

■ Perceived Family Support and Self-Esteem: The Mediational Role of Emotional Experience in Adults with Dyslexia

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Although a growing body of literature shows that perceived family support (PFS) influences self-esteem in adults with dyslexia, little empirical attention has been given to the mechanisms through which this effect operates across early, middle, and late adulthood. The present study examined the mediational effect of emotional experience with dyslexia (EED, emotions stemming from living with an often misunderstood and stereotyped learning difficulty) that may account for the empirical link between PFS and self-esteem. The participants were 224 adults with self-identified dyslexia (average age = 49.1 years, males = 64.7%) who participated in a Web-based survey. A bootstrapping analysis (a new approach to mediational analysis) revealed that EED mediated the relationship between PFS and self-esteem across the entire sample and in early and middle adulthood. The mediational effect was strongest in early adulthood. Implications of these findings are discussed. Copyright © 2011 John Wiley & Sons, Ltd.

Keywords: Dyslexia; adults; emotions; self-esteem; perceived family support; mediator

INTRODUCTION

In contrast to the burgeoning etiological and neural studies on the causes of specific learning difficulties (LD) such as dyslexia, and instructional remediation research, empirical inquiry in the life experiences and socio-emotional adjustment of adults with dyslexia has lagged behind (Ingesson, 2007). This is disconcerting because dyslexia is the most common of specific LD in United Kingdom (British Dyslexia Association, 2011) and the United States (Shaywitz, 1998). There is increasing evidence that as children with dyslexia mature, their struggles with language-based tasks including reading, writing, and spelling persist into adulthood (Undheim, 2009). Accordingly, the field is in need of rigorous research to guide practice and address the needs of adults with dyslexia/LD (Gerber, 2009).

There appears to be heightened interest in the relationship between individuals with dyslexia/LD and self-esteem. Although the terms self-esteem and self-concept are distinctly different in meaning, Burden (2008) argues that aspects of self-esteem along with self-concept and self-worth can be used synonymously throughout much of the literature. Self-esteem is the evaluative component of self-concept. Whereas self-concept denotes the perceptions that individuals ascribe to themselves with regard to behavioral

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performance, self-esteem refers to positive or negative evaluations or feelings about those perceptions (Burden, 2008). Self-esteem indicates the degree to which one experiences oneself as worthy and capable, while low self-esteem results in feelings of unworthiness, inadequacies, and deficiencies (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995). We consider self-esteem to be a multi-faceted construct, tapping into one's overall self-worth, social competence, problem-solving ability, intellectual ability, and self competence and worth relative to others (Nugent & Thomas, 1993). Self-esteem plays a fundamental role in psychosocial adjustment and functioning in adulthood (Benyamini, Leventhal, & Leventhal, 2004; Crocker & Luhtanen, 2003; Hunt & Guindon, 2010; Orth, Robins, Trzesniewski, Maes, & Schmitt, 2009).

The empirical literature suggests that children, adolescents, and adults with dyslexia are at risk for low self-esteem (Burden, 2008). Studies indicate that adults with dyslexia who perceive their parents or family as supportive report more positive self-esteem than those who do not perceive their family as such (Hellendoorn & Ruijsenaars, 2000; Ingesson, 2007; McNulty, 2003; Stampoltzis & Polychronopoulou, 2009). Despite the growing body of literature on the relationship between perception of family support and self-esteem in adults with dyslexia, the mechanisms or mediating variables through which family support exerts its influence on self-esteem have not been explored in the extant literature. Some research suggests that supportive family relationships may influence the emotional well-being of adults with dyslexia (Hellendoorn & Ruijsenaars, 2000; McNulty, 2003). Taken together, the emerging literature suggests that the presence of family support (or lack thereof) may promote positive or negative emotional experience, which in turn influences self-esteem. Understanding the relationships between family support, emotional experience, and self-esteem is vital because it will inform future research endeavors, practice, and policy initiatives since that empirical evidence on the subject is lacking.

The present study is informed by the findings of Phase I of an ongoing research project on the psychosocial aspects of adult dyslexia (Nalavany, Carawan, & Rennick, 2011). The purpose of Phase I was to select, coalesce, organize, and depict the psychosocial experiences of adults with dyslexia within a parsimonious yet comprehensive visual representation using concept mapping methodology (a mixed qualitative-quantitative approach). Three clusters that ostensibly represented a host of emotionally based experiences of living with dyslexia as an adult serve as the basis for the present study. We review the literature on the interrelationships among perceived family support (PFS), emotional experience with dyslexia (EED), and self-esteem. We also present background data on the present study and specify our mediation model by clarifying terminological, statistical, and conceptual confusion within the risk and resiliency research on adults with dyslexia.

LITERATURE REVIEW

Perceived Family Support and Self-Esteem

The most salient dimension of social support is theorized to highlight the 'perception' of support (Turner, Sorenson, & Turner, 2000). In other words, 'social support is likely to be effective only to the extent perceived' by the individual (House, 1981). In this study, we were influenced by Weiss's 1974 conceptualization of the provisions of social relationships specific to family. We define PFS as giving one the perception that one is cared for, esteemed, validated, and assisted by one's family (Turner, Frankel, & Levin, 1983; Turner

et al., 2000). It is almost impossible to discuss the self-esteem of adults with dyslexia without first considering self-esteem in childhood.

Children come into the world with neuro-cognitive differences which can positively or negatively impact the child's sense of self. These neuro-cognitive differences along with early family influences inform the child's construction of the world (Palombo, 1991). According to psychodynamic theory and Palombo (1985, 1991, 2001), the affirmative role of 'caregiver' [which typically means family] is significant in the building of positive self-esteem in children with LD. Development of the sense of self is affected by the ability of the child to function well in areas influenced by the LD. While families may begin the process of helping their children with dyslexia by supporting them academically in their early life at elementary school, the process typically grows to include other kinds of support. According to Palombo, families who attend not only to the child's learning needs but also focus on the emotional issues that are typically a part of LD play an important role in building the child's development of positive self-esteem.

According to adult attachment researchers, there is increasing support that early childhood experiences with caregivers serve as the foundation for the development of healthy self-esteem and adjustment across the life span (Bartholomew, Kwong, & Hart, 2001). Also, a growing body of literature maintains that PFS influences self-esteem in adults with dyslexia/LD. Adults with dyslexia continue to have common experiences and difficulties throughout the different life stages (Hellendoorn & Ruijsenaars, 2000; Ingesson, 2007; McNulty, 2003; Riddick, Farmer, & Sterling, 1997). For example, while the emotional, psychological, and social challenges that began in childhood may be experienced differently in adulthood (e.g., graduating from college, obtaining and keeping a job, developing social relationships), these challenges frequently persist and continue to affect self-esteem. In McNulty's (2003) study, the 'central plot of the participants' lives were characterized by the interplay between the functional challenges of their learning disabilities [difficulties] and the related self-esteem issues' (p. 363). By school age, all participants in his study experienced self-esteem problems. McNulty also emphasized the need for support from family and significant others. Hellendoorn and Ruijsenaars' (2000) study looked at how 27 Dutch adults with dyslexia coped with dyslexia in particular and their life as a whole. Interestingly, the researchers found that the adults in this study saw parental support as the 'most powerful source of help' (p. 237) at the elementary school period of their life. This is an important finding because the perception of support in elementary school was also related to satisfaction with adult life. More recently, in the study of Greek university students with dyslexia ages 19 – 26, Stampoltzis and Polychronopoulou (2009) noted that positive parental support is mentioned as one of the implications that promote successful outcomes and self-esteem even when the students had primary school memories that had a negative effect on their self-esteem.

How or why does the association between PFS and global self-esteem come to be? An overview of the literature on this aspect suggests that adults' PFS may influence their self-esteem indirectly by way of affecting emotional pathways. In what follows, we briefly discuss empirical evidence of a unique emotional experience that is inherent in living with dyslexia and explanations on PFS and its association with such emotional experience.

Perceived Family Support and Emotional Experience

The literature shows that adults with dyslexia have a range of emotional experience in their lives and that many of these experiences are affected negatively by their dyslexia (Hellendoorn & Ruijsenaars, 2000; McNulty, 2003; Nalavany *et al.*, 2011; Riddick, Sterling,

Farmer, & Morgan, 1999; Stampoltzis & Polychronopoulou, 2009; Wilson, Armstrong, Furrrie, & Walcot, 2009). For instance, McNulty's (2003) qualitative study examined the life stories of 12 adults with dyslexia and emphasized the related emotional experience throughout their adulthood. All participants came from middle to upper class backgrounds which according to McNulty likely provided them with access to resources that less affluent persons may not have had. McNulty believes that 'when a learning disability [difficulty] is diagnosed, a unique set of emotional experience [feelings of sadness and depression, stress, anxiety, past pain, and exhaustion] ensues that involves living over time with a hidden phenomenon that is prone to misunderstanding' (p 365). Even with the affluence that allows for more resources, the participants in the McNulty study 'noted an added sense of insecurity that was related to their lifelong struggles' (p. 379) with dyslexia.

Such lifelong struggles and emotional distress may be related to living in a society that associates literacy with educational and occupational success. Hence, adults with dyslexia often are the subject of negative perceptions, stereotypes, misunderstandings, and discrimination (Denhart, 2008). On an intrapersonal basis, adults with dyslexia/LD are often anxious about being exposed as 'learning disabled' and often equate their literacy challenges with being 'stupid' (Denhart, 2008; Gerber, Reiff, & Ginsberg, 1996; McNulty, 2003). On an interpersonal level, adults with dyslexia often describe negative school experiences as being emotionally painful and not easily forgotten in adulthood (Hughes & Dawson, 1995; McNulty, 2003). Such traumatic experiences may be replicated in adulthood when the disclosure of their dyslexia/LD to others, including teachers and bosses, is often met with misunderstanding and discrimination (Denhart, 2008). Such experiences heighten the emotional challenge that accompanies dyslexia/LD.

Clearly, the literature shows that the negative emotional experience of dyslexia that begins in childhood continues throughout adulthood. Once they move from childhood to early adulthood, expectations from self and others begin to change. For example, one is typically expected to be in college or to have a job by the early 20s years of age. By the early 30s, the expectation is that one is on a career track, is self-sufficient, and has established meaningful social relationships. But for the young adult with dyslexia/LD, this is often a precarious and vulnerable life stage fraught with new learning and emotional stress (Cosden & McNamara, 1997; Gerber & Reiff, 1991; Hellendoorn & Ruijsenaars, 2000).

A clear body of research connects social support to emotional well-being (House, Umberson, & Landis, 1988; Vaux, 1988). More recent work demonstrates the association of social support to psychosocial adjustment for individuals who fit within the broader category of disabilities and/or difficulties (Chwalisz & Vaux, 2000). In the case of adults with dyslexia, for example, there is awareness of the emotional toll that dyslexia takes on these adults. However, there is a small body of research that speaks to the importance of families providing emotional support for the adult who lives in a world that is not dyslexic/LD friendly (Hellendoorn & Ruijsenaars, 2000; McNulty, 2003). Previous research (Goldberg, Higgins, Raskind, & Herman, 2003; Hellendoorn & Ruijsenaars, 2000; Spekman, Goldberg, & Herman, 1993; Wilson *et al.*, 2009) suggests that young adults with dyslexia need a longer period of family support to achieve independence, to manage emotional turmoil. Research supports that families often use the strengths perspective in assisting their young adults with dyslexia/LD. This is often played out by assisting them in finding 'niches' that fit their strengths and offering much needed emotional support. The notion of 'niches' is echoed in the dyslexia/LD literature (Gerber, Ginsberg, & Reiff, 1992; Gerber & Reiff, 1991; Goldberg *et al.*, 2003; Hellendoorn & Ruijsenaars, 2000; McNulty, 2003). This process of family support may promote the self-esteem in adults with dyslexia/LD indirectly through emotional pathways.

Emotional Experience and Self-Esteem

There appears to be a foundational role in the relationship between EED and self-esteem. Much of the research points to the importance of developing creative emotional strategies to cope with adulthood (Goldberg, Higgins, Raskind, & Herman, 2003; McNulty, 2003). More relevant to our study is the research by Davis, Nida, Zlomke, and Nebel-Schwalm (2009) who compared 34 students (ages 18 – 29) with a diagnosis of LD to 34 students with no diagnosis of LD. To the best of our knowledge, the Davis *et al.* (2009) study is the only research that has examined mediators of adjustment in adults with dyslexia/LD. With the statistical procedures as outlined by Baron and Kenny (1986), the link between LD status and quality of life was explained or mediated by global anxiety and sadness. Our study seeks to extend the work of these researchers by using more advanced statistical methods to examine whether EED mediates the relationship between PFS and self-esteem.

The Present Study

To explain our mediational model more thoroughly, it is important to clarify possible terminological and statistical confusion over the concept ‘family/social support’ in the risk and resiliency research on adults with dyslexia. In the literature, a host of authors use the term ‘protective’ or ‘risk’ factor in describing research findings that show adults who have supportive parents, siblings, and relatives adapt more successfully to the demands of adulthood than those who report a lack of such family support (Goldberg *et al.*, 2003; Hellendoorn & Ruijsenaars, 2000; Morrison & Cosden, 1997; Wilson *et al.*, 2009). Risk factors are conceptualized as factors that are related with the increased probability of an individual developing an emotional or behavioral disorder relative to a randomly selected person from the general population (Garmezy, 1983). Other processes, called protective factors, may be working to buffer, modify, or ameliorate a person’s response to some environmental hazard that predisposes a negative outcome (Rutter, 1985). Protective and risk factors are special types of moderating variables (Rose, Holmbeck, Coakly, & Franks, 2004). On a conceptual level, moderators address ‘when’ or ‘for whom’ a variable most strongly predicts an outcome. Any effects of the independent variable on the outcome are conditional on, or contingent upon, values of the moderator (see Figure 1, bottom). This is denoted statistically by an interaction with the independent variable (Fairchild & McQuillin, 2010).

Again, in the risk and resiliency research, literature on adults with dyslexia there appears to be confusion over the proper statistical analysis of ‘family/social support’ conceptualized as a ‘protective factor’. For example, using correlational and multiple regression analyses, Hellendoorn and Ruijsenaars (2000) stated that ‘support from parents emerged as a powerful protective factor’ (p. 237) in the adjustment of 27 young adults with dyslexia. More recently, Wilson *et al.* (2009) used logistic regression to predict the psychosocial adjustment of a large, nationally representative sample of 680 adults with LD (203 with self-reported dyslexia) and 12,265 adults without LD. These authors concluded that ‘The importance of social support as a protective factor was found in the current study’ (p. 36). However, the data-analytic procedures failed to test for whether family/social support moderates or protects against negative adjustment outcomes. Rather, Hellendoorn and Ruijsenaars (2000) and Wilson *et al.* (2009) assessed for main effects or the predictive utility of family/social support in determining psychosocial adjustment. In diagrammatic form, this is more akin to path c (top) depicted in Figure 1. According to Figure 1, bottom, family/social support was not analyzed as a protective

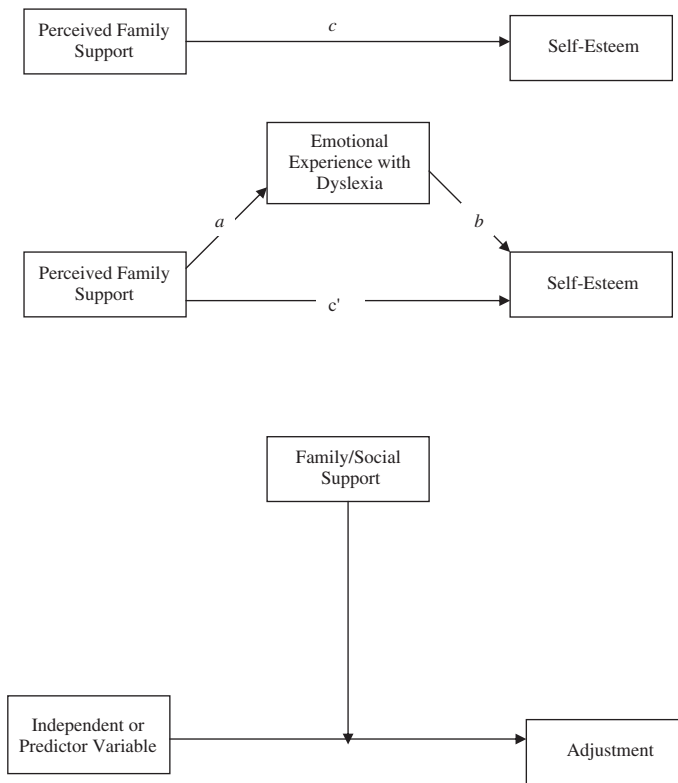


Figure 1. Conceptual model for the simple mediation model (top and middle) and example of a moderation model (bottom). Path c (top) represents the total effect, while paths a , b , and c' , (middle) represent direct effects. Paths ab represent the indirect or mediated effect.

factor. Such an analysis would entail, for instance, a hierarchical moderated regression to examine main effects and interaction effects (e.g., acceptance of dyslexia or coping skills as the predictor X family support as the moderator or protective factor) on psychosocial adjustment (Fairchild & McQuillin, 2010). It is important to realize that the terminological confusion and the use of improper statistical methods to test for hypothesized moderated effects has been reported throughout the social and behavioral sciences (Holmbeck, 1997). Our review is not meant to discredit the work of Hellendoorn and Ruijsenaars (2000) and Wilson *et al.* (2009) since their findings make invaluable contributions to the understanding of the adjustment of adults with dyslexia. Rather, conceptualizing and analyzing moderated effects using recommended strategies can help promote theory development and refinement and positively affect practice.

Given the preceding literature review and especially the findings of Hellendoorn and Ruijsenaars (2000) and Wilson *et al.* (2009), the association between PFS and self-esteem (that is, path c in Figure 1, top) appears to be well established. The present study aims to extend the extant findings by proposing a mediation model whereby PFS positively affects the self-esteem of adults with dyslexia indirectly through emotional pathways (that is, Figure 1, middle). In contrast to a moderator variable, a mediating variable answers 'how' and 'why' the association between an independent variable and an outcome variable comes to be. In other words, 'the independent variable causes the mediator which then causes the outcome' (Shadish & Sweeney, 1991, p. 199). More specifically, our primary

hypothesis is that the effect of PFS on self-esteem is transferred or mediated through adults' EED including exhaustion, stress, anxiety, sadness, depression, self-consciousness, and feeling of being overwhelmed (see Figure 1, middle). In this paper, we do not conceptualize PFS as a risk or protective factor. While in a future manuscript, we will examine further the role of PFS as a protective or risk factor, in this manuscript, we proposed that positive PFS would decrease negative EED which in turn would promote higher self-esteem. Responding to Gerber's call (2009) for an adult development perspective in researching adults with LD, we tested the mediation model across early, middle, and late adulthood (as well as the entire sample) and, based on the preceding literature review, hypothesized that the mediational role would be most pronounced in early adulthood.

METHODS

Survey Development and Procedures

This study involved a cross-sectional, web-based survey of adults with self-identified dyslexia. The purpose of the project was to identify the experiences that facilitate or hinder adults with dyslexia in living successful and satisfying lives. We systematically followed proposed guidelines for web-based survey research (Dillman, 2000) and web-based survey research for individuals with a broad range of disabilities (J. A. Cook *et al.*, 2007). The website included a URL link to the survey, a video and narrative overview of the study, biographies of the researchers and contact information, summary of Phase I, and project updates. It was important to the research team that potential survey respondents have some type of 'connection' with the team. Personalized contacts with respondents before the actual survey are the factors most related to higher response rates in Web surveys (C. Cook, Heath, & Thompson, 2000).

Adults age 21 years and older with diagnosed or self-reported dyslexia were eligible for the University Institutional Review Board approved study and were recruited with nonrandom sampling methods due to the difficulty with gaining access to this population (Gerber, 2009). First, we attempted to recruit respondents through various social-media optimization methods, such as Facebook. Second, announcements were placed in the various newsletters of organizations that advocate on behalf of adults with dyslexia/LD. Additional methods were initiated between May 1, 2010 and August 16, 2010. First, a video introducing the study was posted on Youtube and the website's homepage. Second, 15 International Dyslexia Association state branch presidents agreed to post information about the project on their home webpage or inform their membership via their listserv. Last, alumni who were enrolled in a private school exclusively for adolescents with dyslexia/LD were contacted via email and invited to visit the project homepage.

To access the survey, participants clicked on a link on the website's homepage. This led them to an introductory webpage and informed consent information. Participants who wished to keep their responses anonymous did not fill out the contact information at the end of the survey. Survey completers could choose to enter a lottery to win one of ten \$25 prizes.

Participants

A total of 228 individuals completed the survey, and 22 individuals partially completed it. This represents a 91.2% completion rate. The findings described herein are only from those who completed the survey. Over 30% of participants did not complete the contact information. The majority of participants who completed the contact information resided

in the United States with a limited number of participants from Canada and the United Kingdom. We omitted one participant who was under age 21 and three participants who did not provide their birth data, yielding an analysis sample of 224. Table 1 presents the characteristics of the 224 participants and across the three developmental phases. A majority of the participants (83.1%) responded 'yes' to having a specific diagnosis of dyslexia, while all participants self-identified as having dyslexia.

Measures

Independent variable: Family support. PFS was measured by the Provisions of Social Relations (Turner et al., 1983) family support dimension, which is capable of capturing both tangible and emotional support. Six items (e.g., 'My family lets me know they think I am a worthwhile person') are rated on a 5-point scale ranging from (1) *Not at all like me* to *Very much like me* to (5). The items were summed, with higher scores reflecting more family support. The Cronbach's alpha reliability of this measure was .88.

Dependent variable: Self-esteem. Self-esteem was measured using the Self-Esteem Rating Scale (SERS) (Nugent & Thomas, 1993). The SERS is a 40-item instrument designed to provide a measure of self-esteem as a multi-faceted concept capable of assessing problematic as well as positive dimensions of self-esteem in adults. The SERS has excellent psychometric properties (Nugent & Thomas, 1993). The items are rated on a 7-point Likert scale, with total scores ranging from -120 to +120. Positive scores reflect higher self-esteem. The items focus on a range of areas that are important as they relate to dyslexia, including overall self-worth, social competence, problem-solving ability, intellectual ability, and self-competence and worth relative to others (e.g., 'I feel confident in my ability to learn new things; I feel that other people are smarter than I am'). The Cronbach's alpha reliability of this measure was .97.

Table 1. Sample descriptive characteristics by entire sample and adult development

Variable	Entire Sample	Early Adulthood	Middle Adulthood	Late Adulthood
	(n = 224)	(n = 57)	(n = 117)	(n = 50)
1. PFS	25.02(5.54)	25.77(5.07)	24.95(5.71)	24.34(5.68)
2. EED	87.06(28.60)	91.93(27.43)	87.97(27.96)	79.38(30.29)
3. SERS	51.17(40.77)	46.21(41.55)	49.92(40.39)	59.74(40.28)
4. ADD	17.4%	28.1%	14.5%	12.0%
5. ADHD	6.7%	8.8%	6.8%	4.0%
6. Anxiety/Depression	21.4%	31.6%	17.9%	18.0%
7. Age	49.06(14.55)	31.21(5.87)	49.06(5.63)	69.39(7.49)
8. Bachelor's Degree or Higher	60.7%	57.9%	60.7%	64.0%
9. Gender (male)	64.7%	63.2%	60.7%	76.0%
Race/ethnicity	87.5%	86%	85.5%	94.0%
10. Caucasian	12.5%	14%	14.%	6.0%
Other (African American, Hispanic/Latino(a), Asian Pacific/Islander, Bi-racial)				

Note. Mean (Standard Deviation)

PFS = Perceived Family Support (Provisions of Social Relations)

SERS = Self-Esteem Rating Scale

EED = Emotional Experience with Dyslexia

Mediator variable: Emotional experience with dyslexia. As noted earlier, based on Phase I (Nalavany et al., 2011), the data that comprise the mediator variable, EED, were based on three clusters: On Being Overwhelmed, Emotional Downside, and Pain, Hurt, and Embarrassment from Past to Present. Concept mapping is suitable for the development of scale domains or factors (Kane & Trochim, 2007). Participants were instructed to rate the items given their personal experience with dyslexia. Items were rated on a 7-point scale ranging from (1) *Strongly disagree* to (7) *Strongly agree*. In addition to the original cluster items, 14 additional items were assessed for their use in the present study.

Based on the confirmatory factor analysis and reliability analysis (Nunnally & Bernstein, 1994), 20 items were summated (17 of the original cluster items) to represent an EED indicator, whereby higher scores reflect elevated levels of stress, anxiety, sadness, depression, exhaustion, and self-consciousness and other emotionally based experiences associated with dyslexia. The EED indicator demonstrated excellent internal consistency yielding an alpha coefficient of .95. Example items are: 'Coping with dyslexia leads to exhaustion', 'Even as an adult I experience sadness about my dyslexia', 'I have concerns, worries, and anxieties about others understanding what I'm trying to communicate', and 'I experience a lot of anxiety and stress regarding my dyslexia'.

Adult Developmental Stage. Early adulthood was conceptualized to span the ages between 21 and 39, middle adulthood 40 to 59, and late adult 60 and over.

Control variables. We include several covariates in the mediation analysis: ADD, ADHD, a current diagnosis of depression or anxiety, current age at time of survey (in years), gender, and education (interval). These variables have been shown to be related to indices of adjustment (Able, Johnston, Adler, & Swindle, 2007; Morrison & Cosden, 1997; Riggs & Han, 2009).

Data analytic strategy. We explored EED as an important mediator between PFS and self-esteem by testing a simple mediation model. A simple mediation model tests the extent to which a variable, called a mediator (i.e., EED), accounts for the association between the independent variable (i.e., PFS) and the outcome variable (i.e., self-esteem) (Preacher & Hayes, 2004). As recalled, a mediator model answers 'how' and 'why' the association between an independent variable and an outcome variable comes to be. In evaluating mediation, it is important to differentiate between various effects and their consequent weights. According to Figure 1, the *total effect* (unstandardized regression coefficient or weight of path *c*) of an independent variable (i.e., PFS) on a dependent variable (i.e., self-esteem) is derived from a *direct effect* (weight of path *c'*) of the independent variable (i.e., PFS) on the dependent variable (i.e., self-esteem) and a mediated or *indirect effect* (weight of path *ab*) of the independent variable (PFS) on the dependent variable (self-esteem) through the hypothesized mediator (EED). Weight path *a* denotes the direct effect of the independent variable (PFS) on the mediator (EED), while weight path *b* signifies is the direct effect of the mediator (EED) on the dependent variable (self-esteem), while removing the influence of the effect of the independent variable (PFS) and any control variables.

We used a state-of-the-art nonparametric resampling method called bootstrapping to evaluate the indirect effect (Preacher & Hayes, 2004). We used an SPSS macro (available for download on quantpsy.org) that accompanies the papers by Preacher and Hayes (2008) and allows for the inclusion of control variables. In contrast to the casual steps approach to mediation popularized by Baron and Kenny (1986), bootstrapping directly

tests the indirect effects while minimizing Type I and Type II errors and does not assume that the indirect effect is normally distributed (Hayes, 2009). Point estimates and 95% confidence intervals are produced for the indirect effects. The estimate of the indirect effects is statistically significant when zero is not contained in the 95% confidence interval (Preacher & Hayes, 2004). This corresponds to an alpha level for significance at .05 and is the criterion for all analyses. We described the extent of mediation across the subsamples (i.e., entire sample, early, middle, and late adulthood) by examining the unstandardized indirect effect (Hayes, 2009) and by calculating the proportion mediated, which is the ratio of indirect effect to total effect (Shrout & Bolger, 2002).

Results

Bivariate analyses

PFS was negatively correlated with EED ($r = -.43, p < .05$) and positively associated with self-esteem ($r = .50, p < .05$). EED was significantly negatively associated with self-esteem ($r = -.77, p < .05$). A diagnosis of ADD and a current diagnosis of anxiety or depression was negatively associated with PFS, positively associated with EED (i.e., higher levels of emotional reactivity), and negatively associated with self-esteem, respectively. As for gender, being a male was positively associated with PFS, negatively associated with EED, and positively associated with self-esteem. Higher academic achievement was negatively associated with EED and positively associated with self-esteem. Current age at time of survey was also negatively associated with EED.

Mediation analyses. Although tests of mediation are not contingent upon independent tests of total and direct effects (Hayes, 2009), the results of these analyses are depicted in Figure 2 but not described in text.

As for the entire sample, the bootstrapping results revealed that the indirect effect (i.e., the difference between the total and direct effects) of PFS on self-esteem through EED was significant, with a point estimate of 1.51 and a 95% confidence interval excluding zero ($CI_{.95} = .923, 2.20$). This indirect effect held over and beyond the nonsignificant influence of the control variables. Put differently, as PFS increases by one unit, self-esteem increases by 1.51 units (or between .923 and 2.20 units given the confidence interval) as a result of PFS's negative effect on EED (i.e., promotes less emotional reactivity) which in turn positively affects self-esteem, while holding the control variables constant. Examination of the proportion of effects mediated shows that 48.6% of the total effect of PFS on self-esteem is mediated by EED.

As for early adulthood, the bootstrapping results revealed that the indirect effect of PFS on self-esteem through EED was significant, with a point estimate of 1.96 and a 95% confidence interval excluding zero ($CI_{.95} = .854, 3.80$). This indirect effect held over and beyond the nonsignificant influence of the control variables. Examination of the proportion of effects mediated shows that 54.4% of the total effect of PFS on self-esteem is mediated by EED. With regard to middle adulthood and in comparison to the early adult subsample, the indirect effect and proportion of effects mediated are relatively smaller in magnitude. The bootstrapping results revealed that the indirect effect of PFS on self-esteem through EED was significant, with a point estimate of 1.36 and a 95% confidence interval excluding zero ($CI_{.95} = .587, 2.19$). This indirect effect held over and beyond the nonsignificant influence of the control variables. Examination of the proportion of effects mediated shows that 43.0% of the total effect of PFS on self-esteem is mediated by EED. The findings for

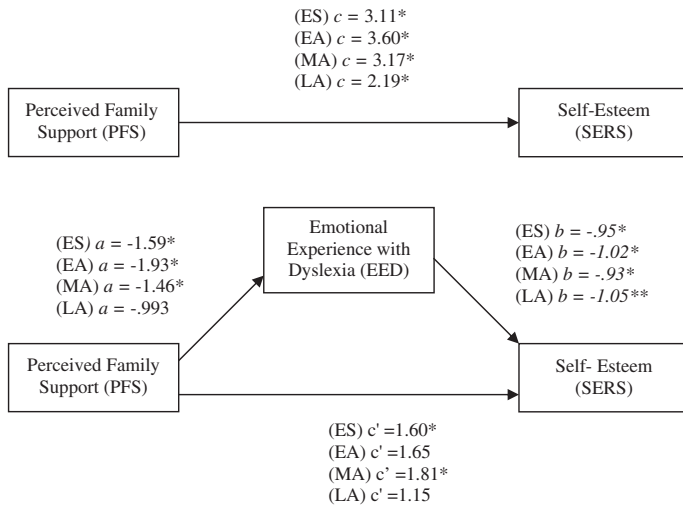


Figure 2. Model of the mediational role of emotional experience with dyslexia (EED) in the relationship between perceived family support (PFS) and self-esteem across the entire sample (ES), early adulthood (EA), middle adulthood (MA), and late adulthood (LA). (PSR = Provisions of Social Relation) and global self-esteem (SERS) = Self-Esteem Rating Scale). Unstandardized regression coefficients are denoted by each path.

the late adulthood subsample are quite different in comparison to the early and middle adulthood analyses. Current age had a negative effect on self-esteem ($b = -1.47, p < .01$). EED was not found to be a significant mediator as its confidence interval contained zero (point estimate of 1.04, $CI_{.95} = -.184, 3.45$).

Discussion

Emotional experience with dyslexia as a mediator. As far as we are aware, no study had empirically tested the mechanism through which PFS influences self-esteem in adults with dyslexia. Our findings demonstrate the importance of emotions as a mechanism that may explain the link between PFS and self-esteem across the entire sample, early, and middle adulthood. Adults with dyslexia tended to have higher self-esteem because PFS directly decreased negative EED which subsequently directly facilitated positive self-esteem. This finding held even when gender, age, academic achievement, a current diagnosis of ADD, ADHD, and anxiety/depression were accounted for.

As hypothesized, the mediational role of EED was strongest for early adulthood accounting for a larger point estimate and proportion mediated as compared to middle adulthood. In late adulthood, no mediational influence was found. This finding suggests that early adulthood is a vulnerable period for adults with dyslexia. For example, as discussed in the literature review, completing post-secondary school, navigating work, and developing satisfying social relationships are often more difficult for this group as compared to their non-dyslexic peers (Cosden & McNamara, 1997). During this transition, young adults with dyslexia are perhaps at the most precarious point in their lives. In this stage of adult development they are besieged with problems such as concealing their learning challenges from others, losing accommodations that they may have depended on while attending post-secondary school, adapting to increasing school or job demands, and adjusting to new life experiences. Reconciling the emotional experience emanating from their challenges with

dyslexia becomes a monumental developmental task in adulthood (Hellendoorn & Ruijsseenaars, 2000; McNulty, 2003).

Our research extends the literature by highlighting the pivotal role family support may have in the lives of adults with dyslexia in early adulthood and middle adulthood. Family support was shown to be instrumental in helping adults with dyslexia positively conciliate their EED. This finding is consistent with studies from the LD literature. Goldberg *et al.* (2003) noted that adults with LD often sought the support of parents and siblings in helping them manage emotional turmoil related to their learning challenges. In part, this might explain why adults with LD in early to early-middle adulthood reported more favorable mental health outcomes when they perceived higher levels of both social and emotional support (Wilson *et al.*, 2009). Particularly in early adulthood, adults with dyslexia who perceive their family as supportive appeared to possess adaptive emotional qualities. When adults' EED is less poignant in their lives via the support received by family, self-esteem is directly enhanced.

The findings revealed that PFS had a less influential bearing on self-esteem through its effect on EED in middle adulthood and no impact in late adulthood. There might be two plausible explanations for this finding. First, the transitional phase and corresponding life struggles associated with having a LD are most pronounced in early adulthood. Second, growing self-awareness that often accompanies the early adulthood stage enables adults with dyslexia/LD to choose academics, careers, and social contexts that punctuate their 'niches' or strengths (Goldberg *et al.*, 2003; Hellendoorn & Ruijsseenaars, 2000; McNulty, 2003). Family support may also play an integral role in helping adults with dyslexia find and validate such niches. Further, 'niche awareness' tends to foster the development of high self-esteem in adults with dyslexia (McNulty, 2003). By middle adulthood, the need for day-to-day family support may be less acute as a result of refined 'niche finding'. The role of family support likely helped prepare and provide the foundation for the middle aged adult much earlier in life.

It is important to stress that the literature on self-esteem in late adulthood has garnered little research in the general population (Orth, Trzesniewski, & Robins, 2010). This combined with a paucity of research on the psychosocial adjustment of older adults with dyslexia/LD (Gerber, 2009) renders any discussion of our findings and implications as tentative. As for late adulthood, adults with dyslexia may be less vulnerable to negative emotional experience associated with their LD due to any number of factors, including being at peace with one's niches, retirement, and a resultant decrease in situations where they may be less self-conscious of their learning differences (e.g., work, post-secondary school). Family support may also be less available due to the passing of their natural support systems and therefore less central in impacting emotional experience. Accommodating emotional experience associated with the life-long journey in living with dyslexia may also have stabilized self-esteem. Crocker and Wolfe (2001) stressed that healthy adult development entails the ability to look inward for affirmation of self-esteem rather than seeking external validation as the source of one's self-esteem. This inward reflection is represented by increases in personality characteristics including emotional stability and a resultant increase in self-esteem. With these extrapolations in mind, it is possible that emotional experience and/or family support moderates or serves as a protective or risk factor in late adulthood. A forthcoming study will examine this hypothesis.

Limitations of the Study and Implications for Future Research

As with all research, this study possessed several limitations. The first concern is the generalizability of these findings due to sample biases inherent in online surveys. We

sought participants using a single home-based website and nonrandom procedures. We are unable to determine the degree to which our sample is representative of the general population of adults with dyslexia. Nonetheless, the completion rate of 90% is indicative of the advantages of this method in researching adults with dyslexia. Second, we acknowledge that reciprocal relationships could be possible between the variables (e.g., self-esteem predicating EED). However, the hypothesized mediation models were extrapolated from extant literature on adults with dyslexia and LD. Third, longitudinal data collected over developmental periods will yield greater insights on the trajectory of adult outcomes than cross-sectional data (Murray, 2003). Future research may benefit from a longitudinal mediational design whereby PFS is measured before EED after which self-esteem is measured. Third, researchers could investigate other plausible mediating variables (e.g., self-awareness, self disclosure, coping skills, life satisfaction).

Implications

The findings of the current study have important implications to practice, policy, and research for three extant bodies of literature: PFS, EED, and self-esteem. To the best of our knowledge, the present study is the first to explore how EED accounts for the relationship between PFS and self-esteem, using advanced statistical methods and a large sample size.

A growing body of research suggests that families and schools not only focus on the literacy needs of children with dyslexia but just as importantly on their emotional well-being and self-esteem (Griffiths, Norwich, & Burden, 2004; Norwich, Griffiths, & Burden, 2005). Our findings also imply that the substantial role parents have in their child's early life may be just as important in early and middle adulthood. Parents of adults with dyslexia need to understand that the transition to early adulthood may be particularly excruciating for the adult offspring. Parents also play a crucial role in cultivating an adult offspring's emotional reactions to a LD which in turn positively affects self-esteem. Just as support services are necessary for adults with dyslexia throughout the lifespan (McNulty, 2003), parents and family members may also benefit from support services. In addition, we agree with Hellendoorn and Ruijsenaars (2000) that future research should include the voices of parents to further understand their experiences and perspectives. Both mental health and educational professionals may be instrumental in educating and coaching parents and other family members in realizing the value their support will have especially in early adulthood. Such awareness may prepare family members for the emotional and tangible support that might be needed to help the individual with a LD develop healthy self-esteem. This support may include encouraging these individuals as they struggle with post-secondary school success, helping them pursue an employment career that capitalizes on their strengths, coping with increasing job demands, accommodating social relationship, making decisions to self-disclose, and to be sure, helping them reconcile emotions as they relate to an invisible LD that is often misperceived by the general public. Adults with dyslexia report that being stereotyped as being stupid, mentally incapacitated, cheating, and lazy extols a greater emotional burden on their lives than do their language-based difficulties (Denhart, 2008; McNulty, 2003). Attachment theorists stress the importance of a child having a sense of 'felt security' in times of emotional distress (Bartholomew *et al.*, 2001). This security is provided in a 'holding environment' by caregivers (Bowlby, 1977). Families also need to be aware that they can provide this same kind of solace or 'holding environment' into adulthood whereby they normalize the emotional experience and help protect adults with dyslexia from pervasive negative social perceptions (McNulty, 2003). Parents should be reminded that continued emotional and practical support, especially in early adulthood, need not be perceived

negatively as overbearing or stifling the independence of their adult offspring with dyslexia (Hellendoorn & Ruijsenaars, 2000). As such, enduring parental and family support may foster the development of healthy self-esteem indirectly through positively affecting emotional experience.

The findings also have implications for the adult with dyslexia given the foundational role EED has in the relationship between PFS and self-esteem. Goldberg *et al.* (2003) found that those adults with LD who were deemed 'successful' developed creative strategies to overcome emotional challenges. These strategies included an awareness of situations that might trigger anxiety, seeking professional help, asking for assistance, compartmentalizing emotions so negative repercussions would not occur, ignoring critical people, making goals achievable by planning ahead, reconciling family and peers-related problems, and changing tasks occasionally so stress would not mount (Goldberg *et al.*, 2003). Adults with dyslexia could benefit from actively pursuing and perfecting such emotional coping strategies. Mental health counselors, teachers, and tutors, as well as parents and family members who understand the emotional toll of living with a LD can ultimately encourage and validate such compensatory strategies. This in turn will enhance the development of high self-esteem.

Conclusion

These findings suggest that the social and emotional impact of living with an often stereotyped and misunderstood LD does not end in childhood. It is crucial for parents and family members to understand that their support is not only critical in childhood but perhaps just as important during the demands of early adulthood. Helping their adult family member reconcile the complex array of emotions that are inherent in living with dyslexia is a task that requires ongoing assistance. Future research is needed to shed more light on the developmental trajectory of adults with dyslexia.

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