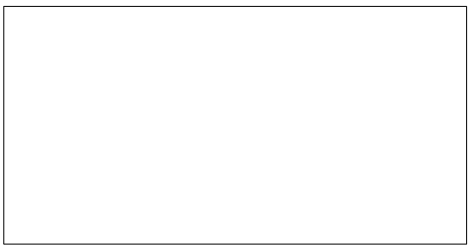

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Perfectionism and Academically Gifted Students:

A Systematic Review

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Abstract

Perfectionism has long been recognised as a psychological factor that can enhance or interfere with the healthy adjustment of young students who are academically gifted. However, it is apparent from existing research that a wide range of methods have been adopted to study perfectionism in this population. To identify what is currently known about perfectionism among these students and what future work needs to be undertaken, a systematic review of existing research is required. The aim of our study was to provide a first such review. In doing so, we utilised the two-factor perfectionism model which differentiates between perfectionistic strivings (PS) and perfectionistic concerns (PC). A systematic literature search returned 36 studies examining perfectionism in young students identified as academically gifted that varied in study characteristics, methodological quality, and findings. Of these studies, 24 adopted a variable-based approach to examining perfectionism (i.e., examined PS and PC) and 12 adopted a group-based approach to examining perfectionism (i.e., examined groups with varying levels of PS and PC). The findings show that the distinction between PS and PC is extremely important. Specifically, while PC are likely to be uniformly debilitating for students who are academically gifted, PS are associated with more mixed outcomes. This is also the case when the two dimensions of perfectionism are considered in combination, with levels of PC being the key factor in determining the outcomes associated with perfectionism. Future research needs to build on the existing evidence base in a systematic fashion and prioritise longitudinal research and intervention studies.

Keywords: perfectionistic strivings, perfectionistic concerns, gifted, education

Introduction

In schools across the world there are exceptional students who show great academic performance in educational domains such as science, mathematics, and humanities. These students are often identified as being more able, advanced, or even exceptionally gifted learners (Leyden, 2013). The level of progress and attainment demonstrated by such students often sets them apart from peers of the same age, opportunity, and educational background (Pfeiffer, 2015). From this perspective, students identified as gifted are those who typically demonstrate an accelerated rate of development or potential to achieve exceptional accomplishments in the field of academic study (Leyden, 2013). Specifically, in line with the National Association for Gifted Children, students identified as gifted are those who demonstrate exceptional aptitude (i.e., ability to reason and learn) or competence (i.e., educational achievement in the top ten percent or above) in one or more domain (Siegle & McCoach, 2010).

Research in educational psychology often focuses on studying the personal characteristics and psychological experiences of students identified as academically gifted (Neihart & See Yeo, 2018). This research has helped to identify developmental experiences and personality characteristics that, although not exclusively observed in students identified as academically gifted, are commonly associated with this population. In relation to developmental experiences, this includes an asynchronous relationship with the school environment, interpersonal difficulties associated with accessing peers with similar interests, and personal conflicts between the need to belong and the need to achieve (Neihart & See Yeo, 2018). In terms of personality characteristics, one trait that is often observed in students identified as academically gifted and has long been a topic of discussion in the gifted literature is perfectionism (Rice & Ray, 2018). Aligned with this previous research, our review focusses on perfectionism in students identified as academically gifted. Specifically,

we aim to review existing research to gain a better understanding of the correlates and consequences of perfectionism among young students identified as academically gifted.

Perfectionism

Perfectionism is a multidimensional personality trait characterised by excessively high standards and overly critical self-evaluation (Frost et al., 1990). There are several models and measures that capture different aspects and dimensions of perfectionism (e.g., Frost et al., 1990; Hewitt & Flett, 1991). To integrate different models and measures, perfectionism dimensions can be constituted into a two-factor higher-order model (Stoeber & Otto, 2006). The first dimension–perfectionistic strivings (PS)–subsumes "aspects of perfectionism associated with self-oriented striving for perfection and the setting of very high personal performance standards" (Gotwals et al., 2012, p. 264). By contrast, the second dimension–perfectionistic concerns (PC)–subsumes "aspects associated with concerns of making mistakes, fear of negative social evaluation, feelings of discrepancy between one's expectations and performance, and negative reactions to imperfection" (Gotwals et al., 2012, p. 264). This approach is particularly useful when trying to understand and summarise research that has adopted different models and measures of perfectionism.

The two higher-order perfectionism dimensions can be studied by focussing on each of the two dimensions separately by using a variable-based approach or by focussing on different combinations of the two dimensions using a group-based approach. There are two main perfectionism models that consider various combinations or groupings of perfectionism. The tripartite model of perfectionism focusses on three groups of perfectionists (Parker, 1997): healthy perfectionists (high PS with low PC), unhealthy perfectionists (high PS with high PC), and non-perfectionists (low PS with low PC). By contrast, the 2 × 2 model of perfectionism focusses on four combinations of perfectionism dimensions (Gaudreau & Thompson, 2010): non-perfectionism (low PS with low PC), pure personal standards (high

PS with low PC), pure evaluative concerns (low PS with high PC), and mixed perfectionism (high PS with high PC). Both models offer a way of comparing the consequences of different groups or combinations of dimensions of perfectionism. They simply differ in relation to the number of groups or combinations they consider important.

Studies examining perfectionism can typically be categorised as adopting either a variable-based or a group-based approach. The identification and evaluation of perfectionism research based on this classification can help to provide a clearer understanding of how the two broad dimensions of perfectionism operate separately and in tandem. For example, Stoeber and Otto (2006) reviewed perfectionism research adopting variable-based and group-based approaches to the study of perfectionism. The first key finding of their review was the importance of distinguishing between PS and PC. This is because while PC showed consistent positive relationships with a range of maladaptive outcomes such as self-blame, anxiety, and suicide ideation, PS showed positive relationships with both adaptive (e.g., satisfaction with life, conscientiousness, and adaptive coping styles) and maladaptive outcomes (e.g., depression, self-blame, and perceived criticism). The second key finding pertained to the group-based studies and the finding that the presence of higher PC typically coincided with the occurrence of more pronounced difficulties relating to intimacy, procrastination, and self-esteem problems.

Perfectionism and Education

Perfectionism is highly relevant to the domain of education. This is evident in research pertaining to both the prevalence and implications of perfectionism for students. Recently, for example, researchers have found evidence that perfectionism in students across North America and the UK is increasing and has been for nearly three decades (Curran & Hill, 2019). This is against a backdrop of important consequences for students. In this regard, and in line with research in other domains, research in education provides evidence regarding

the divergent relationships of PS and PC. That is, in students, PC typically show positive relationships with academic outcomes known to hinder successful learning (e.g., academic burnout, test anxiety, and procrastination), while PS typically show positive relationships with academic outcomes known to promote successful learning (e.g., academic adjustment, academic satisfaction, and academic self-efficacy; Osenk et al., 2020).

One area of research that has received considerable attention in the educational domain is the relationship between perfectionism and academic achievement (Stoeber, 2012). In this regard, early theoretical accounts suggested a complex relationship between perfectionism and performance. While some theorists conceptualised perfectionism as factor likely to impair performance (e.g., Pacht, 1984), others argued that under certain circumstances perfectionism may facilitate performance (e.g., Burns, 1980). To help provide some clarity, researchers have attempted to summarise available evidence on this relationship in education (e.g., Stoeber, 2012). The most comprehensive summary of this research is provided by Madigan (2019) who meta-analysed the findings from 37 studies (N = 8,901) examining perfectionism and academic achievement. Madigan (2019) found that PS showed a small-to-medium positive relationship with academic achievement, whereas PC showed a small negative relationship with academic achievement. This evidence is a clear signal of the relevance of perfectionism in an education context.

Perfectionism in Students Identified as Academically Gifted

The study of perfectionism in students identified as academically gifted is important for several reasons. First, the notion that perfectionism is a feature of such students pervades the gifted literature. This is evident in case study research (e.g., Schuler, 2000), handbook guides (e.g., Rice & Ray, 2018), and organisation guidelines (e.g., National Society for the Gifted and Talented; see Rice & Taber, 2018). Second, students identified as both academically gifted and highly perfectionistic have reported problematic achievement related

attitudes and negative emotional reactions to perceived imperfection in their academic studies (Speirs Neumeister et al., 2009). Third, many students who are gifted have accumulated a history of academic success. However, for some, this sustained success may have stifled opportunities to experience failure and disappointment (Speirs Neumeister, 2004). In this way, perfectionism has been suggested to explain the differences between those students who are more resilient and those who are not (Flett & Hewitt, 2014). In all, then, the study of perfectionism offers a great deal of insight into the unique experiences of students identified as academically gifted.

While perfectionism is often associated with students identified as academically gifted, the empirical evidence linking perfectionism with academic giftedness is more ambiguous. For example, while some authors have found evidence for a higher incidence of perfectionism among gifted versus non-gifted students, others have not (Rice & Ray, 2018). To help make sense of this issue, Stricker et al. (2020) conducted a meta-analytical review of ten studies (N = 4,340) examining the incidence of perfectionism in students identified as gifted versus students identified as non-gifted. In line with the conclusions drawn from other appraisals of this literature (e.g., Rice & Ray, 2018), Stricker et al. (2020) found that students who were identified as gifted showed equal levels of PC in comparison to students who were identified as non-gifted. However, Stricker et al. (2020) did find that students identified as gifted showed elevated levels of PS. These findings provide credence to the notion that setting and striving for unrealistically high standards is a distinguishing feature of students who are academically gifted.

In addition to examining levels of perfectionism in students identified as academically gifted, researchers have also focussed on several other important issues pertaining to perfectionism in this population. This includes research conducted to better understand the developmental origins (e.g., parental goals; Ablard & Parker, 1997) and likely consequences

of perfectionism (e.g., depression; Reyes et al., 2015) in students identified as academically gifted. However, it is apparent from existing research that a wide range of different methods have been adopted to study perfectionism when doing so. For instance, how perfectionism has been measured, how giftedness has been operationalised, the types of research designs employed, and the outcomes examined vary considerably. Beyond the notion that PS are higher among students identified as academically gifted, then, the current state of research means it is difficult to build a coherent understanding of the correlates and consequences of perfectionism in this population. To identify what is currently known about perfectionism in students identified as academically gifted and what future work needs to be undertaken, a systematic review of existing research is required.

The Present Study

The aim of the study was to provide the first systematic review of research on perfectionism in students identified as academically gifted. We hope that in describing, evaluating, and summarising all available empirical research in this area, we can provide greater insight into the importance of perfectionism in this population and identify the most important areas of future research.

Method

Literature Search and Inclusion Criteria

To locate relevant research, we conducted a computerised search of published work using the databases PsycInfo, PsycARTICLES, Educational Administration Abstracts, and Educational Abstracts (H. W. Wilson). The search terms were perfect* (for perfectionism, perfectionist, and perfectionistic) AND gifted. We limited the search to peer-review academic journals published in English. The span of the search was 1990 (to coincide with the publication of the first multidimensional measure of perfectionism) to 2019. The search was conducted in April 2019. In total, the search produced 159 published articles which were

initially reviewed in full by a co-author and then subsequently checked by the lead author. While there were no disagreements between the coders, some coding discrepancies (i.e., mistakenly coded studies) were identified, discussed, and subsequently resolved.

In terms of the coding process, the overall aim was to identify studies that included an empirical examination of perfectionism in young students identified as academically gifted. The first step in achieving this aim involved each coder reviewing the records for duplicate studies to be removed (n = 10). The next step involved screening abstracts and removing studies that were unrelated to the study of perfectionism in gifted student populations (n = 36). The remaining full-text articles were then further assessed for eligibility. Specifically, studies that did not include an empirical examination of perfectionism in students identified as gifted within an educational context were removed (n = 60). For example, opinion articles, review papers, and editor's notes were all removed at this stage. The last step involved removing articles that focussed on perfectionism in students who were identified as academically gifted but were over 18 years of age (e.g., university students; n = 11), articles that employed a qualitative research design (n = 3), and articles that included perfectionism but no criterion variables or group comparisons (n = 3). In total, 36 eligible studies were included in the systematic review. See Fig. 1 for PRISMA flow diagram (Moher et al., 2009).

Data Extraction

The identified studies were reviewed in full. To summarise these studies, the following data were extracted: (a) publication information, (b) participant characteristics, (c) gifted identification method, (d) study design, (e) instrument and subscales used to measure perfectionism, (f) criterion variables examined, and (g) a summary of the main findings. In relation to the results, we provide a brief description of the methods of gifted identification, perfectionism measures used, and research designs adopted across the 36 identified studies. We then provide an evaluation of the methodological quality of the identified studies and

evaluative summary of the main findings across studies employing variable-based and group-based approaches.

In line with previous reviews on perfectionism in education, we categorised perfectionism subscales as indicative of PS or PC (e.g., Madigan, 2019). We adopted an inclusive approach in which the personal standards and organisation subscales of the Multidimensional Perfectionism Scale (F-MPS; Frost et al, 1990), self-oriented perfectionism subscales of the Multidimensional Perfectionism Scale (HF-MPS; Hewitt & Flett, 1991) and Child and Adolescent Perfectionism Scale (CAPS; Flett et al., 2001), high standards and order subscales of the revised Almost Perfect Scale (APS-R; Slaney et al., 2001), and positive perfectionism subscale of the Positive and Negative Perfectionism (PNPS; Chan, 2007) were regarded as indicators of PS. By contrast, we regarded the concern over mistakes, doubts about actions, perceived parental expectations, and perceived parental criticism subscales of the F-MPS, socially prescribed perfectionism subscales of the HF-MPS and CAPS, discrepancy subscale of the APS-R, and negative perfectionism subscale of the PNPS as indicators of PC.

This inclusive approach to the higher-order conceptualisation of perfectionism provided a heuristic that was useful for integrating and summarising the identified research. However, it is important to highlight that while most of the identified indicators are considered core facets of the two higher-order dimensions, some indicators are regarded as peripheral facets. For example, although organisation (F-MPS) and order (APS-R) are aspects of perfectionism closely associated with PS, there is evidence that these dimensions load on a third factor independent of both PS and PC (see Kim et al., 2015; Rice et al., 2005). We include both core and peripheral facets here so to provide a comprehensive account of the available research. In addition, specific facets and measures used in each study are identified with this issue in mind.

Methodological Quality Appraisal

In line with our aim to evaluate the identified studies, we appraised the methodological quality of each study. This is an important process that provides information regarding the methodological adequacy of each study (Petticrew & Roberts, 2008). In line with previous research (e.g., Goodson et al., 2006; Lu et al., 2014; Zhang & Goodson, 2011) we evaluated several methodological characteristics and assigned an overall methodological quality score (MQS) to each study. The characteristics we selected were based on an established methodological quality instrument that was tailored for the current review (see Goodson et al., 2006). Specifically, we focussed on the following methodological characteristics: (1) operational definition of primary variable, (2) construct validity data for measure of primary variable, (3) internal reliability data for measure of primary variable, (4) internal reliability and/or construct validity data for other relevant measures, (5) theoretical framework evident in research, (6) research paradigm adopted, (7) research design adopted, (8) sample size, (9) sample design, (10) data analysis, and (11) inferences of causality (see Table 1 for full details of scoring options). We focussed on perfectionism as our primary variable and gifted students as the participants of interest.

In line with common recommendations (e.g., Higgins & Douglas, 2008), we conducted a pilot testing phase in which the lead author and two co-authors independently evaluated the methodological quality of a random subsample of five studies. The rates of agreement between the lead author and each of the co-authors were on average 96% and 95% per study, respectively. Importantly, all instances of coding discrepancy were revisited and discussed until a consensus was reached and the authors were satisfied that the criteria could be applied consistently. Thereafter, the lead-author used the identified scoring system to evaluate and assign an overall MQS to each study.

Results

The results of the review are organised around the characteristics, methodological quality, and findings of the studies. For study characteristics, we report on the methods of gifted identification, perfectionism measures used, and research designs of the studies. For methodological quality, we report the MQS of the studies and describe what constitutes higher versus lower methodological quality among the review studies. Finally, we report on and evaluate the main findings from the studies employing both variable-based and group-based approaches to the study perfectionism in students identified as gifted.

Study Characteristics

Gifted Identification. The method employed to identify relevant students across the 36 studies included in the review varied considerably. Here, we used the system identified by Carman (2013) to classify the different methods of gifted identification. This process identified that eight studies categorised giftedness based on school recommendation, five studies used achievement test scores, and two studies used achievement test scores in combination with previous academic achievement. The remaining 21 studies all recruited students from advanced programs or schools. The specific requirements for entry on to such programs or enrolment into such schools varied between studies. Ten studies reported that entry was based on multiple sources of gifted identification (e.g., interview, intelligence measure, and school recommendation), four studies reported that entry was based on achievement test scores, one study reported that entry was based on school recommendation, and one study reported that entry was based on previous academic achievement. Five studies did not report any identification method for entry or enrolment.

Some differences in gifted classification reflected the country in which the study took place. Studies in the USA typically recruited students enrolled in advanced programs and schools (14 out of 22 studies), whereas studies in China typically recruited students based on school recommendations (6 out of 7 studies). In the studies conducted outside of the USA and

China, which included Czech Republic (*n* = 2), Australia (n = 2), Canada (*n* = 1), and Philippines (*n* = 1), students were recruited from advanced programs or schools. The only cross-national study (Japan and USA) used achievement test scores and academic achievement to classify students as academically gifted.

Measures of Perfectionism. The review includes 17 studies adopting the original F–MPS and five studies adopting the Goals and Work Habits Survey (GWHS; Schuler, 2000) which is a modified version of the F–MPS. One study adopted the original HF–MPS and two studies adopted the CAPS. The review also includes six studies adopting the APS–R and two studies adopting the PNPS. The remaining three studies adopted unidimensional measures of perfectionism. Specifically, the perfectionism subscale of the Student Adjustment Problems Inventory (SAPI; Chan, 2003a) was used by Chan (2003b), the Perfectionism Questionnaire (PQ) was used by White (2007), and an unnamed perfectionism measure was used by Kline & Short (1991). We considered these measures to be indicative of overall perfectionism as opposed to either PS or PC.

Study Designs. Most studies in the review adopted a non-experimental cross-sectional research design and focused on examining relationships (*n* = 33). Two of the studies adopted pre-experimental research designs. The first of which examined math performance in timed versus untimed maths tests using a within-subject randomised cross-over design. This study was relevant in the present review as it also examined whether perfectionism was related to the discrepancy in test scores between the two conditions (Tsui & Mazzocco, 2007). The second study adopting a pre-experimental design examined differences between pre- and post-test emotions following experimentally induced failure on an anagram task. This study was relevant in the current review as it also examined perfectionism differences between gifted and non-gifted learners (Roberts & Lovett, 1994). The remaining study adopted a quasi-experimental research design to examine the efficacy of an affective-

curriculum intervention in reducing levels of PC in students identified as academically gifted (Mofield & Chakraborti-Ghosh, 2010).

Methodological Quality of Studies

The values of overall methodological quality across the identified studies were provided as a percentage of the maximum possible score per study (with higher percentages reflecting studies scoring higher methodological quality; see Table 2 and Table 3). The MQS for each study ranged from 29 to 76%. (*M* = 65%, *SD* = 11%). There were three studies that received the highest MQS of 76%. These studies focussed on perfectionism in relation to academic achievement (Fong & Yuen, 2009), occupational amotivation (Jung, 2013), and emotional intelligence (Chan, 2009). In these cases, the higher MQS was reflected by various methodological characteristics. For example, perfectionism was operationally defined using a validated multidimensional perfectionism scale, good internal reliability scores were provided based on the collected data for all measures, and the sample size included a large number of students identified as academically gifted.[1]

The two lowest scoring studies received an MQS of 29% and 35%. These studies focussed on perfectionism in relation to potential grade level differences (Kline & Short, 1991) and overexcitability (White, 2007). In these cases, the lower MQS was also reflected by various methodological characteristics. For example, perfectionism was operationally defined using a unidimensional perfectionism measure with questionable validity evidence, good internal reliability scores were not reported based on the collected data for all measures, and the sample size included a small number of students identified as academically gifted. In the following sections, we used the MQS of each study to help evaluate the overall state of evidence in each area of research.

[1] For more information on the breakdown of each MQS based on the specific methodological characteristics evaluated, please see the supplemental material (Table S1).

Findings of Studies Employing a Variable-based Approach

In the review 24 studies employed a variable-based approach to the study of perfectionism (see Table 2). To help integrate the findings across these studies, and where possible, we reported findings pertaining to PS and PC. In studies where this was not possible, we referred to perfectionism more broadly when reporting the main findings. In general, studies employing a variable-based approach assessed perfectionism in relation to at least one criterion variable. We considered the identified criterion variables as broadly reflecting domains relating to academic achievement, personality, motivation, emotion and well-being, and interpersonal relationships. However, there were a handful of studies examining variables that could not be classified into these broad domain areas. We identified these studies as focussing on perfectionism differences between specific participant groups.

Academic Achievement. Seven studies (n = 1773 gifted students) examined outcomes that are relevant to academic achievement (Chan, 2003b; Fong & Yuen, 2009; Maksić & Iwasaki, 2009; Stornelli et al., 2009; Tsui & Mazzocco, 2007; Vandiver & Worrell, 2002; Wang et al., 2012). This included studies examining common measures of academic achievement such as grade point average (GPA), individual test performance, and overall academic achievement based on multiple assessment scores. In addition, as various intelligence factors (e.g., general intelligence and non-verbal intelligence) have been shown to be highly correlated with academic achievement (Roth et al., 2015), studies examining the relationship between perfectionism and intelligence test scores were also included. In this category, the study by Fong and Yuen (2009) which examined the relationships between perfectionism and academic achievement received the highest MQS (76%), whereas the study by Chan (2003b) which examined the relationships between perfectionism and non-verbal intelligence received the lowest MQS (53%).

In terms of the main findings, the two studies examining overall perfectionism found

no significant relationships with the objective markers examined (Chan, 2003b; Tsui & Mazzocco, 2007). However, the studies examining PS and PC identified a divergent pattern of findings. Specifically, PC were typically unrelated or negatively related to objective achievement. By contrast, PS were typically positively related or unrelated to objective achievement. This pattern of relationships was based on bivariate correlations. One study controlled for the overlap between PS and PC when examining academic achievement. In this analysis, Fong and Yuen (2009) found that PS and PC shared stronger relationships with academic achievement once their overlap had been statistically controlled (see Table 2). Overall, based on the consistency of findings among the identified studies, there is strong evidence that perfectionism is associated with academic achievement.

Personality. Six studies (n = 2182 gifted students) examined outcomes relevant to personality (Chan, 2003b; Gallucci et al., 2000; Mofield & Parker Peters, 2018; Mofield & Parker Peters, 2015a; Parker & Stumpf, 1995; White, 2007). These studies examined perfectionism in relation to outcomes including the five-factor model of personality, mindset beliefs, creative strivings, and overexcitabilities. In this category, the studies by Mofield and Parker Peters (2018, 2015a) which examined the relationships between perfectionism, mindset beliefs, and overexcitability received the highest MQS (71%), whereas the study by White (2007) which examined the relationship between perfectionism and overexcitability received the lowest MQS (35%).

In the studies examining multidimensional perfectionism, the findings for PC show a maladaptive profile that includes positive relationships with fixed mindset beliefs, neuroticism, and emotional overexcitabilities, as well as negative relationships with creative characteristics. By contrast, PS show a more positive profile that includes positive relationships with growth mindset beliefs, conscientiousness, creative characteristics, and intellectual overexcitabilities. The only study not differentiating between PS and PC found

that perfectionism was unrelated to divergent thinking but positively related to perceived interpersonal intelligence (Chan, 2003b). Overall, in this category, there is emerging evidence that perfectionism is associated with a range of personality factors in students identified as gifted.

Motivation. Seven studies (*n* = 2246 gifted students) examined motivational outcomes. Of these studies, two included broad motivational outcomes (goal orientations and extrinsic motivation; Chan, 2008; Lyman & Luthar, 2014), four included motivational outcomes specific to education (attribution style, school achievement attitudes, academic goal orientations, and school workbook organisation; Maksić & Iwasaki, 2009; Mofield & Parker Peters, 2018; Vandiver & Worrell, 2002; Wang et al., 2012), and three included motivational outcomes focussed on the future (occupational amotivation, academic aspirations, career plans, and perceived life chances; Jung, 2013; Maksić & Iwasaki, 2009; Vandiver & Worrell, 2002). In this category, the study by Jung (2013) which examined the relationship between perfectionism and occupational amotivation received the highest MQS (76%), whereas the study by Maksić and Iwasaki (2009) which examined the relationships between perfectionism and various motivational outcomes relevant to education received the lowest MQS (59%).

In this area of research, the findings show that PC were typically related to a more negative pattern of motivational outcomes which includes avoidance goal orientations, lower school motivation, and occupational amotivation. However, in other cases, PC were unrelated to motivational outcomes such as extrinsic motivation, school workbook organisation, and academic aspirations. By contrast, PS were consistently related to more positive motivational outcomes including learning goal orientations, favourable school achievement attitudes, and academic aspirations. One exception to this was the finding that PS was related to both performance approach and performance avoidance goal orientations (Wang et al., 2012). Overall, in this category, there is emerging evidence that perfectionism is associated with a

complex pattern of motivational factors in students identified as academically gifted.

Emotion and Well-being. Nine studies (n = 2220 gifted students) examined outcomes relevant to emotion and well-being. Of these studies, six included a broad indicator of well-being or emotion. This included satisfaction with life, positive and negative affect, general self-efficacy, substance use, body dissatisfaction, envy, self-esteem, and depression (Chan, 2007; Lyman & Luthar, 2014; Maksić & Iwasaki, 2009; Reyes et al., 2015; Stornelli et al., 2009; Wang et al., 2012). Six of the studies also included a well-being or emotional outcome specific to education. This included academic self-concept, math anxiety, academic self-efficacy, perceived intelligence, perceived academic competence, and contingent self-worth on academics (Chan, 2003b; Fong & Yuen, 2009; Maksić & Iwasaki, 2009; Stornelli et al., 2009; Tsui & Mazzocco, 2007; Wang et al., 2012). In this category, the study by Fong and Yuen (2009) which examined the relationships between perfectionism and academic self-concept received the highest MQS (76%), whereas the study by Chan (2003b) which examined the relationships between perfectionism and perceived intelligence received the lowest MQS (53%).

In this area of research, the profile of findings for PC includes negative relationships with indicators of subjective well-being and self-efficacy (e.g., positive affect and academic efficacy) and positive relationships with negative emotions such as depression. By contrast, the profile of findings for PS across these studies includes positive relationships with indicators of subjective well-being and self-efficacy (e.g., life satisfaction, positive affect, and academic competence). In the only study to control for the overlap between PS and PC, Chan (2007) found further evidence for the divergent relationships between PS and PC in relation to life satisfaction, negative affect, and general self-efficacy (see Table 2). Overall, in this category, there is emerging evidence that perfectionism is associated with well-being and emotional factors in students identified as academically gifted.

Interpersonal Relationships. One study (n = 299 gifted students) examined the relationships between perfectionism and a series of interpersonally relevant outcomes including alienation from parents, social interactions with others, parental depression, and sexual harassment (Lyman & Luthar, 2014). Specifically, Lyman and Luthar (2014) examined the relationships between perfectionism and these variables by gender and groups differing in socio-economic status. The most consistent finding across each subgroup analysis was that PC were positively related to alienation from mothers and fathers. In terms of methodological quality, this study received an MQS of 71%.

Perfectionism Differences. Nine studies (n = 1693 gifted students) examined whether perfectionism differs between specific groups (Kline & Short, 1991; LoCicero & Ashby, 2000; Maksić & Iwasaki, 2009; Margot & Rinn, 2016; Mofield & Chakraborti-Ghosh, 2010; Mofield & Parker Peters, 2018; Roberts & Lovett, 1994; Siegle & Schuler, 2000; Sondergeld et al., 2007). This included eight studies focussing on differences across gifted status, gender, grade-level, age, birth order, or nationality. The other study focussed on perfectionism change in relation to an experimental intervention (Mofield & Chakraborti-Ghosh, 2010). In this category, the studies by Mofield and Chakraborti-Ghosh (2010), Siegle and Schuler (2000), and Sondergeld et al. (2007) received the highest MQS (75%), whereas the study by Kline and Short (1991) which examined perfectionism differences by grade-level received the lowest MQS (29%).

In this area of research, the findings show potential perfectionism differences in relation to all the identified grouping variables. However, some differences were observed across multiple studies (e.g., studies examining gifted status; LoCicero & Ashby, 2000; Mofield & Parker Peters, 2018; Roberts & Lovett, 1994), whereas others were observed in only one study (e.g., nationality-based differences; Maksić & Iwasaki, 2009). In their experimental intervention, Mofield and Chakraborti-Ghosh (2010) found evidence to support

the efficacy of an affective curriculum programme in reducing levels of PC in students identified as academically gifted. Overall, in this category, there is initial evidence of potentially important perfectionism differences across specific groups and support for a specific educational intervention in reducing levels of PC in students identified as academically gifted.

Findings of Studies Employing a Group-Based Approach

In the review 12 studies employed a group-based approach to the study of perfectionism (see Table 3). In addition to the data extracted for studies employing a variable-based approach, with studies adopting a group-based approach we also documented the number, composition, and label of each perfectionism group identified. In line with previous perfectionism reviews, we reported the main differences found between each of the identified perfectionism groups (Stoeber & Otto, 2006). The main findings of these studies were classified using the same system outlined for research adopting a variable-based approach.

Academic Achievement. One study (n = 320 gifted students) examined an outcome relevant to academic achievement. Specifically, Chan (2011) examined perfectionism in relation to perceived intelligence. The findings show that the healthy perfectionist and unhealthy perfectionist groups scored significantly higher than the non-perfectionist group on all perceived intelligence domains (e.g., verbal-linguistic, logical-mathematical, and naturalist intelligences). Moreover, some significant group differences were also identified between the healthy perfectionist and unhealthy perfectionist groups. Specifically, the healthy perfectionist group scored significantly higher on musical, intrapersonal, and interpersonal intelligence. In terms of methodological quality, this study received an MQS of 71%.

Personality: Three studies (n = 1263 gifted students) examined perfectionism in relation to the five-factor model of personality (Parker, 1997; Portešová & Urbánek, 2013)

and mindset beliefs (Chan, 2012). In this category, the studies by Chan (2012) and Parker (1997) received the highest MQS (71%), whereas the study by Portešová & Urbánek (2013) received the lowest MQS (59%). In terms of the main findings, the results show that unhealthy perfectionist groups are more likely to endorse fixed mindset beliefs and report higher levels of neuroticism in comparison to other perfectionist groups. By contrast, healthy perfectionist groups are more likely to endorse growth mindset beliefs and report higher levels of extraversion, agreeableness, and conscientiousness. Overall, in this category, there is initial evidence of differences in the personality factors associated with different perfectionist groups.

Emotion and Well-being: Seven studies (n = 2088 gifted students) included a criterion variable that was relevant to emotion or well-being. These studies examined how perfectionism groups differed in relation to emotional intelligence (Chan, 2009), satisfaction with life and happiness (Chan, 2012), psychological symptomology, positive adjustment, self-esteem, and coping (Dixon et al., 2004), coping strategies (Mofield & Parker Peters, 2015b), maladjustment and self-esteem (Parker, 1997), health issues and maladjustment (Parker et al., 2001), and self-efficacy (Portešová & Urbánek, 2013). In this category, the study by Chan (2009) which examined differences in emotional intelligence based on perfectionism group membership received the highest MQS (76%), whereas the study by Portešová & Urbánek (2013) which examined differences in self-efficacy based on perfectionism group membership received the lowest MQS (59%).

In this area of research, the findings show that the healthy perfectionist groups reported more positive outcomes (e.g., increased happiness, positive adjustment, and self-esteem) and less negative outcomes (e.g., maladaptive psychological symptoms and dysfunctional coping strategies) than unhealthy perfectionist groups. The differences between unhealthy perfectionist and non-perfectionist groups varied between studies and specific

outcomes. For instance, the findings show that unhealthy perfectionists fared better (e.g., reported increased levels of emotional intelligence), worse (e.g., reported decreased levels of self-esteem), or the same as non-perfectionists (e.g., reported comparative levels of happiness) depending on the specific outcome examined. Overall, in this category, there is initial evidence of differences in the emotional well-being of different perfectionist groups.

Interpersonal Relationships: Two studies (n = 947 gifted students) included a criterion variable that is relevant to interpersonal relationships. One study focussed on parents' academic goals of their gifted child (Ablard & Parker, 1997) whereas the other focussed on parents' perceptions of their gifted child's adjustment, behaviours, and goals in school (Parker, 1997). In this category, the study by Parker (1997) received a higher MQS (71%), whereas the study by Ablard and Parker (1997) received a lower MQS (59%).

The main finding in the study by Ablard and Parker (1997) was that children of parents who endorsed performance goals were more likely to be in the unhealthy perfectionist group than children of parents who endorsed learning goals. A similar finding was also identified by Parker (1997) who found that the unhealthy perfectionist group reported higher perceptions of their parents emphasising the importance of academic and career success in comparison to other perfectionist groups. Overall, in this category, there is initial evidence of differences in the interpersonal relationships of different perfectionist groups.

Perfectionism Differences: Four studies (n = 1944 gifted students) examined perfectionism group membership across demographic variables. Specifically, the studies examined whether gifted status, grade-level, gender, socio-economic status of parents, birth-order, or family size had any bearing on perfectionism group membership (Kornblum & Ainley, 2005; Parker & Mills, 1996; Parker, 1998; Parker et al., 2001). In this category, the study by Kornblum and Ainley (2005) which examined perfectionism group membership in relation to grade-level, gender, and gifted status received the highest MQS (75%), whereas

the study by Parker et al. (2001) which examined perfectionism group membership in relation to gifted status received the lowest MQS (63%).

In this area of research, the findings show potential perfectionism grouping differences in relation to all the identified demographic variables. However, some differences were examined in multiple studies and received mixed support (e.g., gifted status; Kornblum & Ainley, 2005; Parker & Mills, 1996; Parker, 1998; Parker et al., 2001), whereas others were only examined in one study (e.g., family size; Parker, 1998). Overall, in this category, there is emerging evidence of differences in perfectionism group membership corresponding to other variables.

Discussion

The aim of our study was to provide the first systematic review of research on perfectionism in students identified as academically gifted. By describing, evaluating, and summarising the available empirical research in this area, we hope to provide insight into the importance of perfectionism in this population. Based on the findings of the systematic review, below we provide a discussion of some of the key findings and critical considerations to emerge.

One of the most striking findings from the review was the volume of empirical research examining perfectionism in gifted learners. We identified a total of 36 studies (N = 10737 students) published over 24 years (1994–2018). This long and sustained examination of perfectionism in students identified as gifted is consistent with the enduring notion that perfectionism is highly relevant in this population (Rice & Taber, 2018). The most contemporary accounts of perfectionism in this area recognise perfectionism as an important psychological factor that may underpin many of the achievements and challenges encountered by students identified as academically gifted (Neihart & See Yeo, 2018; Rice & Ray, 2018; Speirs Neumeister, 2018). In this regard, the findings of the review are especially

noteworthy as they showcase the various achievement, personality, motivation, emotional, and interpersonal outcomes related to perfectionism in this population.

Another important finding of the systematic review is that the distinction between PS and PC is critical to understanding perfectionism in students identified as academically gifted. This was firstly evident in the studies employing a variable-based approach. In line with previous reviews, PC were consistently related to maladaptive outcomes in students identified as academically gifted (Stoeber & Otto, 2006). This included positive relationships with neuroticism, depression, and alienation from parents, as well as negative relationships with achievement motivation, self-esteem, and creative strivings. By contrast, PS were related to both adaptive and maladaptive outcomes. This included positive relationships with objective performance markers such GPA, positive motivational orientations such as performance approach goals, and subjective well-being such as life satisfaction. However, PS was also negatively related to happiness and motivation to function creatively. In general, these findings suggest that aspects of perfectionism indicative of PC are likely to interfere with the healthy adjustment and performance of gifted learners, whereas aspects indicative of PS are more mixed.

The studies employing a group-based approach provided further evidence regarding the importance of distinguishing between PS and PC. Specifically, in line with previous reviews focussing on the tripartite model, the presence of higher PC contributed to more debilitating emotional and well-being related outcomes (Stoeber & Otto, 2006). This was demonstrated in significant group differences identified between unhealthy perfectionists and healthy perfectionists on outcomes including happiness, adjustment issues, and self-esteem. In relation to the other group comparisons specific to the tripartite model, the findings were more ambiguous. In line with Stoeber and Otto's (2006) review, healthy perfectionists fared better than non-perfectionists on outcomes such as problem solving, agreeableness, and self-

esteem. However, in other cases, these groups were also found to share comparative levels of depression, adjustment issues, and dysfunctional coping mechanisms. The group comparisons between unhealthy perfectionists and non-perfectionists were similarly mixed. Unhealthy perfectionists fared worse than non-perfectionists on outcomes such as self-esteem, depression, and neuroticism, but better than non-perfectionists on outcomes such as emotional intelligence, perceived intelligence, and problem solving. Despite these mixed findings, the group-based studies show that the presence of higher PC typically coincides with the occurrence of more pronounced difficulties in students identified as academically gifted.

Critical Considerations and Future Research

The first critical consideration relates to the identification of students identified as academically gifted. In keeping with previous reviews, our findings show considerable heterogeneity in the methods used to identify and operationalise giftedness (Carman, 2013). The most common method of recruitment across the studies identified was via advanced programs or schools. However, as identified in previous gifted literature, there were salient study-to-study differences in the methods of identification used to grant enrolment or entry into such programs (see Hertzog, 2009). This diversity means that there may be substantial differences in the key characteristics or strengths used to identify these students as gifted. On this basis, some caution is required when comparing and aggregating findings across the studies. The most basic step researchers could follow to help alleviate some of these issues in future work is to follow common reporting guidelines. In this regard, we believe that the recruitment and identification considerations and methods laid forth by Carman (2013) provide the foundations for a common approach.

The second critical consideration relates to the measurement of perfectionism in research among students identified as academically gifted. In line with previous observations,

we identified a range of self-report measures used to assess perfectionism in this population (Rice & Ray, 2018). Most of the identified studies adopted valid and reliable measures commonly used to assess multidimensional perfectionism. However, this was not always the case with many studies also employing measures with more questionable validity (e.g., PNPS; Chan, 2007) and/or measures of unidimensional perfectionism (e.g., PQ; White, 2007) that are typically discouraged (see Flett & Hewitt, 2020). In line with the scoring options assigned in our assessment of methodological quality, we advocate that researchers adopt valid and reliable multidimensional scales that can be integrated into commonly adopted perfectionism frameworks such as the higher-order model of perfectionism. This will ensure best measurement practices and provide further scope for organising and integrating findings across this expanding area of research. In line with the recommendation of Rice and Ray (2018), researchers should also consider using alternative methodological approaches such as informant reports from parents or teachers to supplement the information provided by self-report scales.

The third critical consideration relates to the requirement for researchers to build on existing research in a more systematic manner. In the review, it is evident that a systematic approach is evident in areas focussing on perfectionism and objective academic achievement, perfectionism and self-esteem, and perfectionism and personality. It is also evident that some researchers have sustained an interest in and pursued important issues relating to perfectionism in this population over several years (Ablard & Parker, 1997; Parker & Mills, 1996; Parker & Stumpf, 1995; Parker 1997, 1998; Parker et al., 2001). However, there are also areas and research questions identified in the current review that warrant further sustained scrutiny and examination. This is evident in the current review with multiple criterion variables that have only been examined in one study (e.g., depression, contingent self-worth, and alienation from parents). The importance of developing systematic lines of

inquiry of key issues relating to perfectionism is critical in developing a coherent body of work with potential to influence gifted practices and policy.

The fourth critical consideration relates to the research designs that have been adopted to study perfectionism in students identified as academically gifted. Our main observation was that most studies identified in the current review adopted a non-experimental cross-sectional design. This is a common feature of perfectionism research that has been noted in reviews beyond gifted education (Stoeber & Otto, 2006). Specifically, in line with the scoring options assigned in our evaluation of methodological quality, we recommend that researchers adopt longitudinal research designs to examine perfectionism in students identified as academically gifted. Such designs are needed to provide further clarity regarding the likely antecedents, consequences, and reciprocal effects of perfectionism which are currently difficult to disentangle using existing research. In educational psychology, the importance of longitudinal research is exemplified in two recent studies showing that academic achievement, academic efficacy, and school satisfaction are potentially important antecedents of perfectionism (Damian et al., 2017; Stricker et al, 2019b). These findings are noteworthy as previous cross-sectional research has considered such variables as outcomes rather than antecedents of perfectionism.

The final critical consideration relates to the requirement for researchers in this field to develop and examine intervention strategies aimed at reducing levels of perfectionism in students identified as academically gifted. Based on this review and previous appraisals of research, there is compelling evidence that elevated levels of PC are likely to undermine the healthy adjustment of students who are academically gifted (Rice & Ray, 2018). However, despite the accumulating evidence base, only one intervention study was identified in the review (Mofield & Chakraborti-Ghosh, 2010). This study found evidence to support the efficacy of an affective curriculum intervention in reducing levels of PC. Given the

prominence of PC in determining the consequences of being perfectionistic for students identified as academically gifted, this is a standout study that practitioners and researchers in this area need to be aware of. It provides an important touchstone for future intervention work and other curriculum-based programmes aimed at reducing PC. Developing and examining such primary prevention strategies for perfectionism is the most important area for future research in the gifted.

Limitations

There are several limitations of the present review which should be considered when interpreting the findings. One limitation is that we were unable to statistically evaluate the strength of effect sizes between perfectionism and the specified criterion variables using a meta-analytical technique. This was not possible as most identified variables were examined in less than three studies (Borenstein et al., 2009). Similarly, it was also difficult to comment on whether the major findings identified differed depending upon which indicators of PS or PC were examined. While evidence of functional homogeneity exists among the various subdimensions of the two-factor perfectionism model (Gaudreau and Verner-Filion, 2012), it is important to note that different indicators represent different aspects of perfectionism and that some dimensions are not necessarily interchangeable (see Stricker et al., 2019a). This is particularly important to mention in context of the inclusive approach we adopted to identifying indicators of PS and PC. A further issue relates to our evaluation of methodological quality. While the information we generated helped us to evaluate the state of evidence when examining a specific body of research, it is important to note that the overall MQS assigned to each study provides only a simplistic overview of methodological quality. The final limitation is that the review does not include information and findings from unpublished dissertations or other forms of grey literatures. This is an important issue due to evidence of publication bias in educational psychology (Chow & Ekholm, 2018).

Conclusion

Perfectionism has long been recognised as a psychological factor that can enhance or interfere with the healthy adjustment of students identified as academically gifted (Neihart & See Yeo, 2018). The findings of our review support this notion and provide important insights regarding the divergent roles of PS and PC. Specifically, while PC are likely to be uniformly debilitating for students identified as academically gifted, PS are more mixed and may under some circumstances coincide with some benefits such as increased academic achievement. This is the case when dimensions of perfectionism are considered separately and in combination. Future research needs to build on this existing evidence base in a systematic fashion and prioritise longitudinal research and intervention studies.

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Fig. 1 PRISMA Flow Diagram.

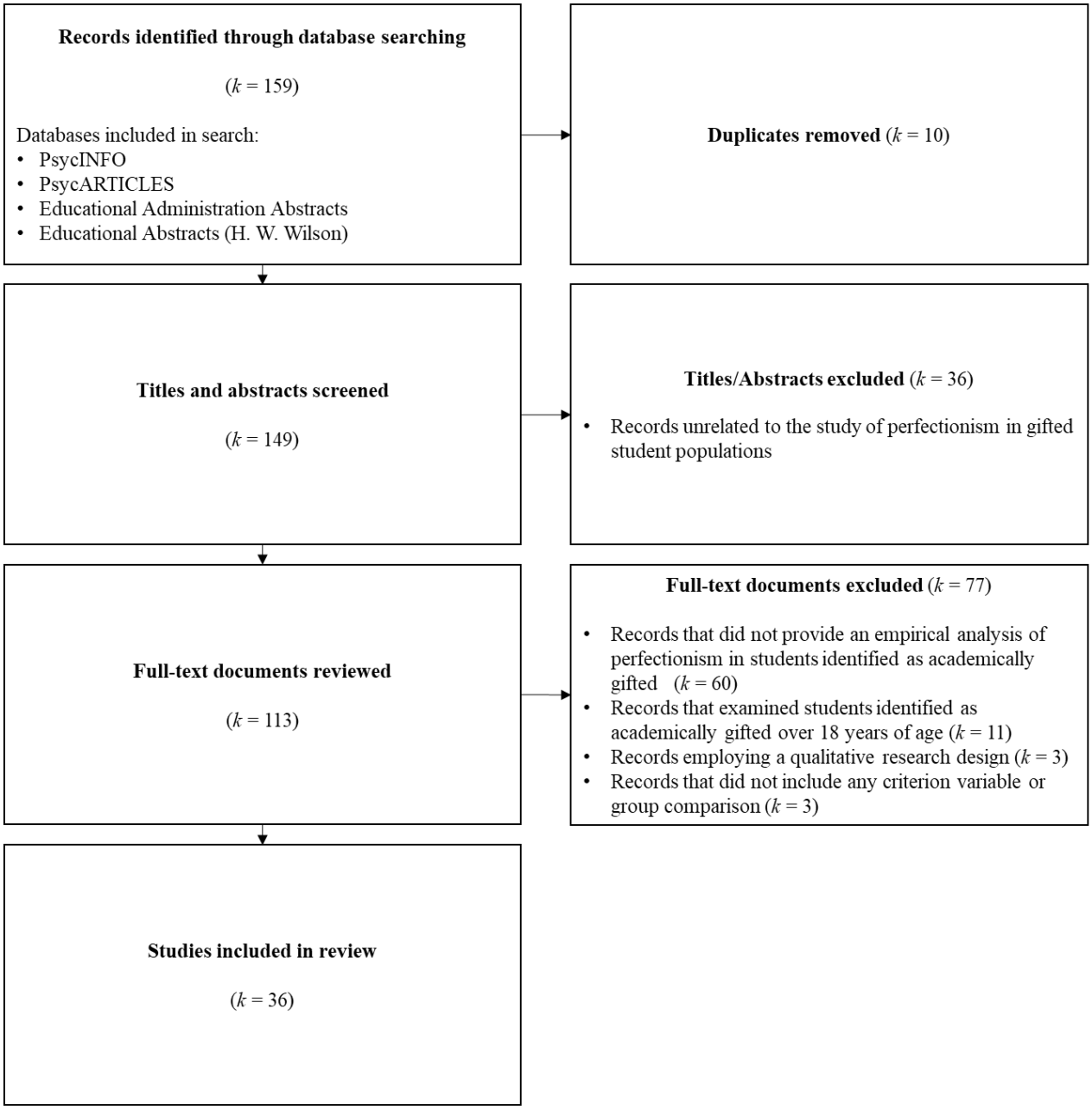

Table 1. Criteria for assessment of methodological quality and frequency distributions for each characteristic among the 36 reviewed studies

Methodological characteristics	Scoring Options (Maximum total score = 17 points)	Distribution of characteristics	
		Frequency (*k*)	Percent (%)
(1) Operational definition of primary variable	• Unidimensional definition = 1 point	• 3	• 8%
	• Multidimensional definition = 2 points	• 33	• 92%
(2) Construct validity data for measure of primary variable	• Measure has not been found (based on own or previous data) to demonstrate meaningful relationships with other established measures of target variable = 0 points	• 5	• 14%
	• Measure has been found (based on own or previous data) to demonstrate meaningful relationships with other established measures of target variable = 1 point	• 31	• 86%
(3) Internal reliability data for measure of primary variable	• No evidence reported (based on own data) to support reasonable internal reliability of measure(s) = 0 points	• 13	• 36%
	• Evidence reported (based on own data) to support reasonable internal reliability of measure(s) = 1 point	• 23	• 64%
(4) Internal reliability and/or construct validity data for other relevant measures	• No evidence reported (based on own data) to support reasonable internal reliability and/or construct validity of measure(s) (as described above) = 0 points	• 13	• 36%
	• Evidence reported (based on own data) to support reasonable internal reliability and/or construct validity of measure(s) (as described above) = 1 point	• 13	• 36%
	• Not applicable to study = NA	• 10	• 28%
(5) Theoretical framework evident in research	• Authors do not provide rationale for studying perfectionism = 0 points	• 2	• 6%
	• Authors provide rationale for studying perfectionism based on theory and/or empirical research = 1 point	• 34	• 94%
(6) Research paradigm adopted	• Quantitative paradigm = 1 point	• 36	• 100%
	• Mixed methods paradigm = 2 points	• 0	• 0%
(7) Research design adopted	• Cross-sectional/Non-experimental = 1 point	• 33	• 92%
	• Longitudinal/Experimental = 2 points	• 3	• 8%
(8) Sample size	• Gifted students in sample < 100 = 1 point	• 9	• 25%
	• 100 < Gifted students in sample < 300 = 2 points	• 12	• 33%
	• Gifted students in sample > 300 = 3 points	• 15	• 42%
(9) Sample design	• Convenience/nonprobability = 0 points	• 36	• 100%
	• Random/probability but not nationally representative = 1 point	• 0	• 0%
	• Random/probability and nationally representative = 2 points	• 0	• 0%
(10) Data analysis	• Inappropriate analytical strategy = 0 points	• 0	• 0%
	• Appropriate analytical strategy = 1 point	• 36	• 100%
(11) Inferences of causality	• Causal language is inconsistent with methodological design = 0 points	• 2	• 6%
	• Causal language is consistent with methodological design = 1 point	• 34	• 94%

Table 2. *Research adopting a variable-based approach to the study of perfectionism in gifted students.*

Study	Sample(s)	Gifted Status	Design	Instru.	PS	PC	Criterion Variables	Main Findings	MQS
Chan (2003b)	639 Gifted Students (50.23% females; M_{age} = 13.16, *SD* = 1.77; China)	Enrolled in advanced program/school (based on school recommendation)	Non-experimental / Cross-sectional	SAPI	-	-	Divergent thinking; Non-verbal intelligence; Multiple (perceived) intelligences	Perfectionism significantly predicted by interpersonal intelligence (*t* = 2.33*); No significant perfectionism differences were found between non-verbal intelligence (high versus low) and divergent thinking (high versus low) subgroups.	9 (53%)
Chan (2007)	317 Gifted Students (40.38% females; M_{age} = 11.62, *SD* = 2.42; China)	School recommendation	Non-experimental / Cross-sectional	PNPS	PP	NP	Satisfaction with life; Positive and negative affect; General self-efficacy	PS significantly associated with life satisfaction (*r* = .29***), positive affect (*r* = .49***), negative affect (*r* = -.16**), and general self-efficacy (*r* = .58***); PC was significantly associated with positive affect (*r* = .10*), negative affect (*r* = .34***) and general self-efficacy (*r* = .14*); When controlling for overlap between the two perfectionism dimensions, PS significantly predicted life satisfaction (*t* = .5.47***), positive affect (*t* = 10.15***), negative affect	12 (71%)

								(*t* = -3.56***), and general self-efficacy (*t* = 12.76***); PC significantly predicted life satisfaction (*t* = -2.28*), negative affect (*t* = 6.68***), and general self-efficacy (*t* = 2.00*)	
Chan (2008)	315 Gifted Students (40.63% females; M_{age} = 11.63, *SD* = 2.42; China)	School recommendation	Non-experimental / Cross-sectional	PNPS	PP	NP	Goal orientation (learning, performance, social, and avoidance)	PS significantly predicted by learning goals (*t* = 5.72***) and social goals (*t* = 5.88***); PC significantly predicted by performance goals (*t* = 7.98***) and avoidance goals (*t* = 4.56***)	12 (71%)
Fong & Yuen (2009)	331 Gifted Students (51.40% females; Age = 9–13 years; China)	Enrolled in advanced program/school	Non-experimental / Cross-sectional	APS-R	HS; ORD	DIS	Self-concept (reading and math); Academic achievement	PS positively associated with academic achievement (*r* = .31*** & .14*); PC was negatively associated with academic achievement (*r* = -.32***); When controlling for overlap between the three perfectionism dimensions, PS (HS only) positively predicted academic achievement (β = .40***) and PC negatively predicted academic	13 (76%)

								achievement (β = -.38***)	
Gallucci et al. (2000)	44 Gifted Students (40.91% females; Age = 12–16 years; USA)	Enrolled in advanced program/school (entry based on achievement test scores)	Non-experimental / Cross-sectional	F-MPS	PS; O	COM; DAA; PE; PCrit	Creative strivings	PS (O), PC (DAA & PCrit), and overall perfectionism significantly associated with motivation to function creatively (r = -.43**, -.51**, -.42**, and -.33**); PS (PStan) significantly associated with proxy measure of creative behaviour (r = .31**)	9 (53%)
Jung (2013)	687 Gifted Students (48% females; M_{age} = 15.22, SD = .91; AUS)	Enrolled in advanced program/school (entry based on multiple forms of gifted identification)	Non-experimental / Cross-sectional	F-MPS	-	CMD	Occupational amotivation	PC significantly predicted occupational amotivation (β = .34)	13 (76%)
Kline & Short (1991)	89 Gifted Students (100% female; 6th–12th Grade; USA)	Enrolled in advanced program/school (entry based on school recommendation)	Non-experimental / Cross-sectional	-	-	-	Grade Level	Older students had higher levels of perfectionism in comparison to younger students	5 (29%)

LoCicero & Ashby (2000)	195 students (42.56% Gifted Students; 58.97% females; M_{age} = 13.90; USA)	Enrolled in advanced program/school (entry based on multiple forms of gifted identification)	Non-experimental / Cross-sectional	APS-R	HS	DIS	Gifted Status	Gifted Students had higher PS and lower PC in comparison to non-gifted students	10 (63%)
Lyman & Luthar (2014)	**Sample A**: 158 students (low-SES high school) **Sample B**: 141 students (high-SES private school) **Overall Sample**: 299 students (63% females; 11th–12th Grade; USA)	Enrolled in advanced program/school	Non-experimental / Cross-sectional	F-MPS	-	PE; PCrit	Internalizing and externalizing domains; Substance use; Mastery and relatedness; Alienation from parents; Parent depression; Social interactions; Sexual harassment; Envy; Body dissatisfaction; Goal orientation	PC significantly associated with various criterion variables in low-SES and high-SES students (e.g., alienation from parents, *r* = .29* to .65***)	12 (71%)
Maksić &	**Sample A**: 195	Achievement test	Non-experimental	F-MPS	PStan;	COM	Self-esteem; Perceived	PC (COM, DAA, & PE) and overall	10 (59%)

Iwasaki (2009)	Gifted Students (44.60% females; Age = 10–12 years; JAP) **Sample B**: 600 Gifted Students (33.50% females; M_{age} = 11.98; *SD* = .40; USA)	scores / Academic achievement	/ Cross-sectional		O	; DAA ; PE; PCrit	academic status; Academic aspirations; Attribution style; Careers plans; Intelligence; School achievement; Nationality	perfectionism significantly associated with self-esteem (*r* = -.36**, -.18**, -.22**, & -.28**) (amongst other academic outcomes); USA students higher in PS and lower in PC in comparison to Japanese students	
Margot & Rinn (2016)	96 Gifted Students (49% females; 7th–12th Grade; USA)	School recommendation	Non-experimental / Cross-sectional	F-MPS	PStan; O	COM ; PE	Age; Grade level; Birth order	PC (COM) higher in older students in comparison to younger students; PS (PStan) and PC (COM & PE) were higher in first born/only children in comparison to middle children and/or youngest children	10 (63%)
Mofield & Chakrabor ti-Ghosh	153 Gifted Students (54% females; 6th–8th	Enrolled in advanced program/school	Quasi-experimental / Intervention	GWHS	PStan; O	COM ; DAA	Change in perfectionism	Affective curriculum intervention significantly decreases PC (COM) in experimental group	12 (75%)

(2010)	Grade; USA)	(entry based on multiple forms of gifted identification)				; PE; PCrit			
Mofield & Parker Peters (2018)	416 students (63.46 % Gifted Students; 51% females; 6th–8th Grade; USA)	Enrolled in advanced program/school (entry based on multiple forms of gifted identification)	Non-experimental / Cross-sectional	GWHS	PStan; O	COM ; DAA	Gifted Status; Mindset (beliefs about intelligence); Achievement attitudes	PS (PStan) higher in gifted and advanced learners in comparison to typical learners; Giftedness was a statistically significant predictor of PS (PStan, β = .27**) and PC (COM, β = .20*); PS significantly associated with favourable achievement attitudes (various) and growth mindset beliefs (r = .37*** and .23***); PC significantly associated with various unfavourable achievement attitudes (various) and fixed mindset beliefs (r = .31*** and .25***)	12 (71%)
Mofield & Parker Peters (2015a)	130 Gifted Students (52% females; 6th–8th Grade; USA)	Enrolled in advanced program/school (entry based on multiple forms of	Non-experimental / Cross-sectional	GWHS	PStan; O	COM ; DAA ; PE; PCrit	Overexcitability	PS and PC positively predicted by various overexcitabilities (e.g., PS & emotional overexcitability, β = .28*** to .32***; PC & emotional overexcitability, β = .26* to .27*)	11 (65%)

		gifted identification)							
Parker & Stumpf (1995)	855 Gifted Students (37.50% females; 6th Grade; USA)	Achievement test scores	Non-experimental / Cross-sectional	F-MPS	PStan; O	COM; DAA; PE; PCrit	Personality (Five-factor model)	Evidence for the hierarchical structure of the F-MPS; Two higher-order factors were identified (PS and PC); PS significantly associated with various five-factor personality traits (e.g., conscientiousness, *r* = .36*** to .56***); PC significantly associated with various five-factor personality traits (e.g., neuroticism, *r* = .09 to .43***)	12 (71%)
Reyes et al. (2015)	173 gifted students (38.15% females; M_{age} = 15.09; *SD* = 1.29; PHL)	Enrolled in advanced program/school	Non-experimental / Cross-sectional	CAPS	SOP	SPP	Depression	PC significantly associated with depression in both males (*r* = .25*) and females (*r* = .26**)	10 (59%)
Roberts & Lovett (1994)	60 students (33.33% Gifted Students, 7th–8th Grade; USA)	Enrolled in advanced program/school	Quasi-experimental	HF-MPS	SOP	-	Gifted status; Gender	Gifted students had significantly higher levels of PS in comparison to academic high achievers and nongifted students	10 (63%)

Siegle & Schuler (2000)	391 Gifted students (57.03% females, 6th–8th Grade; USA)	Enrolled in advanced program/school (entry based on academic achievement)	Non-experimental / Cross-sectional	GWHS	PStan; O	COM; PE; PCrit	Grade level; Birth order; Gender	Evidence for a five-factor GWHS; Females had significantly higher levels of PS (O) in comparison to males; Males had significantly higher levels of PC (PE) in comparison to females; First born students had significantly higher levels of PC (PE & PCr) in comparison to students with older siblings	12 (75%)
Sondergeld et al. (2007)	402 gifted students (55.47% females, 6th–8th Grade; USA)	School recommendation	Non-experimental / Cross-sectional	F-MPS	PStan; O	COM; DAA; PEC	Grade level; Birth order; Gender	Evidence for a five-factor F-MPS; Females had significantly higher levels of PS (O) in comparison to males; Middle children had significantly higher levels of PC (DAA) in comparison to oldest and youngest born children	12 (75%)
Stornelli et al. (2009)	281 students (30.60% gifted students; 56.23% females, 4th & 7th Grade; CAN)	Enrolled in advanced program/school	Non-experimental / Cross-sectional	CAPS	SOP	SPP	Perceived academic competence; Positive and negative affect; Academic achievement	Gifted students: PS and PC significantly associated with elevated maths scores (*r* = .26* & .33*) and reduced levels of happiness (*r* = -.23* & -.25*); PS positively associated with self-reported academic competence (*r* = .22*); PC significantly associated with	10 (59%)

								elevated levels of sadness (r = .26**) and fear (r = .24**)	
Tsui & Mazzocco (2007)	36 Gifted Students (44% females, M_{age} = 11.70 years; *SD* = .38; USA)	Enrolled in advanced program/school (entry based on achievement test scores)	Quasi-experimental	F-MPS	PStan; O	COM; DAA; PE; PCrit	Math performance; Math anxiety	PS was unrelated to math anxiety; PC (COM, DAA, & PCrit) and overall perfectionism positively associated with math anxiety (r = .59***, .49**, .50**, & .50**); The discrepancy between timed versus untimed maths test performance was smaller in students with higher levels of overall perfectionism (compared to students with lower levels of overall perfectionism)	10 (59%)
Vandiver & Worrell (2002)	342 Gifted Students (52% females; M_{age} = 13.19; *SD* = .77; USA)	Enrolled in advanced program/school (entry based on multiple forms of gifted identification)	Non-experimental / Cross-sectional	APS-R	HS; ORD	DIS	Perceived life chances; GPA; Organisation	Evidence for the psychometric properties of the APS-R; PS and PC shared divergent relationships with GPA (PS & GPA, r = .11 to .33***; PC & GPA, r = -.19* to -.26**) organisation (PS & organisation, r = .29*** to .57***; PC & organisation, r = -.08 to -.13), and future goal completion (PS & future goal completion, r = .22** to .51***; PC &	12 (71%)

								future goal completion, *r* = -.25*** to -.37***)	
Wang et al. (2012)	144 Gifted Students (60.42% females; 6th–12th Grade; USA)	Enrolled in advanced program/school (entry based on multiple forms of gifted identification)	Non-experimental / Cross-sectional	APS-R	HS	DIS	Academic goal orientation; Academic self-efficacy; Contingent self-worth on academics; Satisfaction with life	PS and PC significantly associated with mastery (*r* = .50*** & -.14), performance approach (*r* = .29** & .24**), performance avoidance (*r* = .22* & .35***), academic efficacy (*r* = .59*** & -.27), contingent self-worth on academics (*r* = .45*** & .10), satisfaction with life (*r* = .27*** & -.40***), and GPA (*r* = .38*** & *r* = -.24)	12 (71%)
White (2007)	98 students (72.45% Gifted Students; 51.02% females; Age = 12–18 years; USA)	Achievement test scores / Academic achievement	Non-experimental / Cross-sectional	PQ			Overexcitability	Perfectionism significantly associated with sensual (*r* = .34**), intellectual (*r* = .41***), imaginational (*r* = .30**), and emotional (*r* = .65***) overexcitabilities	6 (35%)

Note. Instru. = Instrument, PS = perfectionistic strivings, PC = perfectionistic concerns; SAPI = Student Adjustment Problems Inventory (Chan, 2003a), PNPS = Positive and Negative Perfectionism Scale (Chan, 2007), APS-R = Almost Perfect Scale–Revised (Slaney et al., 2001), F-MPS = Multidimensional Perfectionism Scale (Frost et al, 1990), GWHS = Goals and Work Habits Survey (Schuler, 2000), CAPS = Child and Adolescent Perfectionism Scale (Flett et al., 1997), HF-MPS = Multidimensional Perfectionism Scale (Hewitt & Flett, 1991), PQ = Perfectionism Questionnaire (White, 2007); PP = Positive perfectionism, NP = Negative perfectionism, HS = High standards, ORD = Order; DIS = Discrepancy; PStan = Personal standards, O

= Organisation; COM = Concern over mistakes; DAA = Doubts about actions; CMD = Concern over mistakes and doubts; PE = Parental expectations, PCrit = Parental criticism, PEC = Parental expectations and criticism, SOP = Self-oriented perfectionism, SPP = Socially prescribed perfectionism; GPA = grade point average; MQS = Methodological Quality Score; The MQS is provided as a total score and percentage of maximum possible score per study (in parentheses); *$p < .05$; **$p < .01$; ***$p < .001$

Table 3. *Research adopting a group-based approach to the study of perfectionism in gifted students.*

Study	Sample(s)	Gifted Status	Design	Instru	Groups	Main Criterion Variables	Main Findings	MQS
Ablard & Parker (1997)	127 Gifted Students (44% females; 6th Grade; USA)	Achievement test scores	Non-experimental / Cross-sectional	F-MPS	• HP • DP • NP	Parents academic goals for child (Performance/Learning goals; Dweck, 1986)	(a) Children of performance goal parents more likely to be in the DP group *versus* children of learning goal parents	10 (59%)
Chan (2009)	380 Gifted Students (40.79% females; M_{age} = 12.19, *SD* = 2.18; China)	School recommendation	Non-experimental / Cross-sectional	F-MPS	• HP (↑PStan, ↑O, ↓CMD, ↓PCrit) • UP (↑PS, ↑CMD, ↑PE, ↑PCrit, ↑O) • NP (↓PStan, ↓CMD, ↓PE, ↓PCrit, ↓O)	Emotional intelligence (social skills, self-management of emotions, empathy, and utilisation of emotions)	(a) HP > UP > NP (emotional intelligence)	13 (76%)
Chan (2011)	Sample A: 882 students (45.69%	School recommendation	Non-experimental / Cross-sectional	APS-R	• HP (↑HS, ↑ORD, ↓DIS)	Perceived Intelligences (verbal-linguistic, musical, logical-mathematical, visual-	(a) HP > UP > NP (musical, intrapersonal, & interpersonal) (b) HP, UP > NP (verbal-linguistic,	12 (71%)

	females; M_{age} = 11.09, *SD* = 1.08; China) Sample B: 320 Gifted Students (39.69% females; M_{age} = 10.25, *SD* = 1.23; China)				• UP (↑HS, ↑DIS, ↑ORD) • NP (↓HS, ↓DIS, ↓ORD)	spatial, bodily kinaesthetic, intrapersonal, interpersonal, naturalist)	logical-mathematical, visual-spatial, bodily kinaesthetic, & naturalist)	
Chan (2012)	251 Gifted Students (43.82% females; M_{age} = 12.68, *SD* = 2.42; China)	School recommendation	Non-experimental / Cross-sectional	APS-R	• HP (↑HS, ↑ORD, ↓DIS) • UP (↑HS, ↑DIS, ↑ORD) • NP (↓HS, ↓DIS, ↓ORD)	Satisfaction with life; Happiness; Mindset (fixed/growth)	(a) HP > UP (happiness) (b) HP > NP (growth mindset) (c) UP > HP, NP (fixed mindset)	12 (71%)

Dixon et al. (2004)	142 Gifted Students (60.09% females; M_{age} = 15.97, *SD* = .41; USA)	Enrolled in advanced program/school (entry based on multiple forms of gifted identification)	Non-experimental / Cross-sectional	F-MPS	• Mx-Ad (↑PStan, ↑PE, ↑O, ↓COM, ↓DAA, ↓PCrit) • Mx-Mal (↑COM, ↑DAA, ↑PE, ↑PCrit, → PStan, ↓O) • PP (↑PStan, ↑COM, ↑DAA, ↑PE, ↑PCrit, ↑O) • NP (↓PStan, ↓COM, ↓DAA, ↓PE, ↓PCrit, ↓O)	Psychological symptomology; Positive adjustment; Self-esteem (Academic competence; Personal security); Coping (problem-focussed/emotion-focussed/dysfunctional)	(a)	PP, Mx-Mal > Mx-Ad, NP (negative psychological symptoms, adjustment issues, & dysfunctional coping mechanisms)	12 (71%)

Kornblum & Ainley (2005)	612 students (59.80% Gifted Students; 28.27% females; M_{age} = 13.90; AUS)	Enrolled in advanced program/school (entry based on multiple forms of gifted identification)	Non-experimental / Cross-sectional	F-MPS	• HP (↑PStan, ↑O, ↓CMD, ↓PEC) • DP (↑PStan, ↑CMD, ↑PEC, ↑O) • NP (↓PStan, ↓CMD, ↓PEC, ↓O)	Gifted status; Grade level; Gender	(a)	HP, DP, & NP groups identified	12 (75%)
Mofield & Parker Peters (2015b)	153 Gifted Students (54% females; 6th–8th Grade; USA)	Enrolled in advanced program/school (entry based on multiple forms of gifted identification)	Non-experimental / Cross-sectional	GWHS	• FP (→PStan, →COM, → DAA, →PE, →PCrit, → O) • UP (↑COM, ↑DAA, ↑PE, ↑PCrit; → PStan, →O)	Coping strategies	(a) (b)	UP > FP > NP (internalising coping) UP, FP > NP (problem solving)	12 (71%)

					• NP (↓PStan, ↓COM, ↓DAA, ↓PE, ↓PCrit, ↓O)			
Parker & Mills (1996)	Sample A: 600 Gifted Students (33.50% females; M_{age} = 11.98; *SD* = .40; USA) Sample B: 418 students (43.30% females; M_{age} = 11.97; *SD* = .38; USA)	Achievement test scores	Non-experimental / Cross-sectional	F-MPS	• HP • DP • NP	Socioeconomic status of parents; Gender; Gifted status	(a) Females more likely to be in the HP group *versus* males (b) Males more likely to be in the NP group *versus* females (c) No group differences evident between gifted and non-gifted groups	11 (69%)
Parker (1997)	820 Gifted Students	Achievement test scores	Non-experimental /	F-MPS	• HP (↑O, → PStan, →PE,	Self-evaluation (adjective check list), Personality (five-	(a) HP > NP > DP (self-esteem & parental perceptions of social-	12 (71%)

	(37.40% females; 6th Grade; USA)		Cross-sectional		→TP, ↓COM, ↓DAA, ↓PCrit) • DP (↑PStan, ↑COM, ↑DAA, ↑PE, ↑PCrit, ↑TP) • NP (↓PStan, ↓PE, ↓O, ↓TP)	factor model); Self-esteem; Maladjustment; Parental perceptions of child adjustment, behaviours, and goals	emotional adjustment) (b) HP > NP, DP (extroversion, agreeableness, & conscientiousness) (c) HP > DP > NP (parental perception of academic development) (d) DP > HP [> NP] (depression [& parental success orientation]) (e) DP > NP > HP (neuroticism)	
Parker (1998)	828 Gifted Students (37.90% females; 6th Grade; USA)	Achievement test scores	Non-experimental / Cross-sectional	F-MPS	• HP • DP • NP	Birth order; Family size	(a) Youngest children more likely to be in the NP group and less likely to be in the DP group (b) Only children more likely to be in the HP group and less likely to be in the NP group	11 (69%)
Parker et al. (2001)	219 students (64.84%	Enrolled in advanced	Non-experimental /	F-MPS	• FP (↑PStan, ↑COM, ↑O,	Gifted Status; Health Issues; Maladjustment	(a) Gifted students most likely to be in the NP group and least likely	10 (63%)

	Gifted Students; 29.22% females; M_{age} = 15.80; *SD* = 1.30; CZE)	program/school (entry based on achievement test scores)	Cross-sectional		→DAA, → PE, ↓PCrit) • UP (↑COM, ↑DAA, ↑PE, ↑PCrit, → PStan, ↓O) • NP (↓PStan, ↓COM, ↓DAA, ↓PE, ↓PCrit, ↓O)		(b) Typical students most likely to be in the UP group and least likely to be in the NP group. (c) No significant group differences relating to health issues or maladjustment	
Portešová & Urbánek (2013)	2005 Sample: 97 Gifted Students (22.70% females; CZE) 2010 Sample: 95 Gifted Students	Enrolled in advanced program/school (entry based on achievement test scores)	Non-experimental / Cross-sectional	F-MPS	• FP (↑O, → PStan, ↓COM, ↓PE, ↓PCrit) • DP (↑PE, ↑PCrit; → COM, ↓PStan, ↓O)	Personality (five-factor model); Self-efficacy	(a) FP, Mx-Mal/Mx-Ad > DP (conscientiousness, emotional stability, self-efficacy, & openness/intellect)	10 (59%)

	(30.50% females; CZE)				• Mx-Mal/Mx-Ad (→/↑PStan, →/↑COM, →/↑PE, → /↑PCrit, → /↑O)		

Note. Instru. = Instrument, PS = perfectionistic strivings, PC = perfectionistic concerns; F-MPS = Multidimensional Perfectionism Scale (Frost et al, 1990), APS-R = Almost Perfect Scale–Revised (Slaney et al., 2001), GWHS = Goals and Work Habits Survey (Schuler, 2000); HP = Healthy perfectionists, DP = Dysfunctional perfectionists, NP = Non-perfectionists, UH = Unhealthy perfectionists, Mx-Ad = Mixed adaptive perfectionists, Mx-Mal = Mixed maladaptive perfectionists, PP = Pervasive perfectionists, FP = Functional perfectionists; PStan = Personal standards, O = Organisation; COM = Concern over mistakes, DAA = Doubts about actions, CMD = Concern over mistakes and doubts, PE = Parental expectations, PCrit = Parental criticism, PEC = Parental expectations and criticism, HS = High standards, ORD = Order; DIS = Discrepancy; ↑ = High levels; → = Moderate levels; ↓ = Low levels; →/↑ = Moderate-to-high levels; MQS = Methodological Quality Score; The MQS is provided as a total score and percentage of maximum possible score per study (in parentheses).