

PERFECTIONISM AND THE GIFTED

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Perfectionism has long been considered a characteristic associated with giftedness. In this chapter, we make the case for a multivalenced view of perfectionism as it relates to the concept of giftedness. This view is derived from several conceptual and empirical approaches for understanding the effects that traits and characteristic adaptations have on various outcomes. The perfectionism literature generally supports two higher-order latent factors of perfectionistic strivings and concerns, and three or four latent class differentiations into adaptive, maladaptive, and nonperfectionistic groups. We pay particular attention to the implications of such a model for various kinds of challenges that gifted individuals may face. In general, much of the research supports other findings regarding the generally positive psychological health and resilience of the gifted, but also suggests that a subgroup may be at risk for stress-related adjustment difficulties. We conclude this chapter with methodological recommendations aimed at encouraging more contemporary and diversified approaches to measurement and to modeling classes and change trajectories to capture uniquely intersecting aspects of perfectionism and giftedness.

Through our research, we have come to understand that perfectionism is fundamentally about a strong, persistent, pervasive embracing of very high standards and performance expectations. Insofar as giftedness also involves an extreme desire to create at a high level of excellence, it is easy to see how

the two rather broad constructs might be linked. At the same time, it is easy to see how they could be unrelated; giftedness need not go hand in hand with perfectionism. Early in our review, it seemed any relation between the two constructs would not be clarified by sweeping generalizations and probably required more focus on empirically supported within-construct variation. This chapter attempts to add more breadth and depth involving perfectionism variation than was possible in other contributions (e.g., Fletcher & Speirs Neumeister, 2012; Fong & Yuen, 2014; Olszewski-Kubilius, Kulieke, & Krasney, 1988). Although we cannot claim to have authority over empirical knowledge in the field of giftedness, we hope our distance may yield fresh ideas about the interplay between these two constructs.

IMPORTANCE OF THE TOPIC: CONCEPTUALIZING AND MEASURING PERFECTIONISM

Perfectionism has long been directly or indirectly linked with giftedness and talent. For example, Bloom (1985) concluded that talented individuals were willing to put in considerable effort to achieve high standards for performance, and they wanted to perform their best at all costs. Silverman and Golon (2008) listed perfectionism among the “typical traits of giftedness” (p. 201), but they also acknowledged that perfectionism is “one of the most frequently

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misunderstood qualities of the gifted” (p. 213). They explained how perfectionistic strivings could be a risk factor for “paralysis and underachievement” or a source of positive, motivational energy, “the passion that leads to extraordinary creative achievement—an ecstatic struggle to move beyond the previous limits of one’s capabilities” (pp. 213–214). Similarly, Heller and Schofield (2008) placed striving for perfectionism within a set of other noncognitive moderators of the association between talent and performance, such as achievement motivation and coping with stress. Borders, Woodley, and Moore (2014) identified “high expectations of self and others” under strengths of gifted students but placed “intolerant, perfectionistic; may become depressed” (p. 131) under associated behaviors. Borders et al. added that sensitivity was a strength and potential problem for the gifted that could lead them to take criticism more personally than warranted. These observations from different authors point to possible benefits and risks of perfectionistic qualities for the gifted, not unlike some threads of discourse regarding positive and negative implications that have run through the perfectionism literature.

Definitional Considerations

Shafran, Cooper, and Fairburn (2002) defined “clinical” perfectionism as the “overdependence of self-evaluation on the determined pursuit of personally demanding, self-imposed, standards in at least one highly salient domain, despite adverse consequences” (p. 778). Pacht (1984) concluded that perfectionism was “a kind of psychopathology” (p. 387). We see several limitations with the clinical view. For example, if Pacht was correct, it seems odd that in over three decades, perfectionism has not been formally designated as a disorder, despite what some consider persuasive evidence for its inclusion (Ayearst, Flett, & Hewitt, 2012). In fairness, there are clearly some maladaptive expressions of perfectionism that raise clinical concerns and may even be transdiagnostic given links to several other diagnosable disorders (Egan, Wade, & Shafran, 2011). However, a critical reading of the existing research indicates that some dimensions of perfectionism or classes of perfectionists are not necessarily problematic.

Conceptualization and Measurement

Careful measurement and analysis can help adjudicate the question of perfectionism’s isomorphism with pathology; though in some respects, measuring perfectionism is not as easy as one might imagine. Indeed, after summarizing only three perfectionism scales, Sondergeld, Schultz, and Glover (2007) commented that, “perfectionism historically has been theoretically diffuse, and remains an empirically- and socially-derived moving target in the literature” (p. 20). Their comment gains force when wading further into the daunting list of measurement options. Excluding short versions of previously published scales, Rice, Richardson, and Ray (2016) recently counted 19 measures of perfectionism presented in peer-reviewed journals.

Despite the large number of perfectionism scales available, chances are good that results on the basis of two or more scales can be reduced to two higher-order dimensions: perfectionistic striving (e.g., high standards for performance) and perfectionistic concerns (e.g., worry about making mistakes, negative self-evaluation about reaching one’s standards; Dickie, Surgenor, Wilson, & McDowall, 2012; Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000; Fairburn, Cooper, & Shafran, 2003; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993; Rice, Richardson, & Tueller, 2014; Stoeber & Damian, 2014). The perfectionistic concerns dimension is often comprised of subscales measuring excessive, self-critical concerns about performance. Perfectionistic concerns seem regularly linked to psychological difficulties but perfectionistic strivings (e.g., personal expectations for attaining high performance standards) is at best inconsistently associated with pathological outcomes (e.g., Aldea & Rice, 2006; Dunkley et al., 2000; Stoeber & Otto, 2006).

Furthermore, perfectionistic concerns may be less problematic among some subgroups compared with others. Fong and Yuen (2014) noted that the “Chinese view of perfectionism” allows for failures to be “simply regarded as temporary obstacles that need to be overcome by extra study and persistence” (pp. 82–83). Consequently, self-criticism could be considered important for positive self-growth within some cultures. As Zane and Song (2007) explained, “Research in Japan and other East Asian societies

indicates that . . . the basic underlying motivation is to be self-critical and to make continual efforts to improve oneself and to reduce one's shortcomings" (p. 295; see also Chang & Chang, 2009; C. M. Lo, Helwig, Chen, Ohashi, & Cheng, 2011). Consistent with this perspective, Rice, Richardson, and Clark (2012) found that self-critical perfectionism was a weaker predictor of depression for more "easternized" Asian Chinese students than for "westernized" Asian Indians.

The most frequently used measures of perfectionism in studies of gifted and talented individuals provide subscales that align with perfectionistic strivings or concerns, though the correlation between the two dimensions varies considerably across these scales. The range of correlations between the two major dimensions of perfectionism, or individual subscales serving as proxies for those dimensions, has been extremely wide: $r_s = .00$ to $.70$ (Stoeber & Otto, 2006). In some measurements, researchers may find nearly orthogonal dimensions of perfectionistic strivings and concerns (e.g., Almost Perfect Scale-Revised [APS-R]; Slaney, Rice, Mobley, Trippi, & Ashby, 2001) and other selections will produce less distinguishable dimensions (e.g., Multidimensional Perfectionism Scale [MPS]; Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991). Although differentiating perfectionistic strivings from concerns is easier with some measurement choices than others, one reason for doing so is that several models of perfectionism emphasize standards or standard-setting as a core element of perfectionism (A. Lo & Abbott, 2013; Stoeber & Otto, 2006). High personal standards also appear to be something many individuals are reluctant to relinquish. Indeed, Stoeber and Hotham (2013) found that the perfectionistic qualities some clinicians might regard as maladaptive are experienced by others as socially desirable. Clinically-distressed perfectionists more commonly choose to retain their standards, regardless of their positive (success) or negative (failure) consequences (Egan, Dick, & Allen, 2012). One key consideration is whether perfectionistic striving to achieve high performance standards is reasonable and motivating or unreasonable and debilitating (Silverman & Golon, 2008).

There may be different implications for various combinations of strivings and concerns. Our position, similar to Stoeber's (2012), is that the current status of research evidence supports perfectionism as multidimensional, organized under two higher-order dimensions of striving and concerns, and that different combinations of those dimensions can be adaptive, maladaptive, or inconsequential with respect to relevant criterion indicators. High levels of perfectionistic striving (high personal standards) combined with high levels of perfectionistic concerns (worries about mistakes, self-criticism) is likely problematic to the point of hampering motivation and self-growth whereas high perfectionistic striving combined with low levels of concerns could be an adaptive combination for motivated self-growth and resilience. These latter points regarding some potential value of perfectionism and the possibility that effects of perfectionism could vary by subgroup seem particularly relevant to highly talented and gifted individuals.

RELEVANT THEORY AND PRINCIPLES

Classification of Gifted Perfectionists

Parker (1997) cluster analyzed data from Frost et al.'s (1990) MPS and identified three distinct subgroups in his larger sample of over 800 academically talented sixth graders. *Healthy* perfectionists had a "moderately high level of personal standards, which is probably indicative of focused and realistic standards" (p. 555). Compared with the other clusters, *dysfunctional* perfectionists scored the highest on all perfectionism indicators (except for preferences for organization). Dysfunctional perfectionists also produced the most classification errors, suggesting a less clear separation of this cluster from others, or greater within-cluster variation than might be present with other clusters.

Perhaps the classification errors detected by Parker are responsible for some subsequent variations in cluster analytic studies of perfectionism. For instance, Portešová and Urbánek (2013) found variations in their cluster solutions for three cohorts of mathematically gifted adolescents in the Czech Republic. Dixon, Lapsley, and Hanchon's (2004) study of students attending an academy for science,

mathematics, and humanities identified four clusters as *non-perfectionists*, *mixed-adaptive* (healthy or functional), *mixed-maladaptive* (unhealthy or dysfunctional), and *pervasive*. Their mixed-adaptive cluster (e.g., with high standards and moderate concerns about making mistakes) had the highest levels of academic competence compared with the other clusters. The pervasive and mixed-maladaptive groups were the most depressed, compulsive, and interpersonally sensitive compared with the other clusters.

Some level of inconsistency in cluster analytic studies is not unique (e.g., Boone, Claes, & Luyten, 2014; Rice, Ashby, & Gilman, 2011; Sironic & Reeve, 2012; Wang, 2012), or unexpected. Among other limitations, Ruscio, Haslam, and Ruscio (2006) noted that stopping rules for identifying clusters are “highly fallible, and cluster analyses often overidentify clusters” (p. 48). To address some of the limitations of cluster analysis, recent studies of perfectionism have implemented model-based latent class and mixture modeling approaches (for introductions, see Berlin, Williams, & Parra, 2014; Hallquist & Wright, 2014; for different modeling choices see Masyn, Henderson, & Greenbaum, 2010). To our knowledge, these methods have not been implemented in studies of perfectionism and the gifted.

The Intercept Question: Comparing the Gifted and Nongifted on Perfectionism

The question of group differences between gifted and nongifted samples can be addressed by comparing average scores on perfectionism measures and frequency distribution of perfectionists and nonperfectionists between the samples. Analyses associated with each of these comparisons are predicated on the existence of measurement invariance between the groups, though we hasten to add that this preliminary necessity has not regularly been addressed in studies of perfectionism and the gifted (see Chan, 2010, for an exception).

Parker and Mills (1996) used scores on Frost et al.’s (1990) MPS to compare academically talented ($N = 600$) sixth graders with a group of nongifted students ($N = 418$). No differences between the groups were found on average scores for personal

standards (strivings) or concerns about making mistakes (perfectionistic concerns). In classification analyses, at most, there was a trend effect ($p = .053$) when examining the distribution of perfectionist and nonperfectionist clusters by academic group. Contrary to expectations, within the academic groups, more nongifted students were likely to be healthy perfectionists (48.6%) than students in the gifted group (43.2%). The proportions of dysfunctional perfectionists were nearly identical in the two academic groups (26.3% and 27.8%, respectively).

Kornblum and Ainley (2005) compared 367 gifted and 245 nongifted youth in a cross-sectional study of students in sixth, eighth, and eleventh grades. They found that, overall, the gifted students had higher levels of perfectionistic strivings (standards) but were no different from the nongifted students on the measure of perfectionistic concerns; Wimberley and Stasio (2013) reported similar effects comparing honors and nonhonors college students. However, a significant interaction effect qualified Kornblum and Ainley’s results. In sixth grade, nongifted students had significantly higher perfectionistic concerns than gifted students, but in eighth and eleventh grades, those effects were reversed with the gifted students reporting higher levels of concerns. This latter effect might be consistent with Yoo and Moon’s (2006) finding that parents seeking counseling services at a counseling center for gifted students and families were more likely to identify perfectionism and pressure to meet expectations as problems for older than younger children, as with Shaunessy, Suldo, and Friedrich’s (2011) finding of higher levels of self-critical perfectionism among advanced high school students at upper grade levels compared with students at lower grade levels. Kornblum and Ainley used all three grades to create perfectionism clusters and concluded that gifted students were more likely to be perfectionists than were the nongifted students, and the gifted students were equally likely to be either healthy or dysfunctional perfectionists.

Using the APS-R, LoCicero and Ashby (2000) reported that gifted middle school students had significantly higher standards (strivings) and lower self-critical perfectionism (concerns) compared with nongifted students. Chan (2010) found similar

effects in his study of 320 gifted students and 887 nongifted children. Chan also found that the largest proportion (53%) of the gifted sample was classified as healthy perfectionists (compared with 20% in the nongifted group), whereas the largest proportion (52%) of the nongifted group was comprised of nonperfectionists (compared with 26% in the gifted group). The proportion of unhealthy perfectionists in the gifted and nongifted groups were 21% and 28%, respectively. Shaunessy et al. (2011) found that high school international baccalaureate students had higher standards (strivings) and low self-critical perfectionism (concerns) than general education students.

Several researchers have compared gifted with nongifted samples on Hewitt et al.'s (1991) MPS. Roberts and Lovett (1994) studied a small sample of 60 early adolescents categorized as gifted, academic achievers (honor roll students), and nongifted ($N = 20$ in each group), and they found gifted students to have higher levels of self-oriented perfectionism compared with their nongifted peers. Although there were no group differences on socially prescribed perfectionism (perceiving that others expect perfection), the gifted students reported generally stronger reactions to failure than the other groups and also showed greater physiological response to a stressful failure task induced during the study. Unfortunately, Roberts and Lovett did not examine group by perfectionism interactions in stress reactivity. Stornelli, Flett, and Hewitt (2009) studied sixth and seventh graders differentiated into gifted ($N = 86$), general ($N = 162$), and fine arts ($N = 33$) programs. They found no overall average differences between the three groups on self-oriented perfectionism (strivings) or socially prescribed perfectionism (concerns).

Although there were some deviations, most of the researchers found higher levels of perfectionistic striving among gifted compared with nongifted samples, but perfectionistic concerns were generally lower or comparable in those comparisons. Classification analyses found some gifted students more likely to be categorized as healthy or adaptive perfectionists than other categories, though similar distributions were often observed among nongifted samples as well. Perhaps the most

consistent finding is that the gifted samples were unlikely to report more problematic aspects of perfectionism compared with other groups. These results seem clearly different from other bold conclusions regarding giftedness and perfectionism. For example, Blaas (2014) wrote that, "Gifted students are *known to be* sensitive, *perfectionists*, and experience social isolation, which are *all considered risk factors for poor social-emotional difficulties and underachievement* [emphasis added]" (p. 245). Instead, the research seems more consistent with Pfeiffer's (2013) comment that, "there is little conclusive research supporting [the] position . . . that many gifted suffer from negative or neurotic perfectionism" (p. 168).

The Slope Question: Correlates and Consequences of Perfectionism

Several of the previously reviewed studies also addressed links between perfectionism and various outcomes. In the following paragraphs, we present a narrative of convergence regarding different adjustment implications of perfectionism for gifted samples, but heterogeneity within and between studies limited our ability to find common ground in some areas.

Parker (1997) identified significant but small differences between the healthy perfectionists, dysfunctional perfectionists, and nonperfectionists on verbal and math achievement scores. He also found that healthy perfectionists "scored the least neurotic, the most extroverted, the most agreeable, and the most conscientious . . . descriptors suggest individuals who are organized, dependable, and socially skilled . . . conscientious, goal and achievement oriented, predictable, well adjusted, and socially at ease" (p. 555). Dysfunctional perfectionists scored the highest on all perfectionism indicators and were substantially higher on neuroticism and lower on agreeableness. Although results varied somewhat by cohort, Portešová and Urbánek (2013) also found that functional perfectionists tended to score higher on conscientiousness, and that dysfunctional perfectionists tended to have lower emotional stability (higher neuroticism).

Dixon et al.'s (2004) study of academically gifted high school students found that their mixed-adaptive cluster (e.g., with high standards and

moderate concerns about making mistakes) had the highest levels of academic competence compared with the other clusters less differentiated on that indicator. They added that, compared with mixed-adaptive and nonperfectionists, their pervasive and mixed-maladaptive clusters had generally worse mental health profiles operationalized by more dysfunctional coping, more depression, and lower scores on general adjustment scales. Shaunessy et al. (2011) reported that self-critical perfectionism (concerns) was linked to greater anxiety and lower grade point averages (GPAs), but standards (strivings) was unrelated to anxiety and positively associated with GPA. In a study of gifted adolescents, Wang, Fu, and Rice (2012) reported that perfectionistic strivings were associated with academic efficacy, GPA, and life satisfaction, and perfectionistic concerns were inversely linked with those outcomes. Rice, Leever, Christopher, and Porter (2006) studied college honors students and found moderate to large within- and across-time associations between perfectionistic concerns and several emotional (perceived stress, depression, hopelessness), interpersonal (social connectedness), and academic (academic integration) outcomes. Negligible links were found between strivings and emotional and social adjustment indicators.

Studies of advanced high school students (Speirs Neumeister, & Finch, 2006), gifted adolescents (Wang et al., 2012), and elite athletes (Gucciardi, Mahoney, Jalleh, Donovan, & Parkes, 2012; Immundsen, Roberts, Lemyre, & Miller, 2005) using different perfectionism measures have reported somewhat similar effects regarding achievement goal orientations. Findings indicated that perfectionistic strivings were positively associated with mastery approach goal orientations (need for achievement, strive for competence) and performance approach goals (demonstrate competence relative to others). Perfectionistic concerns were positively associated with performance approach and avoidance (avoid appearing incompetent) goal orientations. For athletes, Gucciardi et al. (2012) also found mastery avoidance goals were associated with perfectionistic concerns, whereas Immundsen et al. (2005) found stronger associations between perfectionism dimensions and performance

orientations (ego goals) than mastery orientations (task goals).

An interesting thread in the literature on athletes concerns the motivational climate or situational context within which athletes practice and perform. There are generally two kinds of motivational climates as perceived by athletes: a mastery climate, with emphasis on learning or mastering skills, and a performance climate, with emphasis on social comparison. Perceptions can be directed to teachers, coaches, or parents. Harwood, Keegan, Smith, and Raine (2015) recently reviewed studies of intrapersonal correlates of motivational climate, including studies that focused on perfectionism. One of the major themes tapped by indicators of mastery climate was “mistakes are part of learning,” and a major theme of performance climate was “punishment/fear of mistakes” (p. 10). In their quantitative review, eight of the effects revealed a nonsignificant association between perfectionistic concerns and mastery climate, but a significant moderate to strong association emerged with performance climate ($\rho = 0.49$, 95% CI: 0.39 to 0.58).

Other recent research clarifies potential directions of effects between perfectionism and motivational climate. Nordin-Bates, Hill, Cumming, Aujla, and Redding (2014) conducted a longitudinal study of adolescent dancers who were part of a national talent development program. They found that higher levels of perfectionistic concerns were likely to predict subsequent emphasis on performance climate. In contrast, earlier emphasis on mastery was likely to predict subsequent perfectionistic strivings but had no effect on concerns. Similarly, Rasquinha, Dunn, and Causgrove Dunn (2014) found that pursuing higher levels of competitive sport were more likely for athletes with higher perfectionistic strivings than among those with higher levels of perfectionistic concerns.

To our knowledge, similar research on motivational climate on the basis of student perceptions of teachers and parents has not been undertaken in studies of intellectual giftedness and perfectionism. Fletcher and Speirs Neumeister (2012) noted that perfectionistic concerns are likely associated with extrinsic motivation and related detrimental effects on school engagement, whereas strivings

have generally been associated with intrinsic motivation and more positive or adaptive motivational profiles. They suggested that, because of tendencies for maladaptive perfectionists to focus less on mastery and more on social comparison with others, gifted students may be at risk for stress and anxiety as they find themselves in performance contexts with increasingly more gifted students over time. The odds of successfully navigating such contexts in ways that promote learning and academic as well as personal well-being are likely to be improved if students can embrace more adaptive and fewer maladaptive perfectionistic tendencies, and key players (parents and teachers) in those environments can emphasize mastery and receptivity to learning from mistakes over performance and institutionalized fear of failure.

Chan (2009, 2012) shed additional light on resources and deficits that adaptive and maladaptive perfectionists may have. He reported that self-critical perfectionism (concerns) was moderately associated with a “fixed mindset” approach to problems (resistant, change-avoidant) and not significantly related to a growth mindset (open to new ideas and learning, change-receptive), whereas a nearly opposite pattern emerged for perfectionistic standards (strivings) (i.e., moderately related to growth mindset, but minimally linked to fixed mindset). In classification analyses, although unhealthy perfectionists remained higher than other groups in terms of adopting a fixed mindset, there were no differences between healthy and unhealthy perfectionists on growth mindset. Similar findings were reported by Dixon et al. (2004) and in another recent study of gifted adolescents. Mofield and Peters (2015) found that unhealthy perfectionists displayed higher levels of avoidant coping than functional perfectionists, but functional perfectionism was not differentiated by approach-oriented coping. In general, it may be the case that, among the gifted, maladaptive perfectionists have clearly problematic or dysfunctional coping tendencies but adaptive perfectionists are not necessarily superior to other groups in their coping strategies. What may be different involves the perceptions and reactions gifted and talented individuals have when confronted with challenging performance demands.

Stress-Generating and Stress-Enhancing Effects of Perfectionism

In a series of studies, Shaunnessy, Suldo, and colleagues (Shaunnessy et al., 2011; Shaunnessy, Suldo, Hardesty, & Shaffer, 2006; Suldo, Shaunnessy, & Hardesty, 2008; Suldo, Shaunnessy, Thalji, Michalowski, & Shaffer, 2009) found that advanced high school students were likely to report higher stress than general education students, but were not necessarily likely to show higher levels of stress-related adverse outcomes. It is possible that this is because gifted individuals may be generally adept at managing tension owing to aspects of marginality, risk taking, and related creative processes that help promote innovation and advancement (Olszewski-Kubilius, 2008). Indeed, despite higher stress levels, Suldo and Shaunnessy-Dedrick (2013) found “quite positive psychosocial adjustment” in their sample of advanced students and concluded that the “students have unique resources that allow them to experience academic stress without manifesting compromised emotional functioning . . . positive features of the accelerated curricula serve to facilitate wellness and offset the potential negative impact of stress” (p. 212). Suldo and Shaunnessy-Dedrick also found that stress levels were more likely to increase for advanced students pursuing accelerated curricula (such as international baccalaureate) than for general education students during the transition to high school. Peterson, Duncan, and Canady (2009) found that stress levels were likely to increase for gifted students over a much wider time span. These and other studies suggest that factors in addition to, or perhaps in interaction with, giftedness can play important roles in whether and when stress is experienced and the degree to which stress produces problems.

Strong emotional and physiological reactions to failure among gifted students reported by Roberts and Lovett (1994) might also emerge in reaction to performance that, by other standards, could be deemed “excellent.” This kind of double-bind for most maladaptive perfectionists (Rice, Bair, Castro, Cohen, & Hood, 2003) suggests that they may be candidates for chronic stress resulting from particular ways in which challenges (always stressful) and responses (never adequate) to them are

perceived. In this section, we describe a model of the stress-generating and stress-enhancing (or buffering) effects of perfectionism on the gifted. Foundational aspects of the model were initially advanced by others (i.e., Bolger & Zuckerman, 1995; Flett & Hewitt, 2002; Lazarus & Folkman, 1984) and applied in recent work on college students majoring in science, technology, engineering, and math fields (Rice, Ray, Davis, DeBlaere, & Ashby, 2015).

Stress. Stressors can be understood as challenges to homeostatic or allostatic balance (Sapolsky, 2004). Acute challenges for a gifted student could be an unscheduled performance demand (e.g., pop quiz) or a negative comment from a peer or teacher. Chronic challenges could be experienced by self-defeating rumination over mistakes and perceived inadequacies. Chronic challenges could also involve experiencing persistently intense performance demands. There are important components that must be in place to determine whether such experiences are stressful. According to the Transactional Model of Stress (Lazarus & Folkman, 1984), an experience must be *appraised* as meaningfully threatening or challenging given an individual's goals and motivation (primary appraisal), and an evaluation as to whether existing internal or external coping resources are sufficient to psychologically manage the experience (secondary appraisal). *Perceived* stress is fundamental to this model, as are characteristics of the person (e.g., strivings and concerns) that are tied to stress appraisals (Chida & Hamer, 2008).

Stress generation and stress enhancement. Bolger and Zuckerman (1995) described how personality characteristics can increase the likelihood of exposure to stressors (differential exposure model), can affect reactivity to stressors (differential reactivity model), or both (differential exposure/reactivity model). There are two potentially complementary hypotheses regarding how perfectionism may influence stress and the link between stress and outcomes. The stress-generation hypothesis positions perfectionism as a precursor to stress (Flett & Hewitt, 2002). This hypothesis predicts that perfectionists create their own stress, possibly by putting themselves in high-pressure situations and

negatively evaluating their performance in such situations.

In the stress-enhancement hypothesis, perfectionism worsens or moderates the effects of stress. To moderate the effects of stress, perfectionism should precede the experience or appraisal of stress, which is consistent with the MacArthur approach (Chmura Kraemer, Kiernan, Essex, & Kupfer, 2008). Therefore, methodologically, perfectionism should be measured before the onset of a presumed stressor and before the measurement of some subsequent outcome.

Although it is easiest to see maladaptive perfectionism operating in the stress-generation and stress-enhancement hypotheses, there are extensions to adaptive perfectionism. Gifted perfectionists may find themselves in challenging situations, but if the adaptive label is accurate, the perceived (appraised) threat levels experienced by adaptive perfectionists would not likely be as high, or the adequacy of coping resources as low, as they are for maladaptive perfectionists. Likewise, adaptive perfectionism might provide a dampening effect of stress on some outcome, buffering rather than exacerbating stress in the stress-enhancement hypothesis.

To our knowledge, studies examining the stress-generating or stress-enhancing aspects of perfectionism with gifted samples have not yet been undertaken. With careful designs, such studies have the potential to reveal important patterns of risk and resilience among the gifted.

FUTURE CONSIDERATIONS AND DIRECTIONS

Research on perfectionism and giftedness represents considerable heterogeneity in terms of areas of giftedness or talent, age groups, measurements, research design, and implications. Two studies pursuing seemingly similar goals may produce different findings on the basis of variations in how perfectionism or giftedness are conceptualized or operationalized. Therefore, major challenges involve conceptual and methodological variations that make it difficult to accurately gauge what can be reliably concluded about perfectionism and giftedness.

Measurement Invariance

Whether differences exist between gifted and nongifted groups or between subgroups within the gifted population (e.g., gender or age-group comparisons), differences should be predicated on confirming that scale items are measuring the same construct for the different groups and differences must not have resulted from systematic response biases (Chen, 2008; Meredith, 1993). Measurement invariance was thoroughly evaluated and supported in a large, cross-national study of the Gifted Rating Scales (Li et al., 2009; Pfeiffer & Jarosewich, 2003). However, to our knowledge, evaluation of measurement invariance for perfectionism scales used in studies comparing gifted and nongifted samples has been undertaken in only one study using the APS-R (Chan, 2010), and that study evaluated metric invariance and covariance structure but not scalar invariance required for tests of factor mean differences. Therefore, we must add cautionary notes that measurement artifacts have not yet been ruled-out as alternative explanations in many of the findings we summarized in this chapter, but should be addressed as a matter of course in future work.

Another related reason for caution regarding group or longitudinal inferences from studies of perfectionism and giftedness is that little of the research has been directly replicated. There seems to be current resurgence in the literature encouraging replication (e.g., Ioannidis, 2012; Lishner, 2015; Makel, 2014; Simons, Holcombe, & Spellman, 2014). Indeed, although replication is not a novel idea in the area of giftedness research, we could locate only one study specifically designed to replicate another study of perfectionism and giftedness. Sondergeld et al. (2007) were able to only partially replicate Siegle and Schuler's (2000) earlier study. Both studies used the same modified version of Frost et al.'s (1990) MPS to measure perfectionism but some measurement structure results, as well as more substantive group comparisons and interaction effects involving gender and grade, were not replicated.

Classification

Latent class (or profile) analysis and factor mixture modeling offer several improvements over cluster

analysis, such as the flexibility to model (and test) various constraints within and between any emergent latent classes (Muthén, 2008). Among other features, these advances provide statistical tests to determine whether score patterns or subgroup distributions exist that can be reliably explained by latent classes. Mixture models allow for the empirical coexistence of dimensional factors and classification into groups (Masyn et al., 2010; Rice & Richardson, 2014; Rice et al., 2014). Whether perfectionist (or gifted) classes are naturally stable or fluctuating over time could be rigorously examined with latent transition analyses. Different change trajectories in perfectionism (or outcome indicators) for gifted and nongifted samples over time could be examined with growth mixture models. These sophisticated statistical approaches may resolve some prior inconsistencies and produce a more nuanced perspective on the intersections of perfectionism and giftedness.

Measurement Diversity

An improvement in future research on gifted and talented youth will be less reliance on self-report and more consideration of methodological alternatives, such as informant reports (e.g., teacher, coach, or other observers; Connelly & Ones, 2010; Li et al., 2009) or implicit measures to gauge perfectionism (De Cuyper, Pieters, Claes, Vandromme, & Hermans, 2013). Using stress as an example, perceived stress on the basis of self-report is a reasonable approach to measuring stress appraisal over the past month but alternative methodological approaches exist to study other aspects of stress reactivity that appear to have been only minimally examined in the literature on giftedness; using literature search terms of *gifted*, *stress*, and *physiological* (and other variants) produced at most five papers and only two small sample empirical papers (Roberts & Lovett, 1994; Wooding & Bingham, 1988). Little seems known about perceived stress and physiological stress reactivity among the gifted, and virtually nothing is known about how perfectionism might reduce or exacerbate stress for the gifted. These limitations could be remedied through studies that examine the immediate or daily stress reactions of gifted students by measuring hormones

associated with stress reactivity (Dickerson & Kemeny, 2004), noting cardiovascular indicators of stress reactivity (Thayer, Yamamoto, & Brosschot, 2010), or using daily diary approaches (Mehl & Conner, 2012).

SUMMARY AND CONCLUSIONS

A number of studies have examined perfectionism with gifted samples. Despite some variations in methods and findings across studies, there seems to be sufficient accumulated evidence that most gifted students could either be considered high functioning adaptive perfectionists striving to perform well or nonperfectionists for whom high standards of performance are less characteristically relevant. There also seems to be compelling evidence that a subgroup within the gifted could be classified as maladaptive perfectionists. Those individuals possess problematic tendencies to strive to reach high performance expectations while harshly self-criticizing their adequacy in meeting expectations. Those criticisms are likely to be automatic, demotivating, far too intimately tied to self-worth, and possibly echoed by others in the larger performance contexts within which the gifted are pursuing their goals. Cultural contexts might soften, or further exacerbate such effects, but the converging findings seem to be that high levels of perfectionistic strivings plus perfectionistic concerns equal something less healthy or desired than high strivings produce when perfectionistic concerns are low. A challenge on the intervention front will be determining the best ways to reduce the perfectionistic concerns side of the equation while retaining the positive aspects of perfectionistic strivings.

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