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Applying the Vulnerability Stress Adaptation Model of Marriage to Couples Raising an Autistic Child: A Call for Research on Adaptive Processes

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Abstract

Parents of children on the autism spectrum are particularly susceptible to strain in their romantic relationships due to unique risk factors. While some relationships deteriorate, however, others endure and thrive. The Vulnerability Stress Adaptation (VSA) Model of Marriage (Karney & Bradbury, 1995; Fig. 1) offers a framework to explain, not only poor marital outcomes, but also the process by which degradation of relationships occurs over time. The VSA Model posits that a combination of internal

(within-person) vulnerabilities and external stressors influence relationship quality and, in turn, stability, by affecting couples' abilities to collaborate to adapt to stressors and solve problems (i.e., adaptive processes). With robust theoretical grounding, this review comprehensively summarizes and integrates literature pertaining to the romantic relationships of couples raising an autistic child through the lens of the VSA Model. Vulnerabilities, stressors, and adaptive processes relevant to these couples are identified, and empirical evidence pertaining to the proposed pathways in the VSA Model is explored. The body of research reviewed provides support for many of the proposed pathways in the VSA Model, especially related to certain stressors (i.e., child behavior problems) and vulnerabilities (i.e., parent depression), yet it falls short in exploring mechanisms by which these factors beget marital dysfunction (i.e., through adaptive processes). Additional gaps and methodological limitations in the literature are highlighted, and recommendations for future research are provided.

Keywords

Marriage, Vulnerability stress adaptation model, Autism, Parenting, Families

Couples raising a child on the autism spectrum,[1] a neurodevelopmental disorder characterized by challenges engaging socially and the presence of restricted or repetitive behaviors (APA [4]), often experience strain and dissatisfaction in their marriages (Sim et al. [138]). With a prevalence rate of approximately 1 in 54 children in the U.S. (Maenner [103]), many couples are navigating roles as both romantic partners and parents of a child on the autism spectrum. While these marriages are frequently strained and conflictual (Hartley et al. [70]), evidence indicates that some couples have long-lasting, fulfilling romantic couple relationships that are strengthened by caring for their autistic child (Marciano et al. [105]). Given that marital functioning affects parents' well-being and quality of life (Alshekaili et al. [2]; Derguy et al. [35]; Kuhlthau et al. [90]), as well as the broader family system (Grych and Fincham [60]; Mikulincer and Shaver [110]), synthesis of factors and mechanisms that influence marital outcomes among parents of a child on the autism spectrum is paramount. Therefore, the aim of the present review was to comprehensively summarize and integrate literature pertaining to romantic relationships of couples raising a child on the autism spectrum through the lens of a well-established model of romantic relationship functioning, the Vulnerability Stress Adaptation (VSA) Model of Marriage (Karney and Bradbury [85]).

Quantitative and qualitative evidence illuminates challenges in maintaining healthy romantic relationships for couples raising a child on the autism spectrum. Research demonstrates that these parents are less satisfied in their relationships on average compared to couples without an autistic child (Gau et al. [54]; Higgins et al. [75]; Sim et al. [138]). These couples also report that they have little time to spend with their partner (Marciano et al. [105]) and are infrequently physically intimate (Aylaz et al. [7]), which can both negatively affect relationship satisfaction (Johnson and Anderson [82]; McNulty et al. [107]). Coinciding with these relationship challenges, evidence indicates higher rates of divorce among parents of a child on the autism spectrum compared to parents of neurotypical children (Hartley et al. [63]). While a preponderance of literature focuses on the negative effects of having a child on the autism spectrum on parents' romantic relationships, perspectives limited to the detrimental impacts of developmental disabilities on marital adjustment have been called into

question (Risdal and Singer [123]). Many couples also describe benefits and positive experiences (Kayfitz et al. [86]; Markoulakis et al. [106]). Parents have reported forming a stronger connection because of caring for their child (Marciano et al. [105]), especially for those with shared foundational ideas about marriage (Ramisch et al. [121]). Qualitative research also indicates that parents' marital experiences are not static across time, with evolving closeness and intimacy (Hock et al. [76]). These findings give rise to a more complex picture than originally put forth. Understanding the complex interplay of resiliencies and vulnerabilities that may affect the romantic relationship of parents raising an autistic child will aid in identifying avenues for promoting healthy and enduring romantic couple relationships, and in turn, higher quality of life and well-being for children on the autism spectrum and their families.

The VSA Model offers a theoretical framework to explain, not only poor marital outcomes, but also the process by which degradation of relationships occurs over time. That is, internal (within-person) vulnerabilities paired with external stressors contribute to marital functioning by limiting couples' abilities to engage in adaptive processes (Karney and Bradbury [85]). Adaptive processes are the interactions that occur between partners and comprise a couple's capacity to effectively cope with and adjust to stressors. Adaptive processes include how partners provide support to one another, engage in problem solving, and interpret the intentions of one another's behavior. In this Model, vulnerabilities are conceptualized as enduring traits (e.g., personality characteristics). People with particular vulnerabilities may have less capacity to work cooperatively with their partner to adjust and solve problems. Vulnerabilities may also predispose a partner to interpret and experience an event as stressful and, thus, there is also an effect from vulnerability to stress. The association between stressful events and adaptive processes is bidirectional. Interactions between partners (adaptive processes) can be affected by the nature of stressors, while poor capacity to adapt is also thought to exacerbate stressors. There is a transactional effect from adaptive processes to marital quality. For example, one adaptive process, ineffective problem solving, can lead to declines in marital satisfaction (a component of marital quality), while judgements about the marital relationship (i.e., satisfaction) may also diminish couples' capacity to effectively engage in problem solving. Marital quality is unidirectionally linked with marital stability. The creators of the VSA Model pose that the strength of many of these connections is contingent upon the other factors. More specifically, stressors may only impact the ability to engage in adaptive processes for those with particular vulnerabilities, and vulnerabilities may especially affect capacity to adapt under high levels of stress. As such, these conditional effects imply statistical moderation.

Guided by the VSA Model, the current review aims to build upon two published reviews that laid the groundwork in summarizing research on a range of marital outcomes (Saini et al. [128]) and relationship satisfaction (Sim et al. [138]) of couples who have a child on the autism spectrum. These prior reviews highlight the high level of stress and strain on marital relationships, identify poorer relationship satisfaction on average, and enumerate potential contributing factors (Saini et al. [128]; Sim et al. [138]). According to the 2015 review, there were discordant findings related to factors contributing to marital functioning based on the existing research. The present review aims to build upon these prior reviews in the following ways: (1) explore the complex interplay between and among vulnerabilities and stressors that may lead to poor marital outcomes, (2) consider *how* these predictors lead to marital dysfunction, (3) use an a priori theoretical framework to guide organization

of this complex body of literature, and (4) include recent scientific advances such as the large, robust methodological studies that have been conducted since these reviews were published. Therefore, through the lens of the VSA Model, the current paper identifies vulnerabilities, stressors, and adaptive processes relevant to couples raising a child on the autism spectrum and discusses and critiques empirical evidence related to the proposed pathways in the VSA Model. Finally, gaps in the current literature are highlighted, and recommendations for future research are provided.

Approach for Identifying Relevant Literature

Literature included in the current review was identified through searches of four databases: WebofScience, PsychInfo, ERIC, and PubMed. The search approach involved using search terms related to the core domains of VSA Model (Karney and Bradbury [85]) (i.e., vulnerabilities, stressors, adaptive processes, or marital stability/quality) combined with autism terms and parent/caregiver terms. Refer to Table 1 for complete list of search terms. Articles included in the review were required to meet several inclusion criteria. First, they must have been published in a peer-reviewed journal. Second, youth must be on the autism spectrum (i.e., have received a diagnosis of autism spectrum disorder) as evidenced by a prior diagnosis from a mental health provider, confirmation of diagnosis with a standardized instrument (e.g., Autism Diagnostic Observation Schedule (ADOS; Lord et al. [99])), Autism Diagnostic Interview, Revised (ADI-R; Lord et al. [100]), or Social Communication Questionnaire (SCQ; Rutter et al. [126])), or parent report. Third, articles must have been published within a specified date range (1994—present) to coincide with the release of the DSM-IV. Fourth, studies must have been available in English. Finally, the study must have explored at least one of the domains (i.e., vulnerabilities, stressors, adaptive processes, and marital stability/quality) in the VSA Model in relation to either (1) another factor within that domain or (2) another domain.

Table 1 Search terms

Category	Terms
Autism terms	Autism
	ASD
	Autism spectrum disorders
	Asperger*
	Pervasive developmental disorder
Parent/Caregiver	Autistic
	Parent
Marriage terms	Caregiver
	Marital
	Marriage
	Divorce
Stressors terms	Married
	Stress
	Autism severity
	Comorbidity
	Co-occurring
	Parent*

	Support
Vulnerabilities terms	Vulnerabilities
	BAP
	Broad* autism phenotype
	Mental health
	Psychopathology
	Well-being
	Anxiety
	Depression
	Personality
	Self-esteem
	Resilience
	Coping
Adaptive processes terms	Adaptive processes
	Conflict resolution
	Dyadic coping
	Attributions
	Problem solving

The * symbol in Table 1 represents a symbol used in the search process that broadens a search by finding words that start with the same letters

For the purpose of this review, enduring vulnerabilities and stressful events were conceptualized more broadly than in the original VSA Model (Karney and Bradbury [85]) in order to capture a wide range of processes relevant for couples raising a child on the autism spectrum. That is, vulnerabilities, as conceptualized in the present review, are not necessarily enduring. For example, while mental health conditions are not akin to the enduring personality-like traits described in the original VSA Model, they play a key role in relationship functioning, especially in this population. Furthermore, the VSA Model does not specify stressors as either chronic or acute, and thus, the current review encompasses stressors broadly. Additionally, given that the autism research field has begun to shift away from a deficit model of disability and towards a neurodiversity or deficit-as-difference approach (e.g., Kapp et al. [84]), resiliency is also explored; vulnerabilities are paired with strengths, and stressors are paired with supports. Characteristics of studies included in the following sections are summarized in Table 2; the current review includes an additional 32 studies that were not included in either the 2015 or 2016 review (Saini et al. [128]; Sim et al. [138]). Figure 1 depicts an adapted VSA Model specific to couples raising a child on the autism spectrum reflecting the cumulative evidence from studies discussed throughout this review.

Table 2 Study details: VSA model in autism

Author(s)	Year	Study design	N	Gender ^a (% female)	Child age M (SD)	Autism diagnosis confirmation	Path ways									
							a1	a2	A	B	b	C	c	D		
Benson & Kersh	2011	L	96	100	8.7 (1.5)	1			X		X					
Brobst, Clopton, & Hendrick	2009	C	50 (25 D)	n/a	6.64 (2.66)	5		X				X		X		
*Carter, Martinez-Pedraza, & Gray	2009	L	143	100	2.36 (0.33)	1	X		X							
*Chan, Lam, Law, & Cheung	2018	C	150 (75 D)	n/a	10.15 (6.49)	3	X	X	X		X					
*Dabrowska & Pisula	2010	C	51 (25 D)	n/a	4.78 (1.35)	3			X							
*Davis & Carter	2008	C	108 (54 D)	n/a	2.24 (0.35)	1		X	X							
*Dieleman, De Pauw, Soenens, Beyers, & Prinzie	2017	L	139	98	10.2 (2.4)	5		X								
*Dieleman, Soenens, Vansteenkiste, Prinzie, Laporte, & De Pauw	2019	DD	41	100	10.92 (2.05)	1 or 2		X								
*Ekas, Pruitt, & McKay	2016	C	94	100	7.73 (2.58)	5	X									
Ekas, Timmons, Pruitt, Ghilain, & Alessandri	2015	C	134 (67 D)	n/a	6.50 (2.19)	5					X					X
*Faso, Neal-Beevers, & Carlson	2013	C	71	75	4yrs – 12yrs	5	X		X							
*García-López, Sarriá, Pozo, & Recio	2016	C	152 (76 D)	n/a	5.05 (2.59)	3			X	X	X	X	X	X	X	X
*Giallo, Wood, Jellett, & Porter	2013	C	50	100	4.20 (1.26)	5			X							
Harper, Dyches, Harper, Roper, & South	2013	C	202 (101 D)	n/a	8.23 (3.54)	5		X						X		
Hartley, Barker, Baker, Seltzer, & Greenberg	2012	L	199	100	20.18 (67.63)	1		X						X		
Hartley, Barker, Seltzer, Greenberg, & Floyd	2011	C	182 (91 D)	n/a	18.76 (5.57)	1		X						X		
*Hartley, Hickey, DaWalt, & Rodriguez	2019	C	316 (158 D)	n/a	7.90 (2.25)	2				X						

*Hartley, Mihaila, Otolara-Fadner, & Bussanich	2014	DD	146 (73 D)	n/a	12.27 (4.97)	2		X							X	
*Hartley, Papp, & Bolt	2016	DD	352 (176 D)	n/a	7.97 (2.30)	2									X	
*Hartley, Papp, Blumenstock, Floyd, & Goetz	2016	DD	352 (176 D)	n/a	7.97 (2.30)	2				X		X				
*Hastings	2003	C	36 (18 D)	n/a	11.8 (2.6)	5	X	X	X							
*Hickey, Hartley, & Papp	2019	L	300 (150 D)	n/a	7.97 (2.25)	2		X	X							
Higgins, Bailey, & Pearce	2005	C	53	97	10.83	5						X				
*Ingersoll & Hambrick	2011	C	149	91	8.39 (4.18)	5	X	X	X							
*Ingersoll, Meyer, & Becker	2011	C	71	100	9.39 (3.85)	5	X		X							
Kaniel & Siman-Tov	2011	C	176 (88 D)	n/a	10.3 (3.1)	3		X				X				
*Lai, Goh, Oei, & Sung	2015	C	43	81	14.10 (3.60)	5	X		X							
*Langley, Totsika, & Hastings	2017	C	292 (146 D)	n/a	10.56 (2.81)	5						X		X		
Lickenbrock, Ekas, & Whitman	2011	DD	49	100	10.18 (4.31)	5	X					X				
*Neff & Faso	2015	C	51	78	4–12 yrs	5	X		X							
*Osborne, McHugh, Saunders, & Reed	2008	L	72	NR	8.8 (NR)	4		X								
*Paynter, Riley, Beamish, Davies, & Milford	2013	C	43	58	4.11 (0.77)	5	X	X	X			X		X		
*Pruitt, Rhoden, & Ekas	2018	C	98	100	8.27 (3.10)	5	X		X			X				
*Rodriguez, Hartley, & Bolt	2019	L	376 (188 D)	n/a	7.90 (2.3)	2		X								
Santamaria, Cuzzocrea, Gugliandolo, & Larcan	2012	C	72 (36 D)	n/a	NR	5										X
*Schiltz, McVey, Magnus, Dolan, Willar, Pleiss, Karst, Carson, Caiozzo, Vogt, & Vaughan Van Hecke	2018	C	77	80.52	13.58 (1.46)	1		X	X							
Shtayermman	2013	C	253	85	15.9 (NR)	5	X		X			X				
Sikora, Moran, Orlich, Hall, Kovacs, Delahaye, Clemons, & Kuhlthau	2013	C	136	"majority"	7.48 (4.04)	1		X							X	

*Sim, Cordier, Vaz, Parsons, & Falkmer	2017	C	127 (44 D)	90 (of the 39 single parent respondents)	10.75 (3.83)	5									X	X
Siman-Tov & Kaniel	2011	C	176 (88 D)	n/a	10.3 (3.1)	3			X		X					
*Smith, Greenberg, & Seltzer	2012	L	269	100	23.15 (9.82)	1			X							
Stuart & McGrew	2009	C	78	99	4.76 (3.02)	5					X				X	
*Timmons, Willis, Pruitt, & Ekas	2016	DD	70	100	7.85 (2.59)	4					X					
*Totsika, Hastings, Emerson, Berridge, & Lancaster	2015	L	132	100	9 mos, 3 yrs, 5 yrs	5			X							
*Totsika, Hastings, Emerson, Lancaster, Berridge, & Vagenas	2013	L	132	100	9 mos, 3 yrs, 5 yrs	5			X							
*Weiss, Robinson, Fung, Tint, Chalmers, & Lunskey	2013	C	138	100	13.13 (6.75)	5		X								
Weitlauf, Vehorn, Taylor, & Warren	2014	C	70	100	4.98 (1.77)	2			X		X					

N sample size (parents), *C* cross sectional, *L* longitudinal, *DD* daily diary, *Age* age in years (yrs) unless otherwise specified (e.g., mos = months), *M* mean, *SD* standard deviation, *D* dyads, *NR* not reported 1 = Used gold standard instrument, either the Autism Diagnostic Observation Schedule (ADOS) or Autism Diagnostic Interview (ADI); 2 = Verified diagnosis from medical professional and must include ADOS/ADI; 3 = Verified diagnosis from medical professional; 4 = Parent-reported diagnosis with standardized screener; 5 = Parent-reported diagnosis; a1 = within vulnerabilities/strengths domain; a2 = within stressors/supports domain; A = stressors and vulnerabilities pathway; B = vulnerabilities and adaptive processes pathway; b = vulnerabilities and marital outcomes pathway; C = stressors and adaptive processes pathway; c = stressors and marital outcomes pathway; D = adaptive processes and marital outcomes pathway *Not included in Saini et al. ([128]) or Sim et al. ([138]) reviews ^aParent gender

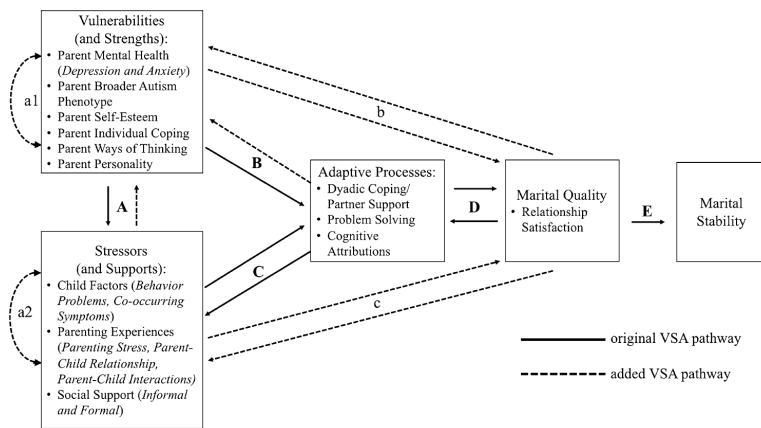


Fig. 1 Vulnerability stress adaption model of marriage in couples raising a child on the autism spectrum

Enduring Vulnerabilities and Strengths

Couples who have a child on the autism spectrum are more likely to display certain traits, experience mental health concerns, and demonstrate depleted protective factors (e.g., coping and self-esteem) compared to parents of neurotypical children. Differences in these areas likely bolster or hinder the development and maintenance of fulfilling romantic relationships. Bidirectional arrows have been added to the VSA Model connecting vulnerabilities (and strengths) with marital quality (Fig. 1; pathway b). These connections were implied in the original VSA Model (Karney and Bradbury [85]), although they were not depicted graphically.

Sources of Vulnerability and Strength

Broader Autism Phenotype

Autism has a genetic component (Ramaswami and Geschwind [120]), and thus, subclinical autism traits (i.e., the Broader Autism Phenotype; BAP) exists to a greater extent among first-degree relatives such as parents (Sasson et al. [130]; Taylor et al. [147]). These subclinical characteristics of autism include aloofness, rigidity, and pragmatic language difficulties (Hurley et al. [78]; Ingersoll and Wainer [81]). The BAP has been associated with loneliness (Lampert and Zlomke [93]; Wainer et al. [156]) and poorer interpersonal functioning in social relationships (Wainer et al. [156]). Given the salience of BAP traits for formation and maintenance of healthy relationships, the BAP is also likely to affect marital satisfaction. Data reveal that those high on the BAP report more anxious and avoidant attachments with their romantic partners (Lampert and Turner [92]), and those attachment styles are related to poorer marital satisfaction (Meyers and Landsberger [109]). One study has found that higher levels of parental BAP among mothers of a child on the autism spectrum, specifically the social and rigidity domains, are related to lower relationship satisfaction (Pruitt et al. [118]) (Fig. 1; pathway b).

Mental Health

Mental health conditions affect functioning in and satisfaction with close relationships. Evidence indicates that depressive disorders, characterized by low mood, withdrawal, and depleted energy (APA [4]), can both be exacerbated by and contribute to marital dysfunction (Mamun et al. [104]; Whisman and Uebelacker [159]). Along the same vein, anxiety disorders, or excessive worry causing distress or impairment (APA [4]), can have high social costs, including poor marital adjustment (Dehle and Weiss [34]). In particular, anxiety is related to difficulties in close relationships including interpersonal

dependency, less assertion, and more conflict avoidance (Davila and Beck [32]), daily relationship dissatisfaction (Zaider et al. [162]), and relationship dissolution (Porter and Chambless [117]). Parents of children on the autism spectrum demonstrate higher levels of mental health concerns, including depression and anxiety, than parents of neurotypical children (Schnabel et al. [133]). The high rate of psychiatric symptoms among these parents may pose vulnerability for interpersonal difficulties, especially in the context of romantic relationships.

Cross sectionally, among couples raising a child on the autism spectrum, poorer psychological health has been associated with poorer marital quality (Benson and Kersh [11]; Chan et al. [24]; Kaniel and Siman-Tov [83]), decreased relationship satisfaction and happiness (Langley et al. [94]; Pruitt et al. [118]; Timmons et al. [152]; Weitlauf et al. [158]), and greater frequency of marital conflict (Chan et al. [24]) (Fig. 1; pathway b). Similar patterns have emerged from daily diaries of parents who have a child on the autism spectrum, such that accounting for covariates including ego resiliency and family flexibility, maternal depressive symptoms were a marginal predictor of less relationship happiness (Timmons et al. [152]).

The associations between depressive symptom and marital outcomes among couples raising a child on the autism spectrum are robust and have been replicated in many studies. Effects between depressive symptom and marital functioning remain significant after accounting for stressors and supports such as life stress, social support, problem behaviors of the child (Benson and Kersh [11]), autism severity, emotional and behavioral problems, and parenting stress (Weitlauf et al. [158]), as well as sociodemographic factors such as age, gender, and socioeconomic status (Shtayermman [136]). While directionality of the association between depression and marital functioning is not yet fully understood in this population, one longitudinal study of mothers of a child on the autism spectrum explored marital quality and depression across two time-points (Benson and Kersh [11]). Results indicated that higher marital quality predicted better mental health (both depressed mood and well-being) at a later time point, controlling for initial levels of mental health variables; thus, marital quality may have long term implications for parental mental health (Benson and Kersh [11]). Looking within and across partners using actor-partner independence modeling (APIM), while actor effects have been identified (e.g., mother's own relationship satisfaction to her well-being), partner effects (e.g., mother's relationship satisfaction to father's well-being) have not been observed (García-López et al. [53]), suggesting that perception of a more satisfying relationship is tied to better well-being, but this may be only true within-person.

Self-esteem

High levels of self-esteem, or a person's sense of self-worth, adequacy, and competence (Leary and Baumeister [97]), are related to positive marital functioning including greater marital satisfaction (Sacco and Phares [127]) and fewer marital problems (Lavner et al. [96]) (Fig. 1; pathway b). Evidence demonstrates strong longitudinal links between marital functioning and self-esteem (Erol and Orth [44]) that emerge within and across partners (Erol and Orth [43]). Some have identified lower levels of self-esteem among parents of children on the autism spectrum (Lu et al. [101]), and thus, these parents may be less resilient to the negative effects of stressors on their romantic relationship, although this has yet to be tested empirically.

Individual Coping Capacity

Given the many stressors experienced by couples raising an autistic child (Hayes and Watson [73]), how each parent copes with stress is critical. Not only does coping relate to individual well-being (Folkman et al. [51]; Taylor and Stanton [149]), it also affects capacity to engage effectively with one's partner (Bélanger et al. [9]) and to foster satisfying relationships (Papp and Witt [115]). Coping strategies have largely been grouped into those that are emotion-focused, which function to regulate emotions, or problem-focused, which attempt to alter the person-environment situation and can be adaptive or maladaptive (Folkman and Lazarus [50]). Coping dispositions are thought to develop from patterns of responding to stress over time (Carver and Scheier [22]). Parents of children on the autism spectrum may be more likely to engage in maladaptive coping strategies (e.g., active avoidance coping) than parents of neurotypical children (Lai et al. [91]). This coping style serves as a link between stress and lower quality of life (Dardas and Ahmad [30]), and may affect marital functioning within families raising a child on the autism spectrum.

Evidence is mixed on individual coping as it relates to relationship satisfaction for couples raising a child on the autism spectrum (Fig. 1; pathway b). One study revealed that both mothers and fathers who endorsed using more frequent and more types of coping strategies (e.g., use of emotional support) also reported greater relationship satisfaction (Ekas et al. [41]). In addition to examining correlational associations, this study also assessed actor and partner effects; only actor effects were observed for the effect of instrumental support on relationship satisfaction (e.g., from mother's use of instrumental support to her own report of relationship satisfaction). For emotional support, however, both actor and partner effects emerged suggesting that the use of emotional support coping strategies has an effect on their partner's relationship satisfaction, beyond their partners' own use of emotional support coping strategies. Among parents of children recently identified on the autism spectrum, one study identified greater marital burden for those who reported using more passive avoidant coping strategies, yet also revealed that when multiple coping strategies were considered together, only emotional approach and problem-focused coping were unique predictors of marital burden (Stuart and McGrew [145]). In contrast to these findings, Higgins ([75]) indicated that coping strategies did not predict marital happiness above satisfaction and availability of services. In this study, coping was measured based on perceived helpfulness of each strategy, rather than coping strategy usage. Another study did not find significant associations between any coping strategies (active avoidance, problem-focused, positive, religious/denial) and relationship quality after applying a Holm–Bonferroni correction (Paynter et al. [116]). Interpretation of effect sizes, however, reveals moderately strong correlations that may point to an association between more use of problem-focused positive coping strategies with better relationship quality (Paynter et al. [116]).

Ways of Thinking

Individual differences in the tendency to view the current or future events in a positive or negative light is found to impact relationship satisfaction (Srivastava et al. [142]; Terveer and Wood [151]). That is, favorable beliefs or expectations about future events, or optimism (Carver et al. [23]), is an enduring resource that supports the health, happiness, and satisfaction of romantic relationships (Gordon and Baucom [56]). This link is understood through many secondary factors including successful goal attainment and cooperative problem solving in people high on optimism (Assad et al. [6]). Ways of

thinking about current and future circumstances seems to be especially important in the face of stress (Segerstrom et al. [134]), and therefore these differences be key contributors to outcomes of parents raising an autistic child.

Few studies have explored the role of ways of thinking in relationship functioning for parents raising a child on the autism spectrum (Fig. 1; pathway b). One study explored optimism and also the role of a related construct, benefit finding, that captures the ability to find positive contributions of seemingly negative life events (Ekas et al. [41]). Findings from this study revealed that each partner's own optimism had an effect on their relationship satisfaction. For benefit finding, both each partner's benefit finding had an effect on the relationship satisfaction of their partner and their own satisfaction (Ekas et al. [41]). Another study found that while mothers' positive perceptions (i.e., degree of enjoyment) of their child's competencies was related to marital adjustment, their negative perceptions of their child's problems and deficiencies was unrelated to marital functioning (Lickenbrock et al. [98]); thus, the lens through which parents think about their child and their child's future, rather than objective individual differences, may be critical to consider.

Personality Characteristics

Stable personality traits have long been recognized as important predictors of romantic couple relationship functioning, satisfaction, and attachment styles (Claxton et al. [25]; Shaver and Brennan [135]; Terman et al. [150]; Fig. 1; pathway b). Even across multiple relationships, longitudinal research demonstrates that personality has an effect on romantic relationship experiences, and vice versa (Robins et al. [124]). This area of research has explored personality using multiple conceptualizations of personality, including the Big Five (i.e., Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism; e.g., Claxton et al. [25]) and others (e.g., Negative Emotionality, Positive Emotionality, and Constraint; e.g., Robins et al. [124]). Notably, Neuroticism has been consistently identified as having negative associations with marital functioning (e.g., Woszidlo and Segrin [161]). Among couples raising a child on the autism spectrum, no studies have explored the role of personality in romantic relationship experiences.

Summary: Vulnerabilities/Strengths and Marital Outcomes (Pathway b)

Mental health conditions, especially depression, demonstrate robust links with relationship outcomes and functioning for couples raising a child on the autism spectrum (Fig. 1; pathway b). Although theory would suggest that these effects are transactional, the only longitudinal evidence supports the effect of marital quality on mental health. These effects between relationship outcomes and mental health are also robust within-person yet do not seem to hold across partners. In contrast, findings related to coping strategies and relationship functioning are less clear, with the most compelling support for an effect of emotional coping on marital satisfaction. Although evidence is scant, the role of ways of thinking (e.g., optimism) on relationship satisfaction has some empirical support. While the effect of self-esteem and personality on relationship quality for these couples is supported theoretically, no empirical studies have tested these notions. Finally, the mechanism by which these vulnerabilities/strengths impact relationship outcomes is not empirically tested, although the VSA Model would suggest that the effect is through adaptive processes.

In considering vulnerabilities, it is critical to remember that the presence of one vulnerability in parents of youth on the autism spectrum increases the likelihood of co-existing vulnerabilities. For example, anxiety and depression commonly co-occur (Carter et al. [21]; Chan et al. [24]; Hastings [71]; Shtayermman [136]). Parental interpersonal interaction styles and personality traits that encompass the BAP have also been associated with higher levels of depressive symptoms within person (Ingersoll et al. [80]; Ingersoll and Hambrick [79]; Pruitt et al. [118]). Mental health conditions and the BAP may impede parents' ability to use effective coping strategies, while less adaptive coping may also promote poor mental health (Hastings et al. [72]; Ingersoll and Hambrick [79]; Lai et al. [91]). Self-esteem, self-compassion, and hope have also demonstrated protective effects on psychopathology, such that greater self-esteem, self-compassion, and hope have been related to better mental health (Ekas et al. [40]; Faso et al. [47]; Neff and Faso [112]; Paynter et al. [116]). In addition, considering ways of thinking, a more positive perception of the child has been related to better maternal well-being (Lickenbrock et al. [98]). Effects of these variables should be considered collectively, rather than in isolation. Therefore, given the evidence that factors within vulnerabilities are tightly intertwined, the double-headed arrow a1 has been added to the VSA Model to capture these effects (Fig. 1).

Stressors and Supports

Studies have identified robust links between stress and marital functioning, including general life stress (Paynter et al. [116]; Stuart and McGrew [145]), and parenting-specific stress and burden (García-López et al. [53]; Hartley et al. [65], [67], [68], [69]; Sim et al. [139]) for parents of a child on the autism spectrum (Fig. 1; pathway c). The stress experienced by such couples is related to a range of child factors, parenting experiences, and functioning of the family's broader social support system. Thus, strain originating in each of these areas likely plays an integral role in marital functioning, while marital quality may also exacerbate stress and stressors. As such, these implied connections in the VSA Model were added via bidirectional arrows to the adapted VSA Model in Fig. 1.

Sources of Stress and Support

Child Factors

Research highlights that child characteristics contribute to parenting experiences and behaviors (Belsky [10]; Putnam et al. [119]) and, consequently, parents' romantic relationships (Almeida et al. [1]; Erel and Burman [42]; Sturge-Apple et al. [146]). Given that autism is particularly heterogeneous (Mundy et al. [111]; Schiltz et al. [131], [132]), rife with medical and psychiatric comorbidities (Hudson et al. [77]; Stevens et al. [143]; van Steensel and Heeman [155]), varying symptom presentations and levels of severity may uniquely impact parenting behaviors and marital interactions. Parents greatest concerns surrounding their autistic child are often behaviors non-specific to autism (Higgins et al. [75]; Ludlow et al. [102]), and, therefore the presence of emotional and behavioral comorbidities may be especially influential on parents' romantic relationships.

Data have indicated that higher levels of marital satisfaction related to fewer child behavior problems (i.e., child factors; Fig. 1 pathway c) among mothers of children (Langley et al. [94]), adolescents, and adults on the autism spectrum (Hartley et al. [64], [67]). Across time, behavior problems have been shown to covary with maternal satisfaction; that is, fluctuations in child behavior problems within person have been related to variations in maternal satisfaction (Hartley et al. [64]). Relatedly, a cross-

sectional study found evidence that externalizing behaviors, but not internalizing behaviors, were associated with functioning in parents' marriages (Sikora et al. [137]). While secondary co-occurring externalizing behaviors seem to have significant implications for parents' romantic relationship, multiple studies have failed to identify a direct association between core autism symptoms and relationship quality (Hartley et al. [64], [67]; Paynter et al. [116]; Stuart and McGrew [145]).

Parenting Experiences

Theory and empirical evidence support the idea that affect and behaviors spill over between parental and marital roles for the general population (Almeida et al. [1]; Erel and Burman [42]; Kouros et al. [88]; Sturge-Apple et al. [146]). The links between marital and parenting experiences are thought to be bidirectional, such that marital discord and dissatisfaction may contribute to harsh and insensitive parenting (Davies et al. [31]; Krishnakumar and Buehler [89]), while excessive parenting demands and ineffective parent–child interactions may also drain parents' capacity to meet the needs of their romantic partner (Lavee et al. [95]). Given the core social communication difficulties inherent in autism, these challenges may undermine the quality of parent–child interactions (Beurkens et al. [12]) and their relationship (Orsmond et al. [113]). Although little research has explored parent–child interactions or relationship quality as it relates to marital outcomes in families of children on the autism spectrum (Fig. 1; pathway c), some evidence demonstrates that closeness in the parent–child relationship is associated with greater marital satisfaction (Hartley et al. [64]).

Social Support

Literature on families of neurotypical children emphasizes the importance of receiving informal support from extended family members and friends for individual well-being (Cohen and Wills [26]; Reblin and Uchino [122]; Taylor et al. [148]) and, for families of children on the autism spectrum, positive family dynamics (Altiere and Von Kluge [3]; Armstrong et al. [5]). In addition to informal support, formal support—called respite care—is available to many families of children with special healthcare needs (Whitmore [160]). Respite care may serve to alleviate stress (Strunk [144]) and provide time for parents to spend together. Given that social support serves as an effective buffer of stress and reduces family dysfunction in families with a child on the autism spectrum (Boyd [15]; Weiss et al. [157]), effective support is also likely to positively affect marital functioning. Indeed, more social support has been related to higher marital relationship quality (Paynter et al. [116]) and less marital burden (Stuart and McGrew [145]) for caregivers of an autistic child (Fig. 1; pathway c). Additionally, more respite care has been shown to predict better romantic relationship quality (Harper et al. [62]) (Fig. 1; pathway c).

Summary: Stressors/Supports and Marital Outcomes (Pathway c)

Based on longitudinal, daily diary, and cross-sectional data, parents' stress levels seem to be closely related to their marital functioning, both as cause and consequence among parents of a child on the autism spectrum (Fig. 1; pathway c). Specific stressors, such as child behavior problems, emerge as consistent significant predictors of marital satisfaction, while autism severity may not have as robust of a direct effect. Additionally, parents with closer parent–child relationships also tend to be in more satisfying romantic relationships. Receiving support, both informally and formally, can also improve marital satisfaction for parents of youth on the autism spectrum, perhaps by alleviating stress. These studies collectively provide evidence for the ties between stressors and supports with marital quality in

these couples. Yet, questions still remain regarding the process by which stress and stressors affect marital functioning.

It is important to note that stressors and supports do not work in isolation and, in fact, many are highly related. Research provides evidence for the notion that child factors covary with parental stress (Brobst et al. [20]; Chan et al. [24]; Davis and Carter [33]; Hartley et al. [67]; Hastings [71]; Paynter et al. [116]; Rodriguez et al. [125]; Schiltz et al. [131], [132]), parenting behaviors (Dieleman et al. [36], [37]; Osborne et al. [114]; Sikora et al. [137]), and the parent-child relationship (Hartley et al. [65], [64]; Hickey et al. [74]). Further, informal social support can serve to alleviate parenting stress (Harper et al. [62]; Ingersoll and Hambrick [79]; Kaniel and Siman-Tov [83]; Paynter et al. [116]; Weiss et al. [157]). Greater amount of formal support (i.e., respite care), is related to fewer and less severe daily stress and more uplifts (i.e., events that elicit pleasant emotions such as joy and satisfaction) for both mothers and fathers of youth on the autism spectrum (Harper et al. [62]). As such, the interplay between stressors and supports likely contributes to either an exacerbation or amelioration of burden over time for these families. Double-headed arrow a2 has been added to the adapted VSA Model (Fig. 1) to reflect these connections.

Links Between Stressors and Vulnerabilities

While the evidence discussed above provides support for the impact of stressors and vulnerabilities on marital functioning, the VSA Model posits that these factors are interconnected, such that vulnerabilities increase the may increase or decrease sensitivity to or presence of stressors (Fig. 1; pathway A). These effects likely hold true among parents of a child on the autism spectrum. For example, many studies have identified zero-order correlations between higher stress and poorer parental mental health/well-being (Benson and Kersh [11]; Chan et al. [24]; Davis and Carter [33]; García-López et al. [53]; Ingersoll and Hambrick [79]; Shtayermman [136]; Siman-Tov and Kaniel [140]; Weitlauf et al. [158]) and more BAP characteristics in parents of an autistic child (Ingersoll and Hambrick [79]). Stress indices in these studies have covered a range of constructs including parenting stress (e.g., Chan et al. [24]; Weitlauf et al. [158]), stressful life events (Benson and Kersh [11]), overall perceived stress (Shtayermman [136]), and stress specific to raising a child on the autism spectrum (Siman-Tov and Kaniel [140]).

Among parents of youth on the autism spectrum, evidence also points to multiple stress-related correlates of parental vulnerabilities, including a range of child factors. Related to parental depression, these include greater child autism symptom severity (Chan et al. [24]; Ingersoll and Hambrick [79]; Weitlauf et al. [158]), behavior problems (Benson and Kersh [11]; Pruitt et al. [118]; Smith et al. [141]; Totsika et al. [154]; Weitlauf et al. [158]), internalizing (Weitlauf et al. [158]) and externalizing symptoms (Carter et al. [21]; Weitlauf et al. [158]), and less prosocial behavior (Benson and Kersh [11]; Totsika et al. [153]). Child behavior problems and autism symptoms have also been related to parental anxiety (Chan et al. [24]; Hastings [71]). Interestingly, some longitudinal evidence has identified an effect from maternal well-being to later child behavior problems (Totsika et al. [154]) and from child prosocial skills to later maternal well-being (Totsika et al. [153]). In contrast to mental health, parent BAP demonstrates non-significant or weak associations with child autism symptoms (Ingersoll and Hambrick [79]) and child behavior problems (Pruitt et al. [118]). Some studies provide support for the idea that child factors and parenting stress each contribute independently to depressive symptoms

(Ingersoll et al. [80]), while others found that the effect of child factors, including autism severity and behavior problems, demonstrate indirect effects on depression through parenting stress (Chan et al. [24]; Schiltz et al. [131], [132]; Weitlauf et al. [158]). These inconsistencies may be due to differences in stress specificity, as tools specific to parenting stress (i.e., *Parenting Stress Index*) may play more of a mediating role, while more general family stress measures (i.e., *Family Impact Questionnaire*) may contribute additional variance not explained by child factors. While these associations exist cross-sectionally, child factors seem to be less important for predicting parent depression longitudinally, as initial levels of child behavior problems have not been found to significantly predict parent depression at a later time point (Benson and Kersh [11]; Smith et al. [141]).

Parenting experiences and perceptions have also been related to mental health in parents of youth on the autism spectrum. In particular, lower parenting efficacy has been related to more severe depression (Benson and Kersh [11]; Carter et al. [21]; Giallo et al. [55]) and poorer well-being (Benson and Kersh [11]). Greater parental depressive symptoms have also been related to lesser parental involvement, controlling for parenting stress and child behavior problems (Schiltz et al. [131], [132]) and greater expression of criticism and less warmth when talking about their child (Hickey et al. [74]).

In terms of strengths, less use of active avoidance (Hastings et al. [72]; Lai et al. [91]; Paynter et al. [116]) and emotion-focused coping (Dabrowska and Pisula [28]), as well as greater self-compassion (Neff and Faso [112]), have been linked with lower parenting stress. Conversely, no associations have emerged between parenting stress and problem-focused, positive coping, or religious/denial coping (Lai et al. [91]; Paynter et al. [116]). Additionally, related to supports, receiving more social support (Benson and Kersh [11]; Carter et al. [21]; Ingersoll and Hambrick [79]; Paynter et al. [116]) has been linked with lesser BAP characteristics and depression. Even after controlling for stressors (problem behaviors, stressful life events) social support remains a significant predictor of depression (Benson and Kersh [11]). One study indicates that, across time, a larger social network may be protective against depressive symptoms (Smith et al. [141]), while another did not find evidence for self-reported social support as a longitudinal predictor of depression (Benson and Kersh [11]). Finally, parents' way of thinking about their child is linked with their stress levels. That is, greater feelings of hope and less despair in their attitude towards their child, termed vicarious futurity, has been related to lower levels of stress (Faso et al. [47]).

Summary: Stressors/Supports and Vulnerabilities/Strengths (Pathway A)

Much research has focused on maternal depression (vulnerability) and its stress-related correlates among caregivers of a child on the autism spectrum (Fig. 1; pathway A). On the whole, these results indicate that more depressive symptoms are related to greater parenting stress, more critical parenting perspectives, greater autism severity, and more child co-occurring conditions. It is unclear, however, whether the effect from child factors to depression is mediated by parenting stress. Social support and less use of maladaptive coping strategies, on the other hand, seem to be protective against depressive symptoms in this population. While these studies depict a compelling correlational picture for parental depression, little is known about other vulnerabilities, especially the BAP. An additional arrow has been added to the VSA Model (Fig. 1; pathway A) in order to depict the reverse effect from stressors to vulnerabilities.

Adaptive Processes

Little empirical work has examined the behaviors and affect that are exchanged between parents of youth on the autism spectrum, yet these processes are instrumental in marital outcomes, and are the mediating mechanisms between stressors/vulnerabilities and marital quality (Karney and Bradbury [85]). For example, adaptive processes including engaging in effective problem-solving, avoiding negative attributions for partner behavior, and supporting one another are key components of healthy marriages (Fig. 1; pathway D) that can be influenced by each partner's existing vulnerabilities (Fig. 1; pathway B) and stressors external to the couple (Fig. 1; pathway C).

Types of Adaptive Processes

Conflict Resolution and Problem Solving

Highly conflictual romantic relationships can lead to negative outcomes for each individual and their family members (Fincham [48]; Grych and Fincham [60]; Krishnakumar and Buehler [89]; Mercado and Hibel [108]). While frequency and severity of conflict can have deleterious effects, successful resolution of conflict is related to better marital quality (Cramer [27]). Research also indicates that behavior and affect exchanged during disagreements and problem-solving have implications for marital functioning (Bradbury et al. [19]; Gottman [57]). In particular, when behavior during conflict is assertive and cooperative, compared to confrontational, hostile, and uncooperative, couples report higher marital satisfaction (Greeff and De Bruyne [58]). Similarly, evidence indicates better marital quality for those partners who approach problem solving with open communication and collaboration, rather than withdrawal, explosiveness, or compliance (Hanzal and Segrin [61]; Woszidlo and Segrin [161]).

Ability to effectively navigate and resolve disagreements may be especially important for couples who have a child on the autism spectrum, as more frequent and severe conflict has been reported compared to parents of neurotypical children (Hartley et al. [70]). Within the same study, observed couple conflict revealed a pattern of differences such that couples of an autistic child displayed more positive affect and sensitivity, yet less engagement, cooperation, and balance, than parents of neurotypical children. These findings indicate that, as a group, parents of autistic children experience a high level of conflict and work together to resolve disagreements in different ways compared to parents of neurotypical children.

Some evidence suggests that stress-related factors and vulnerabilities are linked with couples' problem-solving behavior among couples of children on the autism spectrum (Fig. 1; pathway C and pathway B). More specifically, a daily diary design has been used to determine how autism symptoms and behavior problems relate to negative affect expressed during problem-solving interactions (Hartley et al. [68], [69]). These interactions were those "in which something had to be worked out and/or involved some give and take, a difference of opinion, or differing points of view" (Hartley et al. [68], [69], p. 735). Results indicated that, for fathers, more BAP features were associated with greater initial negative affect in their daily problem-solving interactions (Fig. 1; pathway B). Additionally, within-person, the behavior problems displayed by their child on the previous day related to negative affect exhibited by mothers, but not fathers, during couple problem-solving interactions (Fig. 1; pathway C). This effect was moderated by income and BAP, such that the effect was only present for mothers with lower income and stronger for those with lower BAP. Severity of child autism symptoms demonstrated

a trending relation with father's negative affect during problem-solving on the following day, but this held only for fathers with multiple children with special care needs. Further, differences in average child autism symptoms across families related to the intercept (i.e., initial levels) of negative affect in problem-solving for both mothers and fathers, demonstrating trending and significant effects, respectively.

A later study assessed links between the BAP and observed problem-solving interactions among nearly 200 couples (Fig. 1; pathway B) (Hartley et al. [66]). The interaction task was a 7-min paradigm in which couples discussed a topic of disagreement with the intent of working towards resolution while electrodermal activity, a continuous measure of sympathetic nervous system activity, was collected. Observational coding captured a range of behaviors at the couple-level including engagement, cooperation, and sensitivity, among others. Couples also reported upon their affect following the problem-solving task. Here, greater levels of fathers' BAP correlated with multiple problem-solving interaction indices (Fig. 1; pathway B) including less observed enjoyment, cooperation, and balance, as well as less positive and more negative affect in both partners, and greater physiological reactivity in mothers.

Attributions

From a cognitive perspective, the attributions couples make for their partner's negative behaviors affect marital satisfaction (Bradbury and Fincham [17]). Benign attributions are found to be protective against poor marital outcomes, and, conversely, dissatisfied partners tend to make more negative attributions (Bradbury et al. [16]; Bradbury and Fincham [17]; Fincham and Bradbury [49]). Among couples in unfulfilling or dissatisfying relationships, partner behaviors are often judged to be intentional, unchanging, and part of their character (Bradbury and Fincham [17]). These types of negative attributions have also been related to ineffective problem-solving behaviors (Bradbury and Fincham [18]), which can further perpetuate relationship dissatisfaction.

Parents of youth on the autism spectrum have been found to demonstrate a dysfunctional pattern of attributions, wherein negative events are perceived to be due to a partner's behavior (Santamaria et al. [129]). Such negative attributions place these couples at high risk for poor marital outcomes (Fincham and Bradbury [49]). Among couple raising a child on the autism spectrum, across all attribution dimensions, significant associations emerged with overall relationship satisfaction, such that endorsement of more negative and dysfunctional attribution styles was associated with poorer relationship satisfaction (Santamaria et al. [129]) (Fig. 1; pathway D). In particular, less satisfied partners were more likely to attribute behaviors to the partner and their selfish concerns, consider the cause to be unlikely to change and intentional, and indicate that it affects the relationship more broadly (Santamaria et al. [129]).

Dyadic Coping and Partner Support

Beyond the individual level, coping with stressors can be conceptualized as a shared dyadic process between partners (Falconier and Kuhn [46]) that affects marital satisfaction (Papp and Witt [115]). Dyadic coping occurs in response to external stressors that affect both partners directly or indirectly (Bodenmann [13]). While there are many models of dyadic coping, in essence, dyadic coping focuses on what "partners do or don't do for each other and together to handle stress" (Falconier and Kuhn

[46], p. 7). Positive dyadic coping can be supportive (i.e., one partner assisting the other with coping efforts) or common (i.e., both partners jointly engage in the coping process) and can be problem- or emotion-focused, or take the form of delegation (e.g., one partner taking on tasks). Negative dyadic coping includes hostile (e.g., mocking or minimization), ambivalent (e.g., unwilling support), or superficial (e.g., insincere or unempathetic) forms of coping. When dyadic coping is positive and successful, it can promote more satisfying relationships over time (Donato et al. [38]). Although individual coping is associated with dyadic coping, dyadic coping explains additional variance in relationship satisfaction beyond the effect of individual coping (Papp and Witt [115]).

Supportive processes are affected by parenting stressors (Fig. 1; pathway C) and mental health (Fig. 1; pathway B) in couples raising a child on the autism spectrum. For example, significant positive associations between dyadic coping and parenting stress have been found within-reporter for mothers and fathers (Fig. 1; pathway C) (e.g., mother report of supportive dyadic coping with her own report of parenting stress), yet associations across reporters (e.g., mother report of supportive dyadic coping with father's report of parenting stress) revealed small non-significant effects (García-López et al. [53]). Additionally, within-reporter, greater spousal support has been related to intensity of child behavior problems and parenting stress for mothers and number of child problem behaviors for fathers (Brobst et al. [20]). Considering the effect of vulnerabilities/strengths on dyadic coping, better psychological well-being has been associated with greater supportive dyadic coping for mothers and fathers of youth on the autism spectrum (Fig. 1; pathway B) (García-López et al. [53]). Thus, the ways in which couples raising a child on the autism spectrum work together to adapt to stressors and support each other appears to be directly affected by the intensity of stressors that they face and their pre-existing mental health status.

The robust links between dyadic coping and marital functioning have been replicated among couples raising a child on the autism spectrum (Fig. 1; pathway D). For mothers and fathers of autistic children, receiving more support from their partner has been associated with greater relationship satisfaction cross-sectionally (Brobst et al. [20]; Ekas et al. [41]). Two studies have also explored dyadic coping more specifically as it relates to marital satisfaction for couples of a child on the autism spectrum (García-López et al. [53]; Sim et al. [139]). In particular, one study focused upon supportive dyadic coping and identified that mothers' and fathers' report of supportive dyadic coping was associated with their own relationship satisfaction (García-López et al. [53]). Moreover, mothers' and fathers' reports of supportive dyadic coping were related to their partner's report of relationship satisfaction. Results of an APIM suggested that the effect of one partner's report of dyadic coping was predictive of the other partner's relationship satisfaction, above and beyond the effect of their own report of dyadic coping for couples raising a child on the autism spectrum. In other words, each partners' engagement in dyadic supportive coping not only relates to their own sense of satisfaction in their relationship but also predicts a more satisfying relationship for their partner. A second study on dyadic coping asked similar questions by grouping parents of a child on the autism spectrum into high and low relationship satisfaction groups based on self-report (Sim et al. [139]). The authors then explored whether different types of dyadic coping would predict likelihood to fall into either the satisfied or unsatisfied relationship group. Results from these analyses indicated that both positive and negative dyadic coping predicted relationship satisfaction in opposite directions.

Summary: Adaptive Processes

Considerably less research has centered upon adaptive processes among couples with an autistic child. Based on the handful of available studies, correlational evidence illustrates that greater parenting vulnerabilities and stressors relate to decreased ability for parents of a child on the autism spectrum to provide support to one another and engage in effective problem-solving (Fig. 1; pathways B and C). The effect of stressors on adaptive processes was particularly true for those with vulnerabilities (e.g., BAP) or additive stressors (e.g., income and other children). Although few studies have explored adaptive processes as they relate to marital outcomes (Fig. 1; pathway D) among parents of an autistic child, they have covered a range of processes including those that are more behavioral, such as providing support and dyadic coping, as well as those that are more cognitive, such as making negative attributions. Despite the small number of studies identified, these findings provide evidence that ineffective engagement in adaptive processes is in some ways tied to stressors and vulnerabilities, and that adaptive processes may be driving marital quality among parents of a child on the autism spectrum. Although this evidence can be integrated from multiple studies in a piece-wise fashion to form a modestly cohesive picture supporting the VSA Model, no study has explored the role of adaptive processes as a mediator between stressors/supports or vulnerabilities/strengths with relationship outcomes in this population.

Discussion

Healthy marital functioning among parents raising a child on the autism spectrum is critical for each partners' quality of life (Derguy et al. [35]) and adjustment of the family system (Gau et al. [54]), yet a multitude of risk factors place these couples at high risk for unsatisfying and unstable marriages. While some relationships deteriorate, however, others endure and thrive. The lack of synthesis across literature pertaining to the complex mechanisms driving marital quality and stability in these couples was the impetus behind the current review. Therefore, this paper integrated research on parents who have a child on the autism spectrum in the context of Karney and Bradbury's ([85]) VSA Model of Marriage. While there is ample support for the effect of stressors and moderate support for the effect of vulnerabilities on marital functioning for caregivers raising an autistic child, there is considerably less focus on adaptive processes. Furthermore, many of these factors are considered in isolation, and while the interaction between the host of stressors and vulnerabilities and how these affect romantic partners' ability to work together can be presumed, they are not yet fully explicated empirically. It is clear that this body of work has expanded since publication of the 2015 and 2016 reviews (Saini et al. [128]; Sim et al. [138]); the current review and recommendation are intended to serve as a guide to help foster continued growth of this line of inquiry.

VSA Model Adaptations for Couples Raising a Child on the Autism Spectrum

Considering the research that has been reviewed, adjustments to the original VSA Model (Karney and Bradbury [85]) have been made to fully capture this body of literature (Fig. 1). Strong evidence suggests that factors within stressors and vulnerabilities are tightly intertwined and, thus, double-headed arrows a1 and a2 have been added to capture these effects. Additionally, six new pathways have been incorporated into the VSA Model. Two pathways are now directed towards vulnerabilities from stressors and adaptive processes. This change is likely due to the extension of vulnerabilities to

include mental health, and, as such, interactions between romantic partners and stressors also seem to beget mental health concerns. An additional four pathways have been depicted to directly connect marital quality with vulnerabilities and stressors bidirectionally. These connections were implied, although not graphically included, in the original VSA Model (Karney and Bradbury [85]). It is also noteworthy that four of the original VSA pathways have little to no empirical evidence to support their directionality among parents of a child on the autism spectrum, but these pathways remain included in the adapted VSA Model based on theoretical grounds.

Stressors and Supports

Across the scope of literature reviewed, the predominance of research is centered upon stressors experienced by these families, with autism features, challenging behaviors, and parenting stress frequently explored. Strong links appear to exist among these stressors (Fig. 1; pathway a2), with greater parenting stress and presence of certain child factors (especially externalizing and problematic behavior) related to less adaptive parenting behaviors (Fig. 1; pathway a2). These highly intertwined stress-related factors were predictive of parental mental health (Fig. 1; pathway A), namely depressive symptoms. It is less understood how stressors relate to the BAP, with some evidence of greater parenting stress related to higher levels of the BAP in parents, yet no evidence for links with child-specific variables (Fig. 1; pathway A). Additionally, there was modest evidence that social support might mitigate mental health concerns (Fig. 1; pathway A). Studies exploring the interaction between these vulnerabilities and stressors have primarily taken the stance that stressors influence vulnerabilities (Fig. 1; pathway A), and therefore, although expected, it is unknown whether mental health and the BAP may heighten the experience of stress and stressors for these couples (Fig. 1; pathway A). Although scant, some evidence supported the link between stressors and adaptive processes (Fig. 1; pathway C). It seems as though receiving partner support or engaging in problem-solving seemed to take place most effectively when stress was low or there were fewer challenging child behaviors, although the reverse effect is yet unexplored (i.e., whether more effective adaptive processes can ameliorate stressors for these couples) (Fig. 1; pathway C). A large body of literature supports the notion that stress, whether parenting specific or general, is bidirectionally linked to marital functioning (Fig. 1; pathway c). In terms of child specific stressors, while co-occurring symptoms, especially externalizing or challenging behaviors, were linked with marital outcomes, autism symptoms were not related (Fig. 1; pathway c), suggesting that the impact from child factors to the marital relationship is predominantly due to those that are associated with, but not unique to, autism.

Vulnerabilities and Strengths

Although a sizable body of literature has explored vulnerabilities of parents of a child on the autism spectrum, the scope is fairly narrow. More specifically, depression has received much investigation, while little research exists on the role of anxiety in the context of marital functioning in this population. Within vulnerabilities, mental health is likely linked with the BAP, and, to a lesser extent, these both relate to individual coping capacity (Fig. 1; pathway a1). On the whole, there is compelling evidence that greater depressive symptoms are associated with poorer marital outcomes, with support for the effect of marital functioning on depression based on longitudinal studies (Fig. 1; pathway b). Theoretically, there are likely also reverse effects from mental health to relationship outcomes, yet this

has not been empirically tested. Furthermore, the BAP has been found to correlate with relationship outcomes (Fig. 1; pathway b); although this effect would make the most theoretical sense from the BAP to marital satisfaction, no longitudinal evidence is available. The support for individual coping in association with relationship outcomes is more mixed, with the most evidence for the link between emotional coping and marital functioning (Fig. 1; pathway b). Although few exist, relatively large and rigorous studies have demonstrated associations between vulnerabilities and adaptive processes in these couples (Fig. 1; pathway B), and, more specifically, well-being with dyadic coping/partner support and the BAP with problem-solving interactions (Fig. 1; pathway B). Directionality of these associations remains inconclusive, and likely differs between mental health and the BAP, with some data suggesting the influence of the BAP on problem-solving, and partner support on depression.

Adaptive Processes

Very little research has been dedicated to exploring adaptive processes as intermediary (i.e., related to stressors or vulnerabilities, as discussed above; Fig. 1 pathways B and C) or in association with marital outcomes directly (Fig. 1; pathway D). Recent studies, however, are promising as they provide support for aspects of the VSA model similar to those depicted by literature on romantic relationships in the general population. Emerging evidence supports the notion that both behavioral processes such as supportive partner behaviors (i.e., dyadic coping) as well as cognitive processes, including attributions, are adaptive processes related to marital outcomes (Fig. 1; pathway D) for couples raising an autistic child. Problem-solving, however, has not been directly linked to marital outcomes. Direction of effects suggests adaptive processes impact marital outcomes, yet none have considered the reverse effect. Thus, while this research provides a preliminary foundation for the role of adaptive processes for these couples, much work remains to be done.

Gaps Identified in the Literature

The current review highlights a number of gaps in the literature, in terms of content, study design and methodology, and sample diversity. This literature is limited by the scope of content as little work focuses on interactions that occur between couples (i.e., adaptive processes). While it is clear that stressors and certain vulnerabilities are related to marital outcomes, the process by which this occurs remains less explored. Given that adaptive processes are the crux of the VSA Model (Karney and Bradbury [85]), exploring these interpersonal processes is vital to fully understand how stress and vulnerabilities interact to affect couple relationships, as well as to understand any potential reverse effects. Many studies fail to explore or speculate about the mechanism (e.g., adaptive processes) accounting for the link between stress and vulnerabilities with marital outcomes. Further, within each domain of the VSA Model (Karney and Bradbury [85]), certain constructs have received little empirical investigation. In terms of stressors/supports, little research has been conducted parenting behavior nor parent-child interactions, while a large amount has focused on child challenges and parenting stress. In terms of vulnerabilities, there is little work exploring the BAP, anxiety, self-esteem, and coping skills, and the most on depression. Across all VSA domains, a majority of literature has taken a deficit-based perspective (e.g., stressors and challenges) and less research uses a strengths-based approach (e.g., resiliency factors). This is especially true when looking at pathways connected to marital outcomes: pathways b, c, and D of the VSA Model.

In terms of methodology, a majority of the reviewed research has relied upon cross-sectional designs, which do not allow for casual conclusions nor the exploration of effects across time. Only a handful of studies has utilized longitudinal designs, either across multiple years or taking a more fine-grained approach (i.e., daily diaries), which provide rich information about directionality of effects. Additionally, most studies rely upon self-reported information, which is limited to the subjective experiences of participants, rather than objective information. Further, only one large study has used observational measures to provide an additional source of unbiased information about the couple and their interactions. Many also rely upon the same reporter (e.g., collecting data only from mothers) across multiple measures, which poses shared methods variance concerns. Although few in number, studies have begun to address these concerns by gathering information from both parents and utilizing APIM models to examine effects within and across reporters. Samples are also frequently limited using brief standardized screening tools to confirm diagnosis of autism instead of more in-depth gold-standard instruments, and therefore, the samples may be poorly characterized.

Finally, given that many of these studies focus on marriage, the experience of unmarried, divorced, and/or remarried caregivers in romantic relationships have received scant attention. It may be that aspects of the relationship specific to these relationship statuses plays a significant role in these processes. For example, remarried couples have described the spillover of worries and anxieties from their previous marriage into their current relationship (Faber [45]). Studies also focus primarily on couples in heterosexual romantic relationships, and therefore, much remains to be learned about the experiences of lesbian and gay couples raising a child on the autism spectrum. For these couples, there may be an added layer of vulnerability for romantic relationship strain due to social stigma related to sexual minority status, as well as unique protective factors (Doyle and Molix [39]). Furthermore, parents in these studies are also predominantly biological parents, and, thus, adoptive families' experiences are as yet poorly understood. The added complexities unique to adoptive parenting, including but not limited to whether there is contact with the birth parents (i.e., open versus closed adoption), the age of the child when adopted, transracial or transcultural adoptions (Grotevant and Lo [59]) may be important factors to explore for romantic couple relationship functioning. Additionally, few studies explore the experiences of families with multiple children on or off the autism spectrum. While the BAP is investigated in some studies, the experience of neurodiverse parents is not captured by these studies (i.e., parents on the autism spectrum).

Recommendations

Considering the identified gaps in the literature, several recommendations will foster growth in this line of research. Given that adaptive processes are a critical component of the VSA Model (Karney and Bradbury [85]), additional work capturing varying aspects of adaptive processes, including behaviors, affect, and cognitions, must be further explored, especially as a mediator between stressors/supports or vulnerabilities/strengths and marital quality and outcomes. Moreover, studies should aim to include a range of both stressors and vulnerabilities within the same model as main effects and moderators, as the VSA Model posits the strength of each association is contingent upon levels of other variables. Studies exploring resilience from a strengths-based perspective in each of the VSA domains, especially in relation to marital outcomes, in this population is needed. Clinically, a resiliency and positive psychology approach has shown promise in bolstering well-being in the general population (Gander et

al. [52]) and has been highlighted as a key target for intervention in families of youth on the autism spectrum (Bayat and Schuntermann [8]); thus, identification of these factors for couples raising a child on the autism spectrum is imperative. In terms of study design, to most accurately capture directionality over time, longitudinal data are necessary. Methodologically, information should be collected from multiple informants, as well as through multiple modalities. That is, use of both subjective measures, such as self-report and other report, combined with more objective metrics, such as observational paradigms that are coded using well-established coding schemes (e.g., Hartley et al. [70]), can offer insight into each partner's perception of their relationship as well as a less biased account of inter-partner dynamics. Informants should include each partner in the romantic relationship, as well as other family members (e.g., the child) in order to best capture perspectives from all subunits within the family system. Additionally, researchers should carefully consider the selection of measures of marital and romantic relationship functioning. Emerging evidence indicates that measures developed for use in the general population may not function in the same way for parents of youth on the autism spectrum (e.g., Dardas and Ahmad [29]; Zaidman-Zait et al. [164], [163]); therefore, it may be beneficial to psychometrically evaluate existing marital measures, adapt measures, or develop new measures for use in research with these families. Finally, in order to answer more complex longitudinal questions about dyadic interactions, advanced statistical techniques that account for nesting and interdependence of data within person and across time are required, such as multilevel modeling or structural equation modeling.

Conclusion

Stressors/supports, vulnerabilities/strengths, and adaptive processes seem to impact marital functioning among parents of a child on the autism spectrum in similar and unique ways as understood through the lens of the VSA Model of Marriage (Karney and Bradbury [85]). While a large body of research indicates that stressors and vulnerabilities affect and are affected by marital functioning, considerably less is known about adaptive processes in these couples. The way couples work together to handle disagreements, overcome stressors, and support each other (i.e., adaptive processes) is a core component of healthy romantic relationships. Therefore, addressing this limitation in the current literature is instrumental for identifying avenues to promote healthy and enduring relationships for parents raising an autistic child. By synthesizing the literature with a theoretical frame and a critical eye, this paper identifies the crucial need for clearer understanding of processes that can promote positive individual, couple, and family outcomes for those raising a child on the autism spectrum.

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Compliance with Ethical Standards

Conflict of interest

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Human and animal rights

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Footnotes

The way autism is talked about evolves over time. A combination of identity-first language (i.e., autistic child) and "on the autism spectrum" are used throughout this paper in accordance with the terminology preferences currently expressed by the community and a recent set of recommendations for removing ableist language from autism research (Bottema-Beutel et al., [14]; Kenny et al., [87]). In this paper, both terms refer to a child with a diagnosis of autism spectrum disorder.