Stanford, CA: Stanford University Press.
- Torrance, E. P. (1962). *Guiding creative talent.* Englewood Cliffs, NJ: Prentice-Hall.
- Torrance, E. P. (1964). *Role of evaluation in creative thinking* (Cooperative Research Project No. 725). Minneapolis, MN: University of Minnesota.
- Torrance, E. P. (1965). *Rewarding creative behavior: Experiments in classroom creativity.* Englewood Cliffs, NJ: Prentice Hall.
- Torrance, E. P. (1966). *The Torrance Tests of Creative Thinking: Norms-technical manual.* Lexington, MA: Personal Press.
- Torrance, E. P. (1967). *Understanding the fourth grade slump in creative thinking: Final report.* Athens, GA: University of Georgia. (ERIC Document Reproduction No. ED 081 273)
- Torrance, E. P. (1974). *Torrance Tests of Creative Thinking: Norms-technical manual.* Lexington, MA: Ginn.
- Torrance, E. P. (1978). Dare we hope again? *Gifted Child Quarterly*, 22, 292-312.
- Torrance, E. P., & Safter, H. T. (1990). *The incubation model of teaching.* Buffalo, NY: Bearly Limited.
- Torrance, E. P., & Sisk, D. A. (1997). *Gifted and talented in the regular classroom.* Buffalo, NY: Creative Education Foundation Press.
- Treffinger, D. J. (1986). *Blending gifted education with the total school program.* Buffalo, NY: DOK Publishers.
- Treffinger, D. J. (1988a). Components of creativity: Another look. *Creative Learning Today*, 2, 1, 4.
- Treffinger, D. J. (1988b, April). Cultivating potentials: Beyond the gifted program. *Teaching K-8*, 54-57.
- Treffinger, D. J. (1991). Creative productivity: Understanding its sources and nurture. *Illinois Council for the Gifted Journal*, 10, 6-8.
- Treffinger, D. J. (1992). Programming for giftedness: Needed directions. *Innotech Journal*, 16, 54-61.
- Treffinger, D. J. (1996). *Dimensions of creativity.* Sarasota, FL: Center for Creative Learning.

- Treffinger, D. J., & Isaksen, S. G. (1992). *Creative problem solving: An introduction*. Sarasota, FL: Center for Creative Learning.
- Treffinger, D. J., Isaksen, S. G., & Dorval, K. B. (1996). *Climate for creativity and innovation: Educational implications*. Sarasota, FL: Center for Creative Learning.
- Treffinger, D. J., & Selby, E. C. (1993). Giftedness, creativity and learning style: Exploring the connections. In R. M. Milgrim, R. Dunn, & G. E. Price (Eds.), *Teaching and counseling gifted and talented adolescents: An international learning style perspective* (pp. 87-102). Westport, CT: Praeger.
- Treffinger, D. J., Young, G. C., Nassab, C. A., & Wittig, C. V. (2003). *Talent development: The levels of service approach*. Waco, TX: Prufrock Press.
- Treffinger, D. J., Young, G. C., Selby, E. C., & Shepardson C. (2002). *Assessing creativity: A guide for educators* (RM02170). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.
- Wallach, M. A. (1970). Creativity. In P. H. Mussen (Ed.), *Carmichael's manual of child psychology* (3rd ed., Vol. 1, pp. 1211-1272). New York: Wiley.
- Wallach, M. A. (1971). *The creativity-intelligence distinction*. New York: General Learning Press.
- Wallach, M. A., & Kogan N. (1965). *Modes of thinking in young children*. New York: Holt, Rinehart & Winston.
- Wallas, G. (1926). *The art of thought*. New York: Harcourt, Brace.
- Webb, J. T., Meckstroth, E. A., & Tolan, S. S. (1989). *Guiding the gifted child: A practical source for parents and teachers*. Scottsdale, AZ: Great Potential Press.
- White, R.W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, 66, 297-333.
- White, K., & Owen, D. (1970). Locus of evaluation for classroom work and the development of creative potential. *Psychology in the Schools*, 7, 292-295.
- Winner, E. (1996a). *Gifted children: Myths and realities*. New York: Basic Books.
- Winner, E. (1996b, October 16). The miseducation of our gifted children. Retrieved May 5, 2003, from www.edweek.com/ew/vol-16/07winner.h16
- Winner, E. (1997). Exceptionally high intelligence and schooling. *American Psychologist*, 52, 1070-1081.

Winner, E. (2000). The origins and ends of giftedness. *American Psychologist*, 55, 159-169.

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