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ORIGINAL PAPER

Predicting the Outcomes of Parents of Transition-Age Youth or Young Adults with ASD

Venus Wong[1] · John McGrew[2] · Lisa Ruble[3]

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Abstract
The transition outcomes for individuals with autism spectrum disorder (ASD) and their families are less than desirable. A survey of parent stressors, resources, coping/appraisals, and adaptation to transition was completed by 226 parents. The mediating mechanisms between stressors and parent outcomes were identified. At the indicator level, three stressors (i.e., autism severity, mental health crisis/challenging behaviors, and filial obligation), four resources (i.e., general social support, transition planning quality, parent–teacher alliance, and parenting efficacy), and three coping styles (i.e., problem-focused coping, avoidance-focused coping, and optimism) predicted parents' outcomes (i.e., burden, transition experience, subjective health, and quality of life). At the structural level, optimism, emotion-coping strategies, and resources mediated the relationships between stressors and parental outcomes. Research and practical applications are discussed.

Keywords Family outcomes · Family-centered support · Parent experience · Transition-aged adolescents with ASD · Young adults with ASD

Introduction

Each year, approximately 50,000 teens with autism spectrum disorder (ASD) turn 18 in the United States (Shattuck et al. 2012), highlighting the daunting and urgent need to ensure that these students are prepared to exit school with necessary skills for young adulthood. The Workforce Innovation Opportunity Act (WIOA) defined transition aged youth as ranging from 14 to 24 years of age and tasked the public sector (e.g., schools, Vocational Rehabilitation agencies) with transition-related support. However, transition outcomes of students with ASD are poor and considerably worse than peers with other types of disabilities (Cameto et al. 2004; Shattuck et al. 2011; Howlin et al. 2004; Shattuck et al. 2012).

These negative transition outcomes and experiences can impact parents because they continue to provide support and advocate for their adolescents and adult–children with ASD (Smith et al. 2010; Ankeny et al. 2009; Hanley-Maxwell et al. 1998). In fact, about 80% of adult children with ASD continue to live with their parents after high school (Shattuck et al. 2011). Thus, the responsibility to care for their adult children with ASD often takes a toll on parents. Parents of children with developmental disabilities show more depressive symptoms, poorer health, and lower functional abilities compared to parents of an adult child without a disability (Seltzer et al. 2011; Bitsika and Sharpley 2004; Seltzer et al. 2011). Having a child with autism may also negatively impact other life domains, such as marital satisfaction (Rodrigue et al. 1990), marital status (Seltzer et al. 2011), and financial health (Parish et al. 2015).

Family-Centered Transition

Evidence suggests that family involvement in the transition process is associated with positive postsecondary outcomes (Hagner et al. 2012; Test et al. 2009); yet it is often neglected in daily practices (Dempsey and Keen 2008; Dunst 2002; Kucharczyk et al. 2015). More than 40% of parents reported

✉ Venus Wong
vwhwong@ucdavis.edu

[1] MIND Institute, UC Davis, 2825 50th Street, Sacramento, CA 95817, USA

[2] Indiana University - Purdue University Indianapolis, 402 North Blackford Street, Indianapolis, IN 46202, USA

[3] Educational, School, and Counseling Psychology, University of Kentucky, 237 Dickey Hall, Lexington, KY 40506, USA

that their youth's IEP goals were determined mostly by the school (Cameto et al. 2004), indicating that parents often were not the core decision makers in the planning process. Many of the parents were not even informed about transition planning (Cameto et al. 2004; Snell-Rood et al. 2020) or the availability of effective post-secondary interventions that can lead to gainful employment (e.g., Comprehensive Transition and Post-secondary programs; US Department of Education 2008; Ankeny and Lehmann 2011; Moore and Schelling 2015).

In addition to focusing on the youth, a successful transition should also be based on how the parents perceive the transition process and their outcomes (Neece et al. 2009). That is, the transition process and goals should take parent well-being into consideration. To facilitate family-centered practices for transition planning, researchers and practitioners need a better understanding of the risk and protective factors at the parent and family levels. Research is necessary because a lack of studies focusing on parents' perspectives and experiences limits our ability to develop and evaluate family-centered transition planning approaches (Gerhardt and Lanier 2011; Yu et al. 2018).

ABCX Model and Protective Factors at the Family Level

In the current study, the ABCX Model (McCubbin and McCubbin 1996) was used to conceptualize and analyze parent adaptation and adjustment experiences during the transition process (Lustig 1999). Under this model, parent-level outcomes are treated as adaptation outcomes. The ABCX model includes three predictors of adaptation (X)—stressors (A), resources (B), and family coping and perception (C).

Stressors (A) are defined as life events or transitions that have an impact on the family system (e.g., the severity of autism; McCubbin and Patterson 1983) and the cumulative effects of daily stressors over time (Lavee et al. 1985). For example, increased symptoms of ASD (an indicator of severity) are associated with poorer parent expectations, knowledge, and worries when compared to; parents of children with Down syndrome, learning disabilities, and cerebral palsy (Blacher et al. 2010). Maladaptive behaviors (Lounds et al. 2007) and the child's poor health status (Aschbrenner et al. 2010) are further indicators of severity and can negatively impact parents' well-being. Aging parents of maturing children with ASD also encounter additional normative stressors, such as deteriorating health, changes to marital status (e.g., loss of spouse), or assuming the caregiving role for another family member (Kim et al. 2003).

Resources (B) are defined as the parent abilities to counteract the negative effects of the stressors (e.g., family's social network), existing resources, and newly developed resources following the crisis experienced by the family (McCubbin and Patterson 1983). In general, even though it is commonly accepted that aging parents may have a higher salary than younger parents (Dykens 2000), those with adult children with disabilities are more economically vulnerable than the general population (Fujiura et al. 1998, 2014). In addition, parents' relationships with their children (Greenberg et al. 2004), support from other adult children (Heller et al. 1997), and social support (such as participating in a support group) are also important protective factors of caregiver well-being and quality of life (Aschbrenner et al. 2010; Chou et al. 2009).

Formal support also plays a critical role. For instance, medical services, such as the child's use of psychotropic medication, are associated with improved caregiver well-being (Lounds et al. 2007). Minnes et al. (2007) also found that receipt of formal services, such as case management and respite care, mediated the impact of stressors on the well-being of parents of adult children with intellectual disability. One critical formal support is school-based support, which can be vital in producing desirable outcomes. The National Longitudinal Transition Study-2 revealed that, among their participants with ASD, 97% attended public schools (Newman et al. 2011). For instance, parent-school relationships (Test et al. 2009), access to career counseling, vocational training (Chiang et al. 2013; Migliore et al. 2012), and vocational rehabilitation services (Carter et al. 2012; Roux et al. 2018) were related positively to both important learning and transition outcomes. Schools can provide a variety of evidence-based supports to help during the transition, such as occupational courses, access to internships, and instruction for self-advocacy (Test et al. 2009). However, many schools' transition practices are inadequate, such as not providing enough social and work-related interventions or chances to demonstrate self-determination during transition (Wehman et al. 2014). The common disconnection between in-school and post-school services indicates that schools often fail to act as a medium to facilitate a seamless transition (Hendricks and Wehman 2009; Snell-Rood et al. 2020), and highlights the need to understand the role of schools as sources of support during transition (Wehman et al. 2014).

Family coping and perception (C) are defined as the family's views of the crisis (e.g., perceived impacts; McCubbin and Patterson 1983) and the family's general orientation to dealing with stressful situations (e.g., overall appraisal, coping strategies; Florian and Dangoor 1994). For example, Greenberg et al. (2004) found that optimism—seeing positivity and expecting positive events in life was a mediator between positive parent–child relationships and parents' well-being. Qualitative studies have also explored the potential importance of optimism in response to family stress (Heiman 2002). Similarly, Minnes et al. (2007) found that parental negative perceptions of aging mediated

the relationship between parental health and parental depression. Coping styles also have been related to caregiver outcomes. For example, mothers of adults with intellectual disability using emotion-focused coping reported lower levels of well-being whereas, use of problem-focused coping resulted in a reduction in stress (Kim et al. 2003). However, some other studies failed to find similar effects (Pottie and Ingram 2008). In contrast, passive-avoidance coping has been consistently found to be negatively associated with positive parent outcomes (e.g., McGrew and Keyes 2014).

Finally, **family adaptation (X)** is the outcome of the adaptation and adjustment process and is a product of the "A", "B", and "C' components (Lavee et al. 1985). Williamson and Perkins (2014) observed that parents' economic, mental, and physical health outcomes are important family-level outcomes. Parents' overall well-being, absence of mental disorders, stress, and quality of life have been commonly used as parental outcomes in previous studies (e.g., Manning et al. 2011; McGrew and Keyes 2014). However, the level of overall family adaptation of those with adolescents and young adults with ASD is under-researched (Seltzer et al. 2000).

The ABCX model provides a helpful framework to organize these variables and further explore these issues. The purpose of the current study was to apply the ABCX model to answer two primary research questions: (1) What are the predictors of positive transition outcomes as perceived by parents? (2) Do B (stressors) and C (coping and perceptions) mediate the relationships between A (resources) and X (adaptation) as predicted by the ABCX model?

Method

Participants

Parents (N = 252) were recruited through Amazon Mechanical Turk, a crowdsourcing marketplace that enables a wide reach of participants online; each participant received $7 for their involvement. The survey contained five attention check questions which were randomly distributed throughout the survey (e.g., Please check "yes"). Participants who did not pass the attention check questions were screened out, resulting in a sample of 226. It is worth noting that six (2.7%) of the participants were not the parents but assumed the parenting roles of at least one transition-age youth with ASD. These relationships included uncles or older cousins. All participants were located in the United States. The parenthood status and location were verified by Amazon Mechanical Turk and IP addresses. All the participants reported that their youth/young adults had an IEP during high school and received a clinical diagnosis of ASD from a psychologist, psychiatrist, or other type of medical doctor. Autism severity was obtained using the Social Communication Questionnaire (SCQ; Rutter et al. 2003). Around 11.5% of the participants reported a SCQ score less than 11, which fails to meet the usual cutoff to confirm a diagnosis of ASD (Allen et al. 2007). However, we decided to retain the parents of individuals with ASD with minimal autism symptoms because approximately 10–15% of individuals with ASD obtained more favorable adult outcomes, described as "symptom-free"(Seltzer et al. 2004). The tendency for decreased ASD symptomology in older age (Howlin and Moss 2012) implies that some adults with ASD with fewer autism symptoms may no longer meet the diagnostic criteria. In addition, the percentage of adolescents and young adults with a SCQ score below 11 is similar to the percentage reported in the Seltzer's (2004) study. Since all the parents reported that their youth/young adults were receiving special education services or received such services before they graduated from high school, we believe that our sample is a good representation of the whole spectrum of ASD that can help us understand transition-age youth during the transition process. Out of precaution, the same analyses reported below were repeated using a sample (N = 200) that contains only parents of youth/young adults with an SCQ score at or above 11. The results showed similar patterns. Thus, we utilized the full data set (N = 226) in reporting the results. Overall, the majority of the parents were white (77%) and female (68.2%). Half of them had a college degree. See Table 1 for more information.

Measures

A-Resources

Transition-Aged Youth's Autism Severity The Social Communication Questionnaire (SCQ; Rutter et al. 2003) is a dichotomously rated (Yes/No), 40-item questionnaire that measures the severity of autism, with higher scores indicating greater autism symptom severity. A score of 11 indicates an elevated likelihood of an ASD diagnosis (Norris and Lecavalier 2010). The SCQ has good sensitivity and specificity in identifying autism (sensitivity = .85, specificity = .75; Norris and Lecavalier 2010) and good reliability (α = .80; McStay et al. 2014).

Transition-Aged Youth's Adaptive Skills The 17-item Waisman Activities of Daily Living (W-ADL) Scale was used to evaluate the adaptive skills of individuals with disabilities. Items are rated using a three-point Likert scale (0 = does not do at all; 1 = does with help; 2 = independent). The W-ADL has demonstrated good construct validity and internal consistency (α = .88-.94; Maenner et al. 2013).

Table 1 Demographics

	N	%
Parent variables		
Race		
White	174	77.0
African American	24	10.6
American Indian/Alaska Native	3	1.3
Asian	5	2.2
Latino or Hispanic	10	4.4
Bi-or Multi-racial	10	4.4
Family annual income		
Less than or = $20,000	13	5.8
$20,001–$25,000	15	6.6
$25,001–$30,000	25	11.1
$30,001–$35,000	10	4.4
$35,001–$40,000	14	6.2
$40,001–$45,000	11	4.9
$45,001–$50,000	14	6.2
$50,001–$55,000	7	3.1
$55,001–$60,000	19	8.4
$60,001–$65,000	12	5.3
$65,001–$70,000	9	3.0
$70,001–$75,000	14	6.2
$75,001–$80,000	14	6.2
More than $80,000	49	21.7
Highest education		
High school graduate/GED	25	11.1
Some college	65	28.8
Technical or trade school	21	9.3
College graduate	85	37.6
Advanced graduate or professional degree	30	13.3
Gender		
Female	154	68.1
Male	72	31.9
	Mean (SD)	Range
Age	40.68 (7.23)	23–65
Number of children	2.40(1.24)	1–7
Number of children with ASD	1.06(.31)	0–3
	Mean (SD)	Range
Child variables		
Age (years)	17.34 (1.65)	16–24
	N	%
Gender		
Female	69	30.5
Male	157	69.5
Graduated from high school		
Yes	70	31
No	156	69

Transition-Aged Youth's Mental and Behavioral Health Crisis/Challenging Behaviors The 28-item Health Crisis Assessment Scale (HCAS; Kalb et al. 2017) uses a hybrid scale to measure the presence of emotional and behavioral symptoms in a child. After indicating relevant symptoms, the parent then selects the most dangerous behavior and rates the acuity of such behavior and their efficacy in managing the behavior. HCAS has demonstrated good internal consistency ($\alpha = .87$), construct validity, criterion validity, and convergent validity (Kalb et al. 2017). The HCAS was also used as a proxy measure of challenging behaviors because its first section measures the severity of 14 types of challenging behaviors. That is, injures or hurts self, physically aggressive towards others, etc. ($\alpha = .89$). The overall scale correlated highly with the 14-item first section ($r = .84$).

Family Accumulative Stressor The 43-item Social Adjustment Rating Scales (SRRS; Holmes and Rahe 1967) was used to measure general life stressors. Items are rated using a six-point Likert scale (1 = not experienced; 5 = experienced with extreme stress). The SSRS has demonstrated good internal consistency (Cronbach's $\alpha = .87$; Stuart and McGrew 2009).

Parent's Filial Obligation The Filial Obligation Scale (FOS) was adapted by the author based on the measure reported by Dautzenberg et al. (2000) ($\alpha = 82$; Mangen et al. 1988). The original measure intended to evaluate one's perceived responsibilities for taking care of their own aging parents in six domains (e.g., providing companionship, helping and supporting their parents with household chores and transportation, providing advice and guidance, providing personal and health care, providing housing, and financial support). The modified version asked about the frequency/amount of support provided for aging parents in the aforementioned six areas using a five-point-Likert scale (1 = None or almost none to 5 = Yearly). For financial support, a three-point Likert scale was used (1 = None or almost none to 3 = Fully support). The sum score was used to represent overall filial obligation.

Household Income Annual household income was measured using a single 14-point anchored scale. Each 1-point increase represented a $5000 increase in income (1 = Less than or equal to $20,000 to 14 = More than $80,000). Household income was treated as an indicator under A instead of B because it represented parent's financial strain. The CFA (Confirmatory Factor Analysis) analysis below confirmed that household income loaded significantly on A rather than B in the current model.

B-Resources

Parent's General Social Support The 12-item Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al. 1990) was used to measure general social support. Items are rated using a seven-point Likert scale (1 = very strongly disagree to 7 = very strongly agree). The MPSS has demonstrated good internal consistency (α = .92; Zimet et al. 1990).

Parent's Transition-Related Support The 33-item Transition Quality Questionnaire was used to assess the quality and quantity of the transition support provided by the school. Items were rated using a four-point Likert scale. Items for the TPQQ were developed by the authors based on the best-practices for transitioning youth (Landmark et al. 2010) Indicator 13, and focus group data collected from more than 40 stakeholders (e.g., policy makers, parents, teachers; Snell-Rood et al. 2020). The TPQQ demonstrated good internal consistency in the current sample ($\alpha = .94$).

Parent–Teacher Relationships The 20-item Parent–Teacher Alliance Questionnaire (PTAQ) was used to measure parents' perceptions of the parent–teacher relationship. Items are rated using a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). The PTAQ has demonstrated good internal consistency ($\alpha = .95$; Krakovich et al. 2016).

Religious Support/Faith The 10-item Santa Clara Strength of Religious Faith Questionnaire (SCSRFQ; Plante and Boccaccini 1997) was used to assess level of faith. Items are rated using a four-point Likert scale (1 = Very disagree to 4 = Very agree). The scale has demonstrated good internal consistency ($\alpha = .94$ to .97; Plante 2010).

Parenting Efficacy The 8-item adapted Mastery Subscale of the Revised Caregiver Appraisal Scale (MS-RCA) as modified by Weiss, Tint, Paquette-Smith, and Lunsky (2016) was used to measure parenting efficacy. Items are rated using a five-point-Likert-scale (1 = disagree a lot/never to 5 = agree a lot/nearly always). The scale has good internal consistency ($\alpha = 0.80$; Weiss et al. 2016).

C-Coping and Appraisal

Parental Coping Strategies The 28-item Brief COPE (Carver 1997) was used to assess coping style. Items are rated using a four-point Likert scale (1 = I haven't been doing this at all to 4 = I've been doing this a lot). Three coping subscale scores were used: problem-focused, emotional approach, and passive-avoidance coping. The subscales have demonstrated good internal consistency ($\alpha = .60$ to .81; Stuart and McGrew 2009).

Parental Optimism The 10-item Life Orientation Test-Revised (LOT; Scheier et al. 1994) was used to measure optimism. Items are rated using a five-point Likert scale. The LOT has adequate test–retest reliability (ICC = .72) and internal reliability ($\alpha = .69$– .72; Hirsch et al. 2010).

X-Family Adaptive Outcomes

Parent Burden The 21-item Caregiver Strain Questionnaire (CGSQ; Brannan et al. 2003) was used to measure parent stress and burden. Items are rated using a five-point Likert scale (1 = not at all a problem to 5 = very much a problem). The CGSQ has demonstrated good internal consistency (α = .94; Stuart and McGrew 2009).

Parent-Perceived Transition Experience The 21-item Transition Daily Rewards and Worries Questionnaire (TDRWQ; Glidden and Jobe 2007; Menard et al. 2002) was used to measure parents' perception of rewards and concerns towards the transition process. Items are rated using a five-point Likert scale. The scale has demonstrated adequate internal consistency (α = .74–.85), test–retest reliability ($r = .56$–.68), convergent validity, and divergent validity (Conti-Ramsden et al. 2008).

Parent-Perceived Family Quality of Life The Beach Center Family Quality of Life Scale (FQoL; Hoffman et al. 2006) contains 25 items rated using a five-point-Likert-scale (1 = very Dissatisfied to 5 = Very satisfied). It has demonstrated good internal reliability (α = .88–.94; Hoffman et al. 2006), test–retest reliability ($r = .59$–.63), convergent validity, and construct validity (Hoffman et al. 2006).

Parent Subjective Health Participants rated their health using a single item "please rate your overall health" using a four-point scale (1 = Poor to 4 = Excellent). See Table 2 for additional information about the measures.

Structural Equation Models

For the second research question, a structural equation model was developed based on a prior qualitative study (Yu et al. 2018) and a detailed literature review as summarized in the previous section with a consideration of the availability of psychometrically sound measures and participant's burden. In the current model, six indicators were selected to represent A, stressors, i.e., child's autism severity, child's adaptive skills, child's mental health crisis, family accumulative stressors, parent's filial obligation, and household income. Five indicators, including parent's general social support, parent's transition-related support, parent–teacher relationships, religious support/faith, and parenting efficacy, were used to represent B, resources. Four indicators,

Table 2 Means, standard deviations, and internal consistency of measures in the current study

Measure	No. items	M	SD	α
SCQ	40	17.82	6.50	.82
W-ADL	17	20.69	6.26	.87
MCAS	28	21.11	6.04	.89
SRRS	22	64.42	22.66	.94
FOS	6	12.03	6.14	.87
MSPSS	20	64.64	17.46	.96
TPQQ	33	103.29	14.72	.94
PTAQ	21	83.27	14.14	.95
SCSRFQ	10	25.04	10.89	.99
MS-RCA	8	29.86	5.54	.84
Problem-focused coping	6	16.16	3.88	.76
Emotion-focused coping	10	24.67	5.82	.78
Passive avoidance coping	12	19.77	6.38	.83
LOT	10	34.97	8.42	.88
CGSQ	21	42.73	18.51	.96
TDRWQ	28	94.22	19.41	.94
FQoL	25	95.68	17.01	.96

including problem-focused coping, emotion-focused coping, avoidance coping, and optimism, were used to represent C, coping and appraisal. Lastly, X included four indicators, parent burden, parent transition experience, family quality of life, and parent subjective health. Two default models were assessed to test the reciprocity of the B and C elements as proposed by the ABCX model (McCubbin and McCubbin 1996). Mixed results have been found about the direction of the effects between B and C (i.e., Does B cause C or the reverse?; Carver et al. 2010). Because the current model is cross-sectional it cannot support recursively related paths between B and C. Thus, the first SEM model included only the paths from C to B, while the second one included only the paths from B to C.

Data Analysis

The data were tested for multicollinearity, outliers, and missing data using the VIF and Tolerance indices, Cook's Distance, and Little's Missing Completely at Random Test (MCRT), respectively. There was no evidence of multicollinearity or significant outliers. However, the MCRT indicated that data from three measures, the PTAQ, BRIEF-COPE, and CGSQ, were not missing at random, even though the missing data were no more than 0.2% per each item. We deleted all the cases (N = 26) that contained at least one missing response for these three measures and created a "cleaned" dataset. Due to the absence of major differences between the two datasets and the scattered missing data pattern, we decided to impute the missing data in the original dataset using the Expectation–Maximization (EM) approach in SPSS 24. Correlational analyses and linear regression analyses were conducted using SPSS 24 to answer research question one.

Structural equation modeling (SEM) was conducted using AMOS 24. Assuming 4 latent variables and 19 observed variables in the model, a p-level of .05, a two-tailed test, a power of at least .80, and a large effect size of .50, a sample of 91 would be sufficient to test the anticipated structural equation modeling (SEM; Soper 2017). Prior to testing the mediational hypotheses, we conducted four CFA models verifying the latent A, B, C, and X variables. To test our mediational hypothesis for research question two, we used SEM to develop two partially latent structural regression models. We evaluated the model fit using the following standard measures of practical fit: RMSEA, CFI, TLI, and NFI. Modification indices and recommendations were used for improving the fit of the model. Nonsignificant effects were removed from the model. The two models were compared based on the AIC index, BIC index, parsimony, and theoretical relevance.

Results

Correlation

Due to the large number of variables in the correlation matrix, only the correlations with the four X outcomes (i.e., parent burden, parent transition experience, family quality of life, and parent subjective health) and other A, B, C variables are reported. All four outcome variables were significantly correlated with autism severity, adaptive skills, mental health crisis, accumulated life events, annual income, social support, transition planning quality, parent-teacher alliance, parent efficacy, avoidance-focused coping, and optimum respectively. Only transition experience and family quality of life were significantly correlated with emotion-focused coping ($r = .18$; $p = .27$). Only family quality of life was positively correlated with problem-focused coping ($r = .18$; $p < .01$), and only parent stress was positively correlated with filial obligation ($r = .18$; $p < .05$). No correlation was found between the four outcome variables and religious faith (see Table 3), although it was strongly correlated with emotion-focused coping ($r = .50$, $p < .01$).

Regression

Simple linear regressions were used to further understand the relationships between the predictors and four outcome variables.

Table 3 Correlations among variables

Measures	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Autism severity (SCQ)	–																	
2. Adaptive skills (W-ADL)	− .46**	–																
3. Mental health crisis	.40**	− .34**	–															
4. Accumulated life events (SRRS)	.20**	− .18**	.50**	–														
5. Filial obligation	.08	− .20**	.21**	.22**	–													
6. Annual income	− .16*	.07	− .20**	− .22**	− .10	–												
7. Social support (MPSS)	− .28**	.31**	− .34**	− .31**	− .02	.25**	–											
8. Transition planning quality (TPQQ)	− .12	.15*	− .02	− .11	.16*	.05	.43**	–										
9. Parent–teacher alliance (PTA)	− .09	.13	− .12	− .31**	.01	.04	.46**	.65**	–									
10. Religious faith (SCSRDF)	.09	− .21**	.20**	.17**	.29**	.03	.06	.17*	.10	–								
11. Parenting efficacy	− .34**	.31**	− .47**	− .41**	− .14*	.12	.48**	.40**	.51**	− .04	–							
12. Problem-focused coping	.07	.10	.14*	.05	.07	.02	.20**	.20**	.18**	.15*	.12	–						
13. Emotion-focused coping	.04	.02	.14*	.10	.15*	.06	.34**	.33**	.22**	.50**	.13	.65**	–					
14. Avoidance-focused coping	.27**	− .28**	.45**	.50**	.25**	− .04	− .40**	− .14*	− .30**	.15*	− .55**	.10	.12	–				
15. Optimism (LOT)	− .28**	.32**	− .33**	− .31**	− .02	.23**	.60**	.32**	.33**	.11	.49**	.21**	.33**	− .44**	–			
16. Parent stress (CSQ)	.40**	− .36**	.51**	.40**	.18*	− .14*	− .42**	− .25**	− .31**	.10	− .55**	.10	− .02	.62**	− .52**	–		
17. Transition experiences (TRAW)	− .43**	.32**	− .27**	− .21**	.05	.16*	.43**	.49**	.44**	.12	.61**	.04	.18**	− .44**	.54**	− .59**	–	
18. Family quality of life (BEACH)	− .30**	.27**	− .31**	− .28**	.10	.21**	.74**	.54**	.56**	.12	.55**	.18**	.27**	− .44**	.58**	− .50**	.61**	–
19. Parent health	− .16*	.14*	− .15*	− .14*	− .08	.18**	.30**	.24**	.14*	.11	.31**	.01	.17	− .19**	.45**	− .24**	.35**	.31**

Parent Burden

Mental health crisis ($b = .50$, $t(210) = 2.61$, $p = .01$), problem-focused coping ($b = .91$, $t(210) = 3.00$, $p = .003$), avoidance-focused coping ($b = .97$, $t(210) = 5.14$, $p < .001$), and optimism ($b = -.44$, $t(210) = -3.14$, $p = .002$) were significant predictors of parent burden. The overall model was significant, $F(15, 210) = 17.72$, $p < .001$, and accounted for 56% of the variance.

Transition Experience

Autism severity ($b = -.61$, $t(210) = -3.82$, $p < .001$), filial obligation ($b = .32$, $t(210) = 2.03$, $p = .04$), transition planning quality ($b = .28$, $t(210) = 3.44$, $p = .001$), parenting efficacy ($b = .91$, $t(210) = 3.00$, $p = .003$), problem-focused coping ($b = -.63$, $t(210) = -2.04$, $p = .04$), avoidance-focused coping ($b = -.56$, $t(210) = -2.92$, $p = .004$), and optimism ($b = .53$, $t(210) = 3.70$, $p < .001$) significantly predicted transition experience. The overall model was significant, $F(15, 210) = 20.35$, $p < .001$, and accounted for 59% of the variance.

Family Quality of Life

Filial obligation ($b = .35$, $t(210) = 2.95$, $p = .004$), social support ($b = .42$, $t(210) = 7.67$, $p < .001$), transition planning quality ($b = .16$, $t(210) = 2.56$, $p < .001$), parent-teacher alliance ($b = .18$, $t(210) = 2.57$, $p = .01$), and avoidance-focused coping ($b = -39$, $t(210) = -2.63$, $p = .01$) were significant predictors of family quality of life. The overall model was significant, $F(15, 210) = 30.01$, $p < .001$, and accounted for 68% of the variance.

Parent Subjective Health

Parenting efficacy ($b = .02$, $t(210) = 2.04$, $p = .04$) and optimism ($b = .03$, $t(210) = 4.61$, $p < .001$) were significant predictors of parent subjective health, while transition planning quality was a marginal predictor ($b = .02$, $t(210) = 1.95$, $p = .05$). The overall model was significant, $F(15, 210) = 5.01$, $p < .001$, and accounted for 62% of the variance (see Table 4).

Table 4 Summary of regression prediction

DV	Parent burden			Parent transition experience			Family quality of life			Parent health		
	Standardized coefficient	Unstandardized coefficients		Standardized coefficient	Unstandardized coefficients		Standardized coefficient	Unstandardized coefficients		Standardized coefficient	Unstandardized coefficients	
IV	*β*	*β*	*SE*	*β*	*β*	*SE*	*β*	*β*	*SE*	*β*	*β*	*SE*
Autism severity (SCQ)	.10	.29	.16	−.21**	−.61	.16	−.05	−.14	.12	−.003	.000	.01
Adaptive skills (W-ADL)	−.07	−.20	.17	.07	.22	.17	−.002	−.01	.13	−.009	−.001	.01
Mental health crisis	.16**	.50	.19	.06	.20	.20	−.03	−.09	.15	.07	.01	.01
Accumulated life events (SRRS)	−.01	−.01	.05	.10	.09	.05	.06	.05	.04	−.01	.000	.002
Filial obligation	.02	.05	.15	.10*	.32	.16	.13**	.35	.12	−.10	−.01	.01
Annual income	−.02	−.07	.20	.08	.33	.21	.06	.22	.16	.07	.02	.01
Social support (MPSS)	.05	.05	.07	−.09	−.10	.07	.43**	.42	.10	.01	.000	.003
Transition planning quality (TPQQ)	−.07	−.08	.08	.22**	.28	.08	.14*	.16	.06	.16+	.01	.004
Parent–teacher alliance (PTA)	−.03	−04	.09	.06	.09	.09	.15*	.18	.07	−.16	−.01	.004
Religious faith (SCSRDF)	.06	.11	.10	.06	.10	.10	.05	.08	.08	.06	.004	.01
Parenting efficacy	−.11	−37	.23	.32**	1.11	.23	.10	.29	.18	.18*	.02	.02
Problem-focused coping	−.19**	.91	.31	−.13*	−.63	.31	.05	.21	.24	−.16	−.03	.01
Emotion-focused coping	−.15	−49	.25	.06	.20	.25	−.06	−.16	.19	.06	.01	.01
Avoidance-focused coping	.34**	.97	.19	−.18*	−.56	.19	−.15**	−.39	.15	.06	.01	.01
Optimism (LOT)	−.20**	−.44	.14	.23**	.53	.14	.10	.20	.11	.48**	.03	.01
R^2	.56			.59			.68			5.01		
F	17.72			20.35			30.09			.26		

+=.05; *=$p < .05$; **=$p < .01$. With the exception of personal accomplishment, higher scores indicate more of the construct

Confirmatory Factor Analyses (CFAs)

CFAs were conducted to confirm the measurement models for each of the four elements of the ABCX model. The four separate CFAs constructed for each of the latent variables (A, B, C, X) found that all the models had good model fit. See Table 5 for the fit indices. However, for Factor C, avoidance coping was not significantly loaded ($\beta = -.15$, $p = .08$) despite the good overall model fit. Also, optimism and avoidance coping were negatively loaded on Factor C. The literature is relatively uninformative about the relationship among the four indicators selected to represent C (e.g., Aldwin and Revenson 1987; Benson 2010). Because the four indicators did not load coherently on C, the four indicators were entered separately in the model. That is, the four indicators were treated as their own constructs. In contrast, the indicators selected were representative of the A, B, and X latent variables. See Fig. 1.

Table 5 CMIN, RMSEA, CFI, and TLI of the four CFA models

Models	CMIN	RMSEA	CFI	TLI	NFI
A	X^2 (8, N = 226) = 12.28, $p = .14$	.05	.98	.96	.94
B	X^2 (3, N = 226) = .4.51, $p = .21$	.05	1.00	.98	.98
C	X^2 (1, N = 226) = .16, $p = .69$	.00	1.00	1.02	1.00
X	X^2 (2, N = 226) = 1.13, $p = .57$	.00	1.00	1.11	.99

Structural Equation Modeling (SEM)

Model 1 (with Only Paths from C to B)

The original model did not demonstrate sufficient model fit, χ^2 (139, $N = 226$) = 529.39, $p < .001$; RMSEA = .11 CFI = .78; TLI = .73; NFI = .73 (see Fig. 2). In this model, five paths were non-significant and were trimmed.

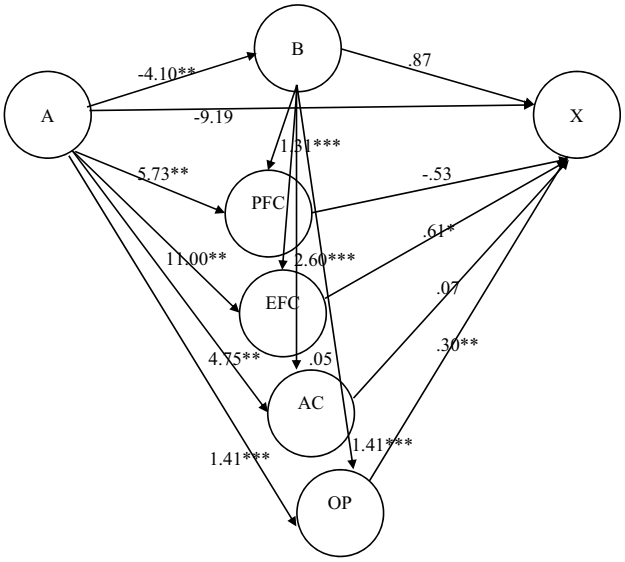

Fig. 2 Model 1; + = .05; = < .05;** = < .03; *** = < .001. *A* = stressors; *B* = resources; *PFC* problem-focused coping, *EFC* emotion-focused coping, *AC* passive-avoidance coping, *OP* optimism; *X* = parent transition outcomes

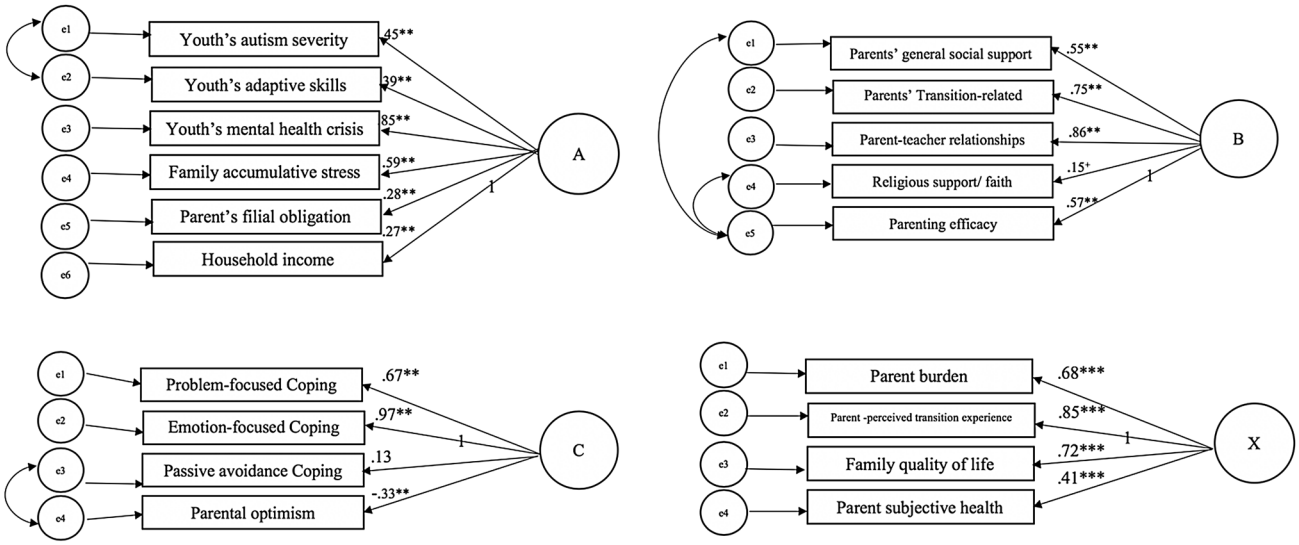

Fig. 1 Confirmatory Factor Analysis (CFA) for latent variable *A*, *B*, *C*, and *X*

Model 1.1

The trimmed Model 1.1 found adequate fit with the data, χ^2 (92, $N = 226$) = 169.05, $p < .001$; RMSEA = .06; CFI = .96; TLI = .94; NFI = .91; AIC = 347.55; BIC = 642.73. Despite a significant overall Chi square statistic, the rest of the fit indices suggest good model fit (see Fig. 3).

Model 2 (with Only Paths from B to C)

The original model did not demonstrate sufficient model fit, χ^2 (139, $N = 226$) = 659.60, $p < .001$; RMSEA = .13 CFI = .69; TLI = .62; NFI = .65. Seven paths were non-significant and were pruned. As a result, problem-focused coping was not significantly related to any variables and was deleted from the model (see Fig. 4).

Model 2.1

The trimmed Model 2 found adequate fit with the data, χ^2 (91, N = 226) = 166.61, $p < .001$; RMSEA = .06; CFI = .95; TLI = .92; NFI = .91; AIC = 326.62; BIC = 600.26. Overall, the fit indices suggest good model fit (see Fig. 5).

Model Comparison

Despite the apparently good model fit indices of the two models, Model 2.1 was preferable to Model 1.1 based on the lower AIC and BIC scores. Also, Model 2.1 was more parsimonious with two fewer paths and was more aligned with the ABCX Model (i.e., with A, B, C, X connected and B and C as mediators) and thus was more interpretable. We selected Model 2.1 as the final model and reported details of the results of Model 2.1 in the following section.

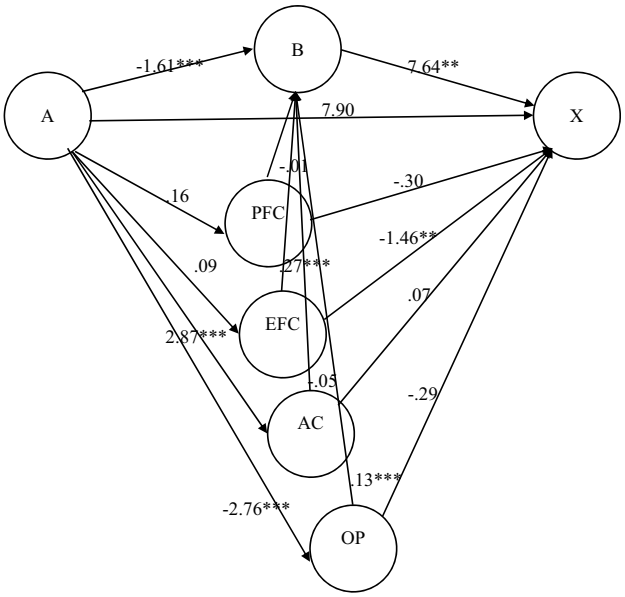

Fig. 4 Model 2; + = .05; = < .05;** = < .03; *** = < .001. *A* = stressors; *B* = resources; *PFC* problem-focused coping, *EFC* emotion-focused coping, *AC* passive-avoidance coping; *OP* optimism; X = parent transition outcomes

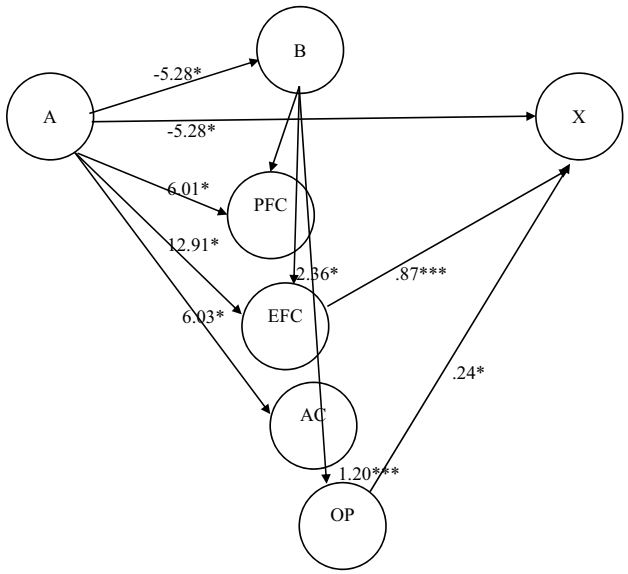

Fig. 3 Model 1.1; + = .05; = < .05;** = < .03; *** = < .001. *A* = stressors; *B* = resources; *PFC* problem-focused coping, *EFC* emotion-focused coping, *AC* passive-avoidance coping, *OP* optimism; X = parent transition outcomes

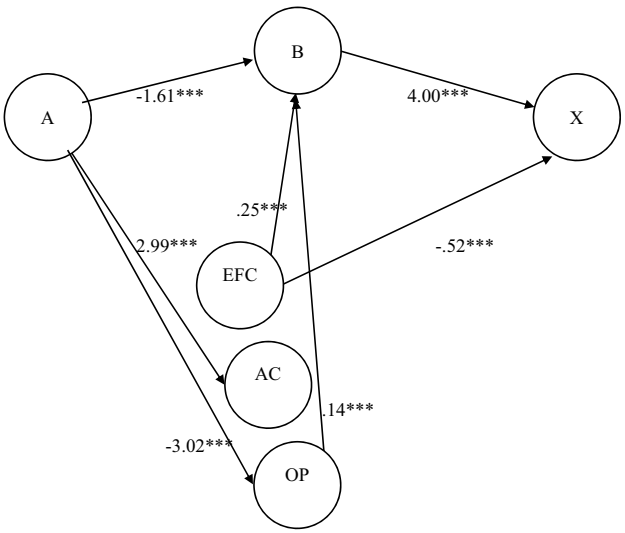

Fig. 5 Model 2.1; + = .05; = < .05;** = < .03; *** = < .001. *A* = stressors; *B* = resources; *PFC* problem-focused coping, *EFC* emotion-focused coping, *AC* passive-avoidance coping, *OP* optimism; *X* = parent transition outcomes

Model 2.1 as the Final Model

Proceeding sequentially through the ABCX model, greater levels of A (Stressors) were associated with lower levels of B (Resources; $\beta = -.1.64$, $p < .001$), greater passive-avoidance coping ($\beta = 2.99$, $p < .001$) and less optimism ($\beta = -3.02$, $p < .001$). That is, with more stressors, parents reported fewer resources, had less optimism, and utilized more avoidance-coping. Second, higher levels of B were associated with higher levels of X ($\beta = 4.00$, $p < .001$). That is, more resources were associated with better parent outcomes. Finally, greater levels of optimism ($\beta = .14$, $p < .001$) and emotion-focused coping ($\beta = .25$, $p < .001$) were related to higher levels of resources or B. However, higher levels of emotion-focused coping also were related to lower levels of adaptation X ($\beta = -.52$, $p = .002$).

Next, the mediating effect in Model 2.1 was examined. The bootstrapping estimate showed a significant indirect effect between A and X through two paths (i.e., A → B → X, A → Optimism → B → X; $\beta = -8.28$, 95% CI = − 13.65 to − 5.74; $p = .002$). That is, overall, stressors were related to poorer adaptive outcomes because parents with more stressors reported being less able to obtain the necessary resources to cope, resulting in poorer adaptive outcomes. Additionally, parents with high levels of stressors also reported being less optimistic, which was in turn related to lower levels of resources, and then to poorer adaptive outcomes.

There was also a significant indirect effect between emotion-focused coping and X through B ($\beta = .99$, 95%, 95% CI .68 to 1.37; $p = .003$). The positive indirect effect was strong enough to override the negative direct effect between emotional-focused coping and X, resulting in a positive, significant total effect ($\beta = .99$, 95% CI .68 to 1.37, $p = .003$).

Discussion

We analyzed a relatively large set of variables and their relationships with four important parent transition outcomes. The findings provided a clearer picture of both the weight of each predictor at the indicator level and the mediating mechanism between A and X at the structural level.

Direct Effect of ABC on X

The regression and correlational analyses provided a detailed representation of the total effects of the 15 predictors on parent burden, transition experience, family quality of life, and parent subjective health. Each is reviewed below.

Stressors (A)

Results from this group of parents of transition-age youth and young adults with ASD are consistent with a previous meta-analysis (Hayes and Watson 2013) and other research findings (e.g., Baghdadli et al. 2014; Rattaz et al. 2017), that *mental health crisis/challenging behaviors* (e.g., elopement, self-injurious behaviors, aggression towards others) are the most significant predictors of parent burden among all the selected stressors.

Autism severity correlated with a negative transition experience. Parents of children with more severe autism symptoms experienced more worry. Similarly, Blacher et als.' findings (2010) also noted that autism, when compared to Down's syndrome, cerebral palsy, and other learning disabilities, correlated with higher levels of worries and restrictive expectations in parents during transition. Parental concerns are validated by findings that positive transition outcomes, such as competitive employment and independent living, are more prevalent among individuals with fewer autism symptoms (Eaves and Ho 2008; Howlin et al. 2004; Taylor and Seltzer 2011). However, similar to Rattaz et al.'s (2017) findings, autism symptomology was not associated with parental quality of life among older parents.

Resources (B)

Transition planning quality emerged as an important predictor of three parent transition outcomes: parent transition experience, parent quality of life, and parent health. Transition planning quality assesses to what extent schools implement evidence-based or recommended practices according to the IDEA, Indicator 13, and existing research literature based on parent perception. *Parent-teacher alliance* was also found to predict family quality of life, yet is often neglected as a source of support in studies predicting parent adaptive outcomes (e.g., Boehm et al. 2015). This result highlights the importance of both quantitative (e.g., compliance with standard practices) and qualitative (e.g., parent-teacher relationship) aspects of school-based transition planning in family-centered transition support and family outcomes. The need to train school personnel to support family-centered support is paramount (Schall et al. 2012; Talapatra 2014; Lillenstein et al. 2006; Aiello and Ruble 2011).

Other than school-based support, *general social support* was also a vital predictor of family quality of life, replicating the importance of informal social support to parents' well-being (Bishop et al. 2007; Ekas et al. 2010). Overall, both formal and informal support predicted better parent outcomes.

In addition to external factors, internal factors also proved to be important. Consistent with previous research with parents, *parenting efficacy* (Carter et al. 2009; Raikes

and Thompson 2005) predicted both parent transition experience and parent health. This finding provides strong evidence for the continual importance of parenting efficacy and its role in transition planning, and encourages future researchers to consider this construct as a potential mechanism of change for effective interventions (Weiss et al. 2016; Keen et al. 2010).

Coping Strategies and Perceptions (C)

Passive-avoidance coping and *optimism* were the two most predictive C factors of parent outcomes across the board. Consistent with previous literature, passive-avoidance coping predicted a lower quality of life (Dardas and Ahmad 2015; Hastings et al. 2005) and has been related to poorer parent outcomes during the transition period (Yu et al. 2018). Similarly, the current results also replicated the positive effects of optimism on positive parent outcomes (Ekas et al. 2010; Greenberg et al. 2004).

Conversely, we found mixed results regarding *problem-focused* and *emotion-focused coping*. Interestingly, higher levels of problem-focused coping predicted lower stress but a poorer transition experience. This finding is somewhat aligned with a relatively large study that showed higher levels of problem-focused coping were associated with better mother outcomes (Smith et al. 2008), but contradicts a study that found a positive relationship between task-oriented coping and stress among parents of young children with ASD (Dabrowska and Pisula 2010). The negative effect found between problem-focused coping and parent transition experience may be explained by the contextual characteristics of coping, meaning that coping is not innately good or bad but is based on the context in which it is expressed (Folkman and Moskowitz 2004). For instance, it is known that schools' transition practices are often not up-to-standard despite parental efforts (Kucharczyk et al. 2015; Snell-Rood et al. 2020). An ineffective educational transition system may negate the effect of strong parental efforts (Yu et al. 2018), aggravating the negative experiences among parents who actively try to tackle problems. Further research is needed to confirm this claim. Similarly, the effect of emotion-focused coping was mixed (Aldwin and Revenson 1987). The results suggested that emotion-focused coping did not have a direct effect on the selected parent outcomes, similar to Benson (2010)'s findings.

Overall, the results support some general practices, such as enhancing parenting capabilities, providing quality family-professional relationships, reinforcing active parent involvement, and providing family-centered approaches proposed by Dunst and Trivette (1996); Aiello and Ruble (2011); Yu et al. (2018).

Indirect Effect of A, B and C on X

To advance our understanding of the relationships between A, B, and C on X, we examined a partially latent structural regression model. The model revealed a significant full mediation effect between A and X through two paths (A → B → X and A → Optimism → B → X). The results showed that resources and optimism mediated the relationship between stressors and parent outcomes. There is a debate about the directional effect between resources and optimism and the reciprocal relationship (Carver et al. 2010). The results supported the claim that optimism motivates individuals to act in ways that lead to more resources. For instance, optimistic individuals are more liked by others and are more likely to seek out social resources (Carver et al. 2010). Optimistic individuals also demonstrate higher goal engagement and attainment of high-priority goals (Geers et al. 2009). In the context of transition, it is possible that optimistic parents not only have more social support, but they are also better able to solve prioritized problems with persistence through available support. However, the full mediation results contrast with a study with parents of young children with ASD (Ekas et al. 2010). In Ekas and colleagues' study, family support was associated with increased optimism, which predicted higher levels of positive maternal outcome (e.g., well-being), suggesting that the directional effect is reversed. This highlights the need to continue to understand the directional effect between optimism and resources. Regardless, the overarching impact of resources highlights the potential of interventions that connect parents with resources during transition (Trainor 2008; Taylor et al. 2017).

Another indirect effect was found between emotion-focused coping and parent outcomes through resources. Unlike optimism, emotion-focused coping had a negative direct effect on adaptive outcomes, but this negative direct effect was counteracted by the positive indirect effect through resources. While this effect may indicate a suppressor effect, it is consistent with some previous findings that emotion-focused coping leads to positive outcomes, such as lower stress levels, among parents of children with ASD (Manning et al. 2011; Hastings et al. 2005; Stuart and McGrew 2009); however, this also supports the paradoxical, negative effect of emotion-focused coping on mental health as summarized by Aldwin and Revenson (1987). The mixed results in the literature may be due to the buffering, countering indirect effect, implying that emotion-focused coping is a double-edged sword—it leads to desirable outcomes if resources are available and obtainable, but has a detrimental effect if used in the absence of resources.

Together, the positive direct and indirect effects of optimism and emotion-focused coping on parent outcomes through resources raises an interesting question: What

coping strategies help parents access necessary resources in order to obtain good family and parent outcomes? It should be noted that avoidance coping leads to poor outcomes across the board. It is also worth noting that the nature of the problems impacts the effectiveness of coping strategies (Pearlin and Schooler 1978). Emotion-focused coping might be more effective in adapting to unsolvable problems (Folkman and Moskowitz 2004; McGrew and Keyes 2014; Wong 2017). It appears that instead of tackling all transition-related stressors directly, staying optimistic and focusing on one's emotional status may be key for gathering support from a system that fails to produce a seamless transition from school to adult service outcomes as promised by IDEA (2004).

Limitations

Due to the malleability of Structural Equation Modeling models (MacCallum and Austin 2000), we encourage readers to interpret the linear regressions and SEM results together. Also, in order to avoid power issues and overloading, the current study did not include important variables, such as repetitive/rigid behaviors (Smith et al. 2008), use of psychotropic medication (Lounds et al. 2007), the presence comorbid conditions such as fragile X syndrome (Abbeduto et al. 2004), and marital relationship (Kersh et al. 2006). Moreover, to reliably untangle the reciprocal relationship between B and C, longitudinal studies are needed.

Conclusion and Research and Clinical Implications

To summarize, we provide a comprehensive picture of the relationships between the 15 predictors and four outcome variables (parent burden, transition experience, family quality of life, and parent subjective health) using a relatively large sample size and propose three research and clinical implications. First, the ABCX model appears to be a useful framework to conceptualize parent experience and parent support during transition from clinical and research perspectives. We encourage researchers to use the ABCX model to organize research questions and identify gaps in the literature. This model can provide a common understanding and language between researchers and clinicians in order to facilitate translation of research findings into clinical practices. Second, both quantitative (e.g., compliance with standard practices required by laws) and qualitative (e.g., parent–teacher relationship) aspects of transition quality are important process outcomes. While states are required to report data on secondary IEP goals and transition services, less is known about the qualitative aspects of transition. We urge researchers to develop measures that capture the full spectrum of quality transition that can be used for state-level reporting. Third, this study generated an actionable list of variables that can be measured and mediated by brief interventions. For instance, the transition planning quality measure predicted parent transition experience, family quality of life, and parent health. It can be used during IEP meetings to ensure compliance with best practices. Brief interventions can be planned to address domains assessed by the measure, such as sharing information with parents about resources (e.g., Medicaid) and services (e.g., vocational rehabilitation). We encourage researchers to partner with the education sector and develop manualized school-based transition interventions.

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Compliance with Ethical Standards

Conflict of interest Venus Wong declares that she has no conflict of interest. Lisa Ruble declares that she has no conflict of interest. John McGrew declares that he has no conflict of interest.

Ethical Approval All procedures performed involving human participants were in accordance with the ethical standards of the institutional research committees where the data was collected and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in this study.

Informed Consent Informed consent was collected from all the participants included in the study.

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