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ABSTRACT

The main goal of this paper is to conceptualize a theory of optimal motivation for talent development. According to this theory, a lack of motivation can seriously undermine talent development. Optimal motivation is necessary for the full development of talent. Optimal motivation is described as a "flow" experience in which students become so absorbed in a task that they lose track of time and their efforts seem "effortless." A generalized expectancy-value theory is used to analyze 3 ideal conditions under which students are most likely to experience flow: (a) optimal challenge, (b) undivided interest, and (c) optimal arousal. These conditions are further analyzed by reversal theory to show how each is composed of two complementary motivational processes: (a) "serious-minded" process and (b) "fun-minded" process. The balanced interaction of these two processes creates the optimal motivation of "serious fun" (Rea, 1995, p. 22). With serious fun, students are able to sustain high levels of talent development without burnout or dropout.

INTRODUCTION

An underdeveloped mind is a terrible waste. Too many of our youth are at risk for not fully developing their rich talents (Glasser, 1990; Rimm, 1986). This underdevelopment of talent is a waste to both the individual and to our nation (The National Commission on Excellence in Education, 1984). The primary problem is not a lack of intellectual ability but, rather, a lack of motivation (Csikszentmihalyi, 1990b; Rea, 1995; Wlodkowski, 1985). This problem is especially evident among highly talented youth (Baum, Renzulli, & Hébert, 1994, 1995; Emerick, 1992; Gallagher, Harradine, & Coleman, 1997; Whitmore, 1980, 1986).

Consider the following scenarios of three highly talented students: (a) a female student stops taking advanced math classes because of her anxiety with the subject; (b) a male student clowns around in an English class because he is bored; and (c) a minority student becomes apathetic and drops out of school because he does not see the relevance of school learning. All three students are very talented, but a lack of motivation undermines the full development of their talent. The problem of these talented underachievers and many others appears to be a programmatic mismatch between their motivational needs and educational opportunities (Baum et al., 1994, 1995; Emerick, 1992; Gallagher et al., 1997; Whitmore, 1980, 1986).

If these talented youth are to realize the outstanding achievements of which they are capable, extraordinary motivation is required (Bloom, 1985). Various studies have shown that people with consistently high levels of accomplishment have equally high levels of motivation (for reviews, see Renzulli, 1986; Robinson, 1996). A high level of motivation is so integral to creative productivity and eminent accomplishments that Renzulli (1986) and Feldhusen (1986) have included it as a necessary component of talent identification and development.

Given the overwhelming evidence for the importance of motivation in talent development, the main thesis of this article is that motivation is an essential key to talent development (Csikszentmihalyi, Rathunde, & Whalen, 1993). Educators need to optimize student motivation to maximize talent development. The more often that students are optimally motivated to use their talents, the more committed they become to the development of these talents (Csikszentmihalyi et al.). Based on this thesis, the proposed model of optimal motivation enables educators and researchers to better understand and assist students in establishing a strong commitment to their talents. Furthermore, this model is consistent with contemporary views in which motivation and talent are nurturable, emergent processes rather than immutable, fixed entities (Clinkenbeard, 1996; Dai, Moon, & Feldhusen, 1998; Feldhusen, 1998; Treffinger, 1998; Treffinger & Feldhusen, 1996).

The reader is invited to join the author in assembling the parts of a conceptual jigsaw puzzle. The object of this puzzle is to construct a highly complex but fully coherent picture of optimal motivation and its relationship to talent development. To facilitate this puzzlesolving process, the article is divided into four sequential steps:

1. In step 1, the conceptual framework for achievement motivation and its component parts is formulated (Pintrich & De Groot, 1990).
2. In step 2, this conceptual framework and a big picture of optimal motivation as flow (Csikszentmihalyi, 1975) are used to guide the selection and integration of three component parts of optimal motivation: (a) Csikszentmihalyi's (1982) optimal challenge, (b) Rathunde's (1991a) undivided interest, and (c) Apter's (1982) and Rea's (1993) optimal arousal. This integration of the component parts leads to a well-formulated picture of flow.
3. In step 3, the component parts of flow are further subdivided and reorganized according to Apter's reversal theory to reveal a more complex but fully coherent picture of flow as serious fun (Rea, 1993).
4. In step 4, reversal theory and serious fun are placed within the larger conceptual framework of a dynamic, complex

systems theory (Apter; Rea, 1997).

ACHIEVEMENT MOTIVATION

The first step of the puzzle-solving process begins by defining achievement motivation as sustained effort directed toward an achievement goal (Feather, 1982). Given this general definition, motivation can be applied to a wide variety of talent-related areas, such as math, science, literature, art, music, and sports. This definition can be further conceptualized and explained by a generalized expectancy-value model (Brophy, 1998; Eccles & Wigfield, 1995; Feather, 1982; Good & Brophy, 1994; Pintrich, 1989; Pintrich & De Groot, 1990). This model proposes three component parts of motivation: (a) an expectancy component, which includes students' cognitive perceptions of their ability to perform a task; (b) a value component, which includes students' volitional beliefs about the interest and importance of a task; and (c) an affective component, which includes students' emotional reactions to a task. According to this model, the effort that students are willing to expend on a task is a product of their expectancy of success at the task, the value they place on the task, and their emotional reaction to the task. In the following text, these three component parts are more fully explained.

The expectancy component represents students' expectancy of success for a learning task. Expectancy is the cognitive dimension of motivation that raises the question, "Can I do this task?" Students with high expectancy answer, "I know I can do this task because I am capable." In the literature, expectancy is conceptualized as self-efficacy, perceived competence, attributional style, control beliefs, potency, and perceived skill level. The essential belief is that students are confident, responsible, and capable of doing a task. Research shows that students with high expectancy tend to achieve at higher levels, persist longer at tasks, employ more cognitive strategies, and are more resilient than students with low expectancy (Berndt & Miller, 1990; Fincham & Cain, 1986; Schunk, 1985).

The value component represents the perceived worth of a learning task. Value is the volitional dimension of motivation that raises the question, "Why am I doing this task?" Students who value a task answer, "I am willing to do this task because it is worthwhile." In the literature, value is conceptualized according to an intrinsic versus extrinsic orientation and learning versus performance goal, interest, and task value. Research demonstrates that students who highly value a task tend to persist longer at the task, employ more effective cognitive strategies, and use more effective attention and effort management (Eccles & Wigfield, 1985; Hidi, 1990; Schiefele, 1991; Wade & Adams, 1990).

The affective component represents students' emotional reaction to a learning task. Affect is the emotional dimension of motivation that raises the question, "How do I feel about this task?" Students with a positive affect answer, "I want to do this task because I like it." In the literature, affect is conceptualized by a pleasant versus unpleasant affect and a negative versus a positive mood, level of arousal, and satisfaction. Research indicates that unpleasant emotional extremes, such as apathy, anxiety, boredom, and overexcitement can be debilitating to attention, performance, and persistence (Hebb, 1955; Hill & Wigfield, 1984; Hockey, 1983; Hockey & Hamilton, 1983; Revelle, 1987). Less extreme and more pleasant productive emotions include excitement and alert levels of relaxation. Excitement appears to be associated with curiosity, exploration, and challenge; calmness (alert relaxation) appears to be associated with control, skillfulness, and mastery (Apter, 1982; Berlyne, 1960; Csikszentmihalyi, 1975; Massimini & Carli, 1988; Wlodkowski, 1985).

Connections among the three components of achievement motivation are symbolically represented by a multiplicative relationship (Good & Brophy, 1994; Pintrich, 1989; Pintrich & De Groot, 1990):

$$\text{achievement motivation} = \text{expectancy} \times \text{value} \times \text{affect}$$

This formulation provides a conceptual framework for organizing the components of achievement motivation. The multiplicative relationship indicates that the total absence or negative extremity of any one component can cancel the contributions of the other two components. For example, if a learning task is absolutely valueless to students, they will be unwilling to continue the task even if they expect to do well and feel pleasant. If students know that they have no chance of succeeding at a task, then they will think it is hopeless to continue the task, even if it is highly valued and pleasant. If students have developed an emotional phobia for a task, then they will be distressed to continue the task, even if it is valuable and simple enough to ensure success. This multiplicative relationship indicates that the components are not independent but interact in an interdependent way (Eccles & Wigfield, 1995).

Although the total absence of one component can cancel the contributions of the other two components, a low level in one component can be compensated by a high level in another component. For example, students may not expect to do very well in a course (low expectancy) and may not like the course work (negative affect) but need the course for graduation (high value). Hence, they are motivated to persist in completing the course. This motivation is suboptimal because of the low expectancy and the negative affect. If students experience repeated failure, they may drop out of the course. Even if they succeed in the course, they will be less likely to pursue this subject in the future because their first experience with it was so difficult and unpleasant.

OPTIMIZATION OF ACHIEVEMENT MOTIVATION

This model of achievement motivation implies that all three components (expectancy, value, affect) are positively interrelated and make important contributions to motivation (Eccles & Wigfield, 1995). Optimal achievement motivation can be defined as the optimization of all three components of motivation. Deficits in any of the components result in suboptimal conditions for motivation. With component deficits, students' achievement motivation can become frustrating

(cognitive deficit), unwilling (volitional deficit), or unpleasant (affective deficit). Students who are optimally motivated experience strong success, significant value, and gratifying pleasure when applying their talents. When the component conditions for optimal motivation are completely met, students are more likely to make wholehearted efforts to sustain talent development. They are eager (affective arousal), able (cognitive expectancy), and willing (volitional value) to make full use of their talents.

A better understanding of the optimal forms of achievement motivation and its components has important implications for maximizing talent development. In this section, four forms of optimal motivation that correspond to achievement motivation and its three component parts are examined: (a) Csikszentmihalyi's (1975) flow, (b) Csikszentmihalyi's (1982) optimal challenge, (c) Rathunde's (1992) undivided interest, and (d) Apter's (1982) and Rea's (1993) optimal arousal. These four forms of optimal motivation are used to construct and operationalize the definitions of optimal achievement motivation and its components. In turn, the componential formulation of achievement motivation is used as a conceptual framework to integrate these four diverse forms of optimal motivation into a single model of optimal motivation.

OPTIMAL ACHIEVEMENT MOTIVATION AS FLOW

A rich, holistic picture of optimal achievement motivation is provided by descriptive reports of the flow experience (Csikszentmihalyi, 1975). For example, one study reported students' descriptions of flow experiences while writing essays for a school assignment (Larson, 1988). One student stated, "As I was writing the rough draft and converting it to final copy, I sensed a real flow in the materials and I felt as if everything was finally falling together" (p. 166). Another student stated, "I was really shut off from everything that was happening. My phone rang, and it took me three rings to realize it; I mean I was really engrossed" (p. 166). From these reports and a variety of others, a composite picture of flow emerges as "a subjective state that people report when they are completely involved in something to the point of losing track of time and of being unaware of fatigue and of everything else but the activity itself" (Csikszentmihalyi et al., 1993, p. 14). Csikszentmihalyi (1975, pp. 38-48; 1990a, pp. 49-66) has identified nine fairly consistent elements of flow: "clear goals ... immediate feedback ... a challenging activity that requires skills ... concentration on the task at hand ... a sense of control over actions ... the loss of self-consciousness ... the transformation of time ... the merging of action and awareness ... and autotelic experience" (intrinsic enjoyment).

Flow is proposed as a form of optimal achievement motivation because it exemplifies the optimal quality and utilization of sustained effort. When students' efforts are flowing, they are clearly focused, totally involved, and highly enjoyable. They become so absorbed in a task that time seems to fly by and their efforts seem effortless. When achievement motivation is suboptimal (e.g., anxious striving or monotonous drudgery), students' efforts become sporadic, unfocused, and fatiguing. The rich, holistic description of flow can be used as a big picture for guiding the selection of the component parts of optimal achievement motivation.

OPTIMAL EXPECTANCY AS HIGH CHALLENGE-HIGH SKILL

One of the most frequently reported conditions under which students experience flow is "optimal challenge," the subjective experience of balancing high skill level with high challenge level (Csikszentmihalyi & Csikszentmihalyi, 1988; Csikszentmihalyi et al., 1993). This perceived balancing is a form of optimal expectancy. Students who perceive their skill as well matched with a highly challenging task feel strong and capable of accomplishing the task and thus have a high expectancy of success. Students who are over-challenged experience frustration and anxiety. Students who are underchallenged experience boredom.

The balance of high skill-high challenge for class work correlates well with potency, esteem, concentration, involvement, and achievement (Csikszentmihalyi et al., 1993, p. 187; Nakamura, 1988). Furthermore, this balance is highly correlated with students' future commitment to talent development. Students who reported the highest percentage of high-skill-high-challenge activities for their talent during a three-week period in the ninth grade were also the most committed to their talent in the 12th grade (Csikszentmihalyi et al., 1993, pp. 233-235). In other words, 9th grade students who most frequently perceived a match of high skills with high challenges in their talent areas were confident of success. This high expectancy appears to have contributed to their motivation to stay committed to their talent through at least the 12th grade while others with low expectancy were less likely to stay committed.

OPTIMAL VALUE AS UNDIVIDED INTEREST

Another frequently reported condition under which students experience flow is characterized as an absorbing interest (McQuillan & Conde, 1996). All of the flow reports are about people who are pursuing their favorite interests. Students who lose interest in their talents are not likely to pursue them, much less have flow experiences. Students' interests not only contribute to the initiation of flow experiences, these interests also energize students' spontaneous involvement as well as direct the flow of their efforts toward important goals (Rathunde & Csikszentmihalyi, 1993). Talent-related activities need to be more than challenging. These activities also need to be interesting to energize and direct achievement motivation. Rathunde's (1992) concept of undivided interest captures this complex function of energizing and directing motivation.

Rathunde's (1992) undivided interest is a maximized combination of spontaneous interest, which fuels the ongoing flow of motivation, and long-term interest, which directs this flow. It is an expression of optimal value because a task is highly valued for both its short-term and long-term interests. Students give their undivided attention to tasks that are optimally valued in the moment and for the future. Rathunde (1992) characterized undivided interest as "serious play" (p. 320)--spontaneous interest is an expression of play, and future interest is an expression of seriousness.

Students motivated by an undivided interest in a task indicate both high "spontaneous interest" and high "future importance" (Csikszentmihalyi et al., 1993, p. 187). Spontaneous interest is measured by the self-descriptive items of open, involved, and excited. Future importance is measured by a response to the question, "How important is this activity to your overall goals?"

Based on these measures, Rathunde (Csikszentmihalyi et al., 1993, p. 230) reported that students most committed to their talent development tend to exhibit an undivided interest in their talent activities as indicated by a combination of high spontaneous interest and high future importance. They are motivated to stay committed because their talents are valuable now (exciting spontaneous interest) and for the future (important for career goals). Students who perceive their talent as merely an exciting momentary interest that lacks future importance are not likely to stay committed to their talent. Conversely, students who perceive their talent as important for the future but who do not find it interesting in the present are not likely to stay committed to their talent (Csikszentmihalyi et al.).

Although the relationship between optimal challenge and undivided interest has not been directly measured, they appear to covary. In one study, Rathunde (1994) found that extracurricular activities were characterized by frequent reports of both optimal challenge and undivided interest. School work was characterized as overly challenging but of high future importance. Socializing was characterized as underchallenging but of high momentary interest.

OPTIMAL AFFECT AS EXCITEMENT-CALMNESS

Another condition under which students experience flow is typically described as feeling excitement, relaxation, or a combination of both. For example, one surgeon stated, "It [an operation] is more exciting than anything else" (Csikszentmihalyi, 1975, p. 125). Another surgeon stated, "It can be enjoyable to lapse into familiarity--everything clicks along. There is enjoyment of the craft--'symphony of motion'" (p. 128). Also, "Operations that are relaxing can merge into the state of flow at certain points" (p. 128). He further explained that there is a clear distinction between very routine cases that are boring and routine cases that allow a relaxing sense of flow.

Although excitement and relaxation are pleasant emotions, too much of either of these emotions can lead to unpleasant consequences. For example, children's excitement can become carried away with the overexcitement of frenetic activity; and their calmness can lapse into the overrelaxed state of apathy. The optimal affective state is a balanced combination of playful excitement and serious calmness (Apter, 1982; Rea, 1993). Excitement counteracts the tendency of calmness to lapse into apathy, and calmness counteracts the tendency of excitement to lead to overexcitement. This combination produces optimal affect because calmness and excitement counterbalance each other's unpleasant tendencies and result in double the pleasure.

Research indicates that the optimal emotions of excitement and relaxation are related to optimal challenge (Massimini & Carli, 1988, p. 286). Students who report more high-challenge-high-skill activities over a week also report more occasions of excitement and relaxation than students with less of these activities. Perhaps these students are experiencing the excitement of challenge and the calmness of skillful mastery. Excitement and relaxation also appear to be related to undivided interest. Excitement is strongly related to momentary interest (Rathunde, 1992), while calmness appears to be related to serious long-term interest.

Thus far, the holistic picture of flow and the conceptual framework of achievement motivation have been used to guide the selection and definition of the three component parts of optimal achievement motivation. Next, the conceptual framework of achievement motivation (expectancy x value x affect) is used to assemble these three parts into a coherent picture of optimal motivation:

optimal achievement motivation as flow = optimal expectancy as high challenge-high skill x optimal value as spontaneous interest-future importance x optimal affect as excitement-calmness

According to this multiplicative relationship, students are most likely to experience flow and become optimally motivated to apply their talents when the following three ideal conditions are satisfied:

1. Optimal expectancy: Talent-related activities are perceived as realistically challenging for students' skill level (optimal challenge).
2. Optimal value: Talent-related activities are perceived as interesting in the present and also important to students' future goals (undivided interest).
3. Optimal affect: Talent-related activities are enjoyed as both relaxing and exciting (optimal arousal).

These three conditions may provide three doors to the flow experience (Goleman, 1995, pp. 91-92). Undivided interest can create an intense focus of attention that leads to flow. Optimal challenge can create a confidence in ability that leads to flow. Relaxed excitement can create a meditative state of relaxed blissfulness that leads to flow. All three conditions taken together maximize the likelihood of experiencing flow.

This model proposes that the more often students are optimally motivated to use their talents, the more committed they will be to the development of these talents. They will want to keep developing their talents because these talents are worthwhile (optimal value), enjoyable (optimal affect), and empowering (optimal expectancy). In the next section, optimal motivation is more fully conceptualized and explained with reversal theory.

REVERSAL THEORY EXPLANATION OF OPTIMAL MOTIVATION

In this section, we continue the puzzle-solving process assisted by reversal theory. This theory reveals the dynamic complexity of the three components of optimal achievement motivation and enables the construction of a more coherent picture of flow as serious fun.

Reversal theory is a complex psychological theory of personality, emotion, and motivation (Apter, 1982, 1989; Apter,

Fontana, & Murgatroyd, 1985; Kerr & Apter, 1991). According to reversal theory, the dynamic nature of motivation can be explained by the bimodal tendency of humans to reverse (switch) back and forth between two contrasting motivational modes, the work-oriented telic mode and the play-oriented paratelic mode (see Table 1). These two modes are mutually exclusive but complementary. They account for the primary psychological sources of human motivation.

An advantage that reversal theory has over other motivation theories is that it accommodates the complex, complementary interaction between work and play. Traditionally, work and play have been dichotomized as sources of motivation (Good & Brophy, 1994, p. 212; Marshall, 1990). According to the conservative tradition of education, motivation is portrayed as seriousness and hard work. The more liberal tradition portrays motivation as fun and games. Both traditions in their extreme forms are misleading. Reversal theory proposes that a balanced interaction between telic work and paratelic play is necessary for optimal motivation. In the next subsections, telic and paratelic motivations are explained and related to optimal achievement motivation.

TELIC MOTIVATION

When teachers make requests, such as "Pay attention because this information will be on the next test," they are attempting to induce telic motivation. When students say, "I'm anxious to complete my studies for the test so I can relax," they are exhibiting telic motivation. This motivation is a serious-minded, goal-oriented, anxiety-avoiding mode. In this mode, students anxiously strive to accomplish work goals that are perceived as important, essential, or required. In the previous example, the test is perceived as very important by students; and they are anxious to master it so they can relax, knowing everything is under control.

The emotions associated with the telic mode are depicted by an inverted "U" curve on the left side of Figure 1. This curve expresses the relationship between students' arousal level and feeling tone. The most pleasant arousal is moderately low between the extremes of overrelaxed (apathy) and overanxious. This optimal telic state is experienced by students as a calm sense of control. For example, when students read a book for a required test, they tend to prefer an arousal state of relaxed alertness so they can calmly concentrate on accomplishing this important goal. If they are too anxious or apathetic (lack of concern), then the task becomes unpleasant; and achievement motivation is difficult to sustain.

PARATELIC MOTIVATION

When teachers tell students, "You are free to pursue your own interest for this activity," they are inviting students to experience paratelic motivation. When students say, "I'm having so much fun that I don't want to stop," they are exhibiting paratelic motivation. This motivation is a playful, spontaneous, excitement-seeking mode. In this mode, students enjoy playful experiences that are stimulating and freely chosen. For example, students may enjoy playing a stimulating game for the fun of it. They are so excited about the game that they do not want to quit.

The emotions associated with the paratelic mode are depicted by an inverted "U" curve on the right side of Figure 1. This curve expresses the relationship between students' arousal and feeling tone. The most pleasant arousal is moderately high between the extremes of overexcitement and boredom. This optimal paratelic state is experienced by students as an exciting sense of confidence. For example, when students are reading a book for pleasure, they tend to prefer an arousal state of excited alertness so they can enjoy a stimulating reading experience. If uncontrollably excited, they experience an unpleasant lack of focus. If too bored, they become unpleasantly restless and distracted. Whether too bored or overly excited, the task becomes unpleasant and achievement motivation is difficult to sustain.

MOTIVATIONAL PREFERENCES

Most students develop a personality preference for either the serious telic mode or the playful paratelic mode (Apter, 1982, 1989). Telic students tend to develop a serious-minded personality, while paratelic students develop a playful, carefree personality. Even though students may have a personality preference, they also are capable of experiencing many motivational reversals (switches between telic and paratelic modes), depending on situational demands and personal conditions. For example, students may approach a writing assignment anxiously because they have to do it for a grade (telic); then, after choosing an interesting topic, they become excitedly involved (paratelic); and finally, because of time pressure, they anxiously rush to complete it (telic).

REVERSAL IMBALANCES AND MOTIVATIONAL PROBLEMS

Extreme reversal imbalances in which students become rigidly fixated in one motivational mode or disjointedly switch between modes can create motivational problems for talent development. Students who are rigidly fixated in the serious telic mode tend to exhibit motivational problems, such as compulsive avoidance of failure, excessive safe seeking, complacency, or apathy. Students at all achievement levels are affected by these problems. High achievers may play it safe by taking easy courses to protect their perfect "A" record. Average achievers may become complacent with minimal achievement and not strive for higher achievement. Low achievers may become apathetic and not risk trying for fear of looking stupid.

The one-sided dominance of the telic mode over the paratelic mode creates a maladaptive motivational orientation referred to as ego involvement or performance goals (Ames, 1992; Dweck, 1986; Pintrich & Schunk, 1996). Achievement motivation that is oriented toward ego involvement is primarily concerned with ego protection and failure avoidance. Students motivated by telic ego involvement attempt to look smarter than others or at least to avoid looking stupid. Highly talented students with ego involvement are very strategic in putting on well-rehearsed performances to impress

teachers with their intelligence (telic motivation). However, they are unwilling to creatively risk difficult challenges (paratelic motivation) because they might blemish their perfect records and look less intelligent to others (Stipek, 1998, p. 4).

Some highly talented students with telic ego involvement become perfectionists who are compulsively driven to avoid failure because they want to look perfect. This compulsive overstriving is self-defeating because it creates debilitating anxiety and a severe sense of inadequacy (Covington, 1992; Parker, 1997). In general, the rigid dominance of telic motivation is maladaptive because students' preoccupation with ego protection undermines the confidence needed to face new challenges.

On the other extreme, students who are fixated in the playful paratelic mode tend to exhibit motivational problems, such as excessive excitement seeking, overexcitability, or susceptibility to boredom. Students who seek excessive excitement may continually crave new activities but never finish what they start. Overly excitable students may become hyperactive and unable to focus their attention. Easily bored students may become restless and distractible with all but the most exciting activities.

The one-sided dominance of the paratelic mode over the telic mode creates a paratelic version of ego involvement. While telically motivated students anxiously strive for self-protection, paratelically motivated students crave self-gratification. They desire spontaneous play, personal amusement, and social stimulation. Students with paratelic ego involvement take on many forms, such as class clowns, chatterboxes, and dabblers who never finish what they start. Highly talented students with paratelic egos can be very creative and affable but lack the discipline to seriously develop their talent. This motivational goal is maladaptive because these students are preoccupied with having fun and are not willing to do the hard work necessary for task mastery.

Dabrowski (1972) observed that youth with superior intellectual and artistic abilities exhibited a high frequency of neurotic-like symptoms (extreme fluctuation of moods, anxiety, obsessions, and compulsions), which he labeled overexcitabilities. These overexcitabilities may be a manifestation of paratelic imbalance. However, they are more likely an intense but uncoordinated attempt to balance both motivational modes. According to Dabrowski, the neurotic-like symptoms of overexcitabilities result from gifted youths' heightened sensitivity and intensity of experience, which are especially acute during early adolescence. Ziegler and Piechowski (1983) described these symptoms as "a tumbling from one feeling to its opposite, and mood swings can be extreme. The individual is often adrift between conflicting motivations and courses of action" (p. 274). According to reversal theory, these youth may be experiencing a heightened intensity and rapid reversal of motivational modes. In other words, these youth may rapidly reverse between the heights of enthusiasm and the depths of despair. They have the capacity to be very serious one moment and then very foolish the next moment. This explanation is consistent with Fontana's (1981) finding that neurotics display an intense overfacilitation of reversals. This intensely rapid reversing of motivational modes in gifted adolescents may cause painful neurotic-like conflict in the early stages of their development. However, the intensity of these conflicted reversals eventually becomes a positive catalyst that accelerates their search for a dynamic balance (Dabrowski).

When classroom activities lack motivation, talented students can experience chaotic reversal imbalances, such as a disjointed switching between telic and paratelic modes (Rea, 1995, 1997). This disjointed switching is illustrated by a figure-eight cycle of dysfunctional interaction between telic and paratelic modes (see Figure 1). For example, a teacher hands out a practice worksheet for individual seat work. She telically stresses the serious importance of learning this material for the test tomorrow. Some talented underachievers at the back of the room react with telic apathy because they do not perceive the relevance of the worksheet. Their telic apathy leads them to procrastinate and to make minimal effort. This lethargic condition eventually reverses, because of a lack of stimulation, to restless paratelic boredom. This restless boredom leads to paratelic, excitement-seeking activities, such as drawing cartoon caricatures of the teacher and passing them around to others. The teacher telically reprimands them for these off-task paratelic activities. This reprimand precipitates a reversal to telic anxiety. The students anxiously get busy for a few minutes to avoid the teacher's disapproval; but when she stops watching, they sink back into telic apathy, starting the dysfunctional figure-eight cycle again. Highly talented students are more likely to experience this type of motivational problem when required to do excessive amounts of repetitive work (e.g., rote drills, practice worksheets, prolonged reviews) that lack personal relevance, interest, and intellectual challenge.

This vicious cycle of reversal extremes entraps talented students and the teacher in a motivational power struggle in which the teacher tries to get students to do serious work and students covertly or overtly undermine the authority of the teacher by misbehaving (Rea, 1995). When serious class activities are boring, talented underachievers are prone to instigate fun off-task activities that are more stimulating. These students think the teacher is attempting to take away their fun and the teacher thinks the students are not taking him or her or the classwork seriously. This power struggle divides work and play, with detrimental consequences for talent development. The best solution to this problem, especially for highly talented students, is not stricter discipline but more motivating instructional activities.

BALANCED REVERSALS AND OPTIMAL MOTIVATION

Ideally, students should experience a dynamic balance of reversals between the playful paratelic and serious telic modes. This optimal balance of the two motivational modes is called serious play (Mann, 1996; Rathunde, 1991a, 1991b, 1992; Rathunde & Csikszentmihalyi, 1993; Wasserman, 1990, 1992) or serious fun (Rea, 1994, 1995, 1997). Serious fun is defined as "play with a purpose" (Rea, 1995, p. 22). It is optimally motivating because students both playfully want (paratelic) and seriously need (telic) to learn. Consistent with this view, Dewey (1933) stated, "To be playful and serious at the same time is possible, and it defines the ideal mental condition" (p. 286). Dewey further explained that when play

and work are isolated, "play degenerates into fooling, and work into drudgery" (pp. 284-285).

With serious fun, the one-sided extreme of each isolated mode is counterbalanced. Students' tendencies to become overexcited (paratelic fooling) are controlled and focused by their serious intentions (telic), while their tendencies to become too relaxed or complacent (telic apathy) are stimulated and challenged by their playful explorations (paratelic). Without the long-term focus and calming influence of serious intentions, the high excitement of new interests and challenges eventually leads to burnout. On the other hand, without the high excitement of new interests and challenges, the calmness of control and mastery eventually leads to stultifying complacency and dropout. With the counteracting balance of serious fun, students are able to sustain very high levels of exciting challenge and relaxing mastery of talent interests without burnout or dropout.

This conceptualization of optimal motivation as serious fun is consistent with the flow experience. According to Csikszentmihalyi (1975), society has created an artificial split between work and play that is reconciled with the flow experience. He stated,

One way to reconcile this split is to realize that work is not necessarily more important than play and that play is not necessarily more enjoyable than work. What is both important and enjoyable is that a person act with the fullness of his or her abilities in a setting where the challenges stimulate growth of new abilities. (Csikszentmihalyi, 1975, p. 202)

OPTIMAL ACHIEVEMENT MOTIVATION AS SERIOUS FUN

The serious-fun model of balanced reversals can be used to further conceptualize optimal achievement motivation and its components. The serious mode can be used to reorganize the three subcomponents of optimal achievement into a single telic factor as follows: expectancy as mastery, value as future importance, and affect as relaxing (see Table 2). This implies that the ideal learning condition for serious telic motivation is the calm mastery of an important task. The fun mode can be used to reorganize the subcomponents of optimal achievement into a single paratelic factor as follows: expectancy as challenge, value as spontaneous interest, and affect as exciting (see Table 2). This implies that the ideal learning condition for fun paratelic motivation is the exciting challenge of an interesting task.

Optimal achievement motivation as serious fun is a dynamic balance of serious telic and fun paratelic factors. In other words, optimal achievement motivation is a dynamic balance of the exciting challenge of an interesting task and the calm mastery of an important task. With optimal achievement motivation, a task is bimodally perceived as paratelicly fun (interesting, challenging, and exciting) and telically serious (important, capable of being mastered, and calming). The bimodal balance of serious fun motivates students to sustain the use of their talents because these talents are perceived as both fun and serious. More specifically, students will be optimally motivated to develop their talents when they perceive them as interesting activities with exciting challenges and they perceive the mastery of these activities as calmly attainable and very important. The three essential conditions of optimal motivation as serious fun are summarized as follows:

1. Optimal paratelic fun: Talent-related activities are perceived as interesting activities that offer exciting opportunities for challenge seeking.
2. Optimal telic seriousness: Talent-related activities are perceived as important activities that offer relaxing (calm) opportunities for mastery attainment.
3. Optimal balance: Paratelic fun and telic seriousness are sufficiently balanced to produce the flow experience.

SERIOUS FUN AS A FLYING BUTTERFLY

The dynamic balance of serious telic and playful paratelic modes is graphically illustrated by a "flying butterfly" curve (see Figure 2). This flying butterfly curve does not allow its wings to get stuck in the unpleasant lower emotions of the grounded butterfly curve (see Figure 1). It soars on the wings of a balanced interaction between exciting paratelic challenge and relaxing telic mastery. This balanced interaction can either be experienced as a sequential alternation or a simultaneous synchrony of modes (Rea, 1993).

A sequential alternation is a flow experience that is less intensely focused than a simultaneous synchrony of modes. A sequential alternation switches back and forth between first one mode and then the other mode. For instance, before the uncertainty of a new paratelic challenge becomes overwhelming, a reversal is made to gain control with a telic mastery of the challenge. This calm telic mastery soon provides the skill and strength to explore a new challenge at a higher level. This sequential alternation creates a positive learning spiral when the reversals are sufficiently balanced (Kriegel & Kriegel, 1984; Van der Molen, 1985). For example, an infant's exciting paratelic exploration of the environment is ideally alternated with safe periods of telic relaxation with a primary caretaker (Bowlby, 1977). This relaxation allows an infant the necessary time to digest new experiences before venturing forth again. If a primary caretaker does not provide sufficient reassurance and relaxation, digestion of the new experiences may not take place; and the infant could develop excessive anxiety about exploring the environment.

This early example of sequential alternation provides a prototypical model for the development of talent in general. Parents and teachers can paratelicly challenge students to take creative risks and give them the freedom to explore their talent interests (Csikszentmihalyi et al., 1993, pp. 152-176). They also need to provide a safe and secure learning environment that supports the relaxed telic mastery of new experiences and allows students the opportunity to learn from their mistakes rather than fear failure (Csikszentmihalyi et al.). This balanced coordination of teachers' paratelic challenge and telic support creates a zone of optimal motivation or flow zone between the emotional extremes of anxiety and

boredom. This flow zone produces an ideal path for talent development.

The simultaneous synchrony of the playful paratelic mode and the serious telic mode creates an intensely focused flow experience. The mutual interweaving of these contrasting modes creates a resultant vector of deep flow that is experienced as both feeling and doing extremely well. Examples of deep flow include joyous, superior experiences of activities, such as running, painting, reading, and writing (Privette, 1983). When serious fun becomes deep flow, students are optimally motivated to develop their talents because they feel and perform extremely well. (For a more detailed reversal theory explanation of deep flow, see Rea, 1993).

SERIOUS FUN IS ADAPTIVE MOTIVATION

When paratelic fun is not balanced with telic seriousness, achievement motivation is suboptimal; and talent development is difficult to sustain. The extreme predominance of paratelic fun over telic seriousness can result in the maladaptive motivation of paratelic ego involvement. This leads students to merely dabble with their talents for amusement but not to seriously develop them (Csikszentmihalyi et al., 1993, pp. 231-233). For example, students may find music to be extremely fun and exciting; but they may not continue to take music courses because it seems impractical as a career option or requires too much hard work and long hours of practice to master at higher levels.

The extreme predominance of telic seriousness over paratelic fun can result in the maladaptive motivation of telic ego involvement. This leads students to anxiously work hard to develop their talents to get good grades but not to enjoy their talents (Csikszentmihalyi et al., 1993, pp. 231-233). For example, students may be highly competent at math and even see the practical value of math but not want to continue taking math courses because they find them neither interesting nor exciting.

Serious fun is an optimal form of achievement motivation with task involvement, mastery orientation, and learning goals (Ames, 1992; Dweck, 1986). Students with task involvement become lost in learning and mastering the task. They are willing to risk new challenges and to persist in the mastery of these challenges. Their efforts are fully devoted to improving skills and better understanding the task. These wholehearted efforts are not divided or distracted by the maladaptive ego involvements of telic failure avoidance or paratelic amusement seeking. Serious fun is an optimally adaptive motivational orientation because it encourages the search for creative new challenges (paratelic motivation) and the intelligent striving for mastery of these challenges (telic motivation; Cohen, 1992).

FUTURE RESEARCH IMPLICATIONS OF OPTIMAL MOTIVATION

Although the serious-fun model of optimal motivation is developed and supported by contemporary motivation research, it needs to be directly confirmed. Given this research goal, the model makes the following predictions for high-achieving, middle school students: The fun paratelic variables (task interestingness, challenge seeking, excitement seeking) and the serious telic variables (task importance, mastery attainment, anxiety avoidance) constitute distinct but interrelated factors; fun motivation (high paratelic-low telic) is more highly correlated with socializing with friends than with academic work (math, science, English); serious motivation (high telic-low paratelic) is more highly correlated with academic work than with socializing with friends; serious-fun motivation (high paratelic-high telic) is more highly correlated with extracurricular school activities than with academic work or socializing with friends; and, in general, serious-fun motivation is very highly correlated with flow experiences.

The model further predicts that, although, most high-achieving students will report that academic work is generally serious motivation, some students will report frequent experiences of serious-fun motivation. Those high-achieving students who report significantly more serious-fun experiences for mathematics than other high-achieving students will be more committed than other high achievers to actually take advanced mathematics courses in high school and to continue high achievement. As reported earlier in this article, researchers (Csikszentmihalyi et al., 1993; Rathunde, 1994; Rathunde & Csikszentmihalyi, 1993) have made and confirmed similar predictions about optimal motivation (as measured by optimal challenge or undivided interest) and commitment to future achievement.

Once a statistically valid measure of serious fun has been confirmed, it can be used to evaluate the motivational effectiveness of various instructional and learning strategies for talent development. This research approach is consistent with Clinkenbeard's (1996) recommendation that researchers focus on the motivational states of gifted students as outcome measures of specific learning activities. A better understanding of how to plan and interpret future research of optimal motivation requires a more fully developed conceptual framework. In the next section, optimal motivation is further conceptualized as a dynamic, complex systems theory.

REVERSAL THEORY AS A SYSTEMS THEORY

Reversal theory is a dynamic, complex systems theory (Apter, 1982; Rea, 1997). As such, it provides a system's explanation for the rich interactions between a person and the environment. It proposes that students are motivated to interact with the environment by the telic need for work and the paratelic desire for play. This interactive model is consistent with a social cognitive model of motivation (Dai et al., 1998). Its goal is to facilitate the evolving best fit between students' talents and motivational needs and the instructional demands and supports. This best fit fosters talent development and leads students to experience a positive spiral of learning.

OPEN DYNAMIC SYSTEM

Reversal theory views human motivation as an open dynamic system that has the capacity to evolve in a positive spiral of learning. For example, when talented students are optimally motivated, they paratelically seek to discover new

challenges and to explore their interests (open system); in turn, they telically strive to master these new challenges and to better understand these interests. With mastery and understanding, they develop the telic security and competence to openly expand the search for additional paratelic challenges and interests. This dynamically balanced process creates a positive spiral of continuous learning that allows students to develop more complex skills and to further expand and deepen their talent-related interests (Rea, 1993; Van der Molen, 1985).

According to traditional arousal theory, optimal arousal is characterized by the static equilibrium of a homeostatic system (Hebb, 1955). In contrast, the optimal arousal of reversal theory is characterized by the shifting equilibrium of a dynamic system (Apter, 1982). The motivational setpoint (equilibrium point) of this dynamic system is continually being self-regulated and equilibrated to develop more advanced levels of balance between calm mastery and exciting challenge. When the setpoint remains static (lack of interesting challenges or relevant tasks), students' optimal arousal degenerates into the unpleasant arousal of boredom or apathy. When the setpoint moves forward too fast (unrealistic task difficulty or excessive stimulation), students' optimal arousal advances into the unpleasant arousal of anxiety or overexcitement. Ideally, students learn to self-regulate the movement of their motivational setpoint by responding to the dual feedbacks of excitement and relaxation. The combined pleasure of these two preferred arousal states provides complementary feedback mechanisms for self-regulation (Iran-Nejad, 1990; Prawat, 1998). These built-in sources of feedback alert students when they are fully using their talents and arouse them to discover and make full use of their talents when they are underutilized (see Rea, 1993, for a more detailed discussion of self-regulation).

This regulation of motivation is neither an internally automatic process nor an externally imposed process. It is an interactive developmental process whereby talented students learn to feel, trust, and act on their internal emotional feedback; and educators learn to respect, support, and guide this motivational process. Sometimes parents and teachers excessively pressure talented students to work hard to demonstrate their talents. As discussed earlier, this can result in students merely putting on good performances to impress others or, worse yet, in academic burnout. Research indicates that talent development is optimally motivated by a leadership style that is not merely intellectually demanding but is also emotionally supportive of students' emerging interests (Baum et al., 1995; Emerick, 1992; Rathunde, 1988; Rea, 1995).

COMPLEX SYSTEM

Reversal theory explains a complex system of motivation (Apter, 1982; Rea, 1997). In order to achieve optimal motivation, talented students must learn to coordinate and balance the mutually exclusive but complementary subsystems of telic seriousness and paratelic playfulness. The one-sided imbalance of either subsystem results in suboptimal motivation. Excessive paratelic playfulness results in foolery. Excessive telic seriousness results in drudgery. Students need to fully differentiate and integrate paratelic playfulness and telic seriousness to attain the optimal motivation of serious fun.

In the process of attaining optimal motivation, students implicitly learn to differentiate and integrate the complexity of each of achievement motivation's three components. When they learn to differentiate and integrate the cognitive complexity of challenge-mastery, they are empowered to succeed fully at a task. When they learn to differentiate and integrate the volitional complexity of short-term interest-long-term interest, they benefit from the full value of a task. When they learn to differentiate and integrate the affective complexity of excitement-relaxation, they enjoy double the pleasure in doing a task. When these complex components are effectively differentiated and integrated, students become fully willing (volitional complexity), able (cognitive complexity), and eager (affective complexity) to pursue the development of their talents.

CONCLUSION

The four steps in the puzzle-solving process are accomplished. The completed puzzle reveals a highly complex but fully coherent picture of optimal motivation as serious fun. The conceptualization of serious fun with reversal theory provides a comprehensive model of motivation that accounts for the rich complexity of Csikszentmihalyi's optimal challenge (1982), Rathunde's undivided interest (1992), and Apter's (1982) and Rea's (1993) optimal arousal. This new model reveals the hidden structure and dynamics of the effortless flow of optimal motivation.

According to this model, talent development need not degenerate into serious drudgery or frivolous play. The predominance of seriousness over fun can lead to stressful talent burnout. The predominance of fun over seriousness can lead to wasteful talent dropout. With the balance of serious fun, students are able to sustain very high levels of exciting challenge and relaxing mastery of talent interests without burnout or dropout.

Parents and teachers can help students develop well-balanced, serious-fun personalities.(FN1) When parents and teachers provide both high expectations and high support, students are encouraged to develop serious-fun personalities (Rathunde, 1988; Rea, 1995). With a complex, resilient personality, students are able to transform boredom into exciting challenges and anxiety into calm mastery. They understand the lesson that Mary Poppins taught: "In every job that must be done there is an element of fun. Just find the fun and snap the job's a game" (Bedford, 1964). Serious-fun students are able to perceive both fun and seriousness in every job that must be done. For them, life is a serious game worth playing.

Serious fun is a fully adaptive motivational orientation because it creatively seeks the challenge and complexity of diversified interests, and it intelligently strives to master and understand them. Serious fun is not divided by the maladaptive ego goals of telic failure avoidance or paratelic amusement seeking. The complementary balance of telic seriousness and paratelic fun motivates the development of creative intelligence. With creative intelligence, students are able to coordinate both the creative expansion and intelligent application of their talents. The motivation of creative

intelligence has vital significance for both the refinement and expansion of students' valuable talents. The completed puzzle of optimal motivation as serious fun will enrich our picture of talent development and provide a more comprehensive theoretical perspective for future research.

ADDED MATERIAL

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AUTHOR NOTES

1. Although a full treatment of the educational implications of serious fun is beyond the scope of this article, the reader may wish to consider some of the following references. For suggestions concerning parenting style, see Rathunde (1988, 1991b). For recommendations for teaching style, see Csikszentmihalyi et al. (1993) and Rea (1994, 1995). For examples and guidelines for learning activities, see Brophy (1998, pp. 126-161), Covington (1992, pp. 216-248), Csikszentmihalyi (1975, 1990b), Raffini (1993, pp. 239-262; 1996, pp. 231-280), Rea (1994, 1995), Stevenson (1990), and Wasserman (1990, 1992). For applications to museum activities, see Csikszentmihalyi and Hermanson (1995); and for job training, see Rao (1995).

Table 1 Two Motivational Tendencies According to Reversal Theory

Telic mode	Paratelic mode
serious minded	fun minded
work oriented	play oriented
goal oriented	activity involved
product oriented	process oriented
future oriented	present oriented
planned	spontaneous
low arousal preferred	high arousal preferred
relaxation preferred	excitement preferred
anxiety avoidance	excitement seeking

Table 2 Optimal Motivation as Serious Fun

Motivation	= Expectancy	X Value	X Affect
Optimal	= Optimal	X Undivided	X Optimal
Motivation	Challenge	Interest	Arousal
SERIOUS fun	= Mastery	X Important	X Relaxing
	+	+	+
	Challenge	Interesting	Exciting
Serious Telic	= Mastery	X Important	X Relaxing
Fun Paratelic	= Challenge	X Interesting	X Exciting

Figure 1. The relationship between arousal and feeling tone.
 Figure 2. Flying butterfly curve.

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