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ORIGINAL ARTICLE

Parent and Child Factors Predicting Early Intervention Choices of Australian Parents of Children With Autism Spectrum Disorder[†]

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Abstract

Extant research addressing implicit factors related to intervention decisions made by parents of children with autism spectrum disorder (ASD) is limited and findings have been inconsistent. In the present study, 74 parents of preschoolers with ASD were surveyed regarding intervention use. The possible relationships between implicit parent factors (education level, age, causal beliefs about ASD, complementary and alternative medicine [CAM] use, and family income) and child factors (time since diagnosis, and perceived severity of ASD), and the number and type of interventions used were examined. Consistent with previous research, only a small number of significant relationships were found, including that family income, parent use of CAM, mother's education, parent belief in an unknown aetiology of ASD, and time since child's diagnosis were all related to the number of interventions used. Some specific findings of previous research were not replicated in the present study (e.g., neither beliefs in environmental aetiology of ASD nor parent education levels were related to the use of specific CAM interventions), indicating that factors affecting decision-making may not be consistent across samples. Nevertheless, future research including an expanded range of possible implicit factors with more diverse samples may provide a more accurate predictive model of parent decision-making.

Keywords: ASD; autism; choice; decision-making; early intervention; parent

Recent surveys of parents of children with autism spectrum disorder (ASD) have revealed that parents are typically using concurrent multiple interventions, with varied levels of empirical support (Carlon, Stephenson, & Carter, 2014; Denne, Hastings, & Hughes, 2018; Salomone, Charman, McConachie, & Warreyn, 2015). Although some interventions for ASD are supported by empirical evidence (National Autism Center, 2015), parents are not necessarily choosing to use these, or to use them exclusively. The factors that influence parents to commence using some interventions and reject others are therefore of interest.

Numerous recent studies have examined factors declared by parents as influencing their intervention decision-making (Carlon, Carter, & Stephenson, 2013; Levy et al., 2016). In addition to declared decision-making factors, intervention decision-making may also be influenced by other implicit factors of which parents are not necessarily aware. A number of studies have examined the relationship between implicit factors and ASD intervention decisions, but few of these have been conducted with Australian participants.

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Implicit Parent Factors

One implicit factor that has been examined in North America and Europe is parental beliefs about the causes of ASD. Hebert and Koulouglioti (2010) reported that the incorrect belief that ASD was caused by vaccinations was found to be related to withholding or delaying vaccinations in three studies (Dale, Jahoda, & Knott, 2006; Harrington, Patrick, Edwards, & Brand, 2006; Harrington, Rosen, Garnecho, & Patrick, 2006), and that a belief in a specific cause of ASD (as opposed to an unknown cause) was related to increased complementary and alternative medicine (CAM) use (Harrington, Patrick, et al., 2006). Dardennes et al. (2011) found significant associations between causal beliefs regarding food allergies and greater use of detoxification treatments, dietary interventions, and vitamins. These beliefs were also associated with lower rates of medication use. Causal beliefs relating to illness during pregnancy were positively associated with the use of medication. Parents who believed ASD was caused by traumatic experiences very early in life were less likely to use some behavioural interventions, and those who believed in brain abnormalities were less likely to use vitamins. The results of these studies suggest that decisions to use or reject some specific interventions for ASD may be related to the beliefs that parents hold regarding the aetiology of their child's ASD.

In addition to surveying parents about their causal beliefs, Dardennes et al. (2011) also examined parent's education level but found no significant relationships between the parent's education and the use of any of the interventions examined. However, Hall and Riccio (2012), Salomone et al. (2015), and Wong and Smith (2006) all reported significant relationships between higher parent education levels and CAM use. In addition, Hanson et al. (2007) reported a positive association between maternal education levels and CAM use. Furthermore, Patten, Baranek, Watson, and Schultz (2013) reported that higher maternal and paternal education levels were associated with the use of gluten-free/casein-free diets and/or vitamins. Overall, these findings indicate that parents with higher education levels may be more likely to use CAM interventions with their children with ASD.

It is a plausible assumption that family income may be associated with variations in intervention use, but there have been mixed findings in this area. Irvin, McBee, Boyd, Hume, and Odom (2012) found that higher socioeconomic status increased the probability of parents using occupational therapy and applied behaviour analysis (ABA) outside of the educational environment. However, Patten et al. (2013) did not find any significant relationships between family income and the number of different services used, the use of sensory integration, or the use of alternative interventions. Additionally, Denne et al. (2018) did not find any significant associations between household income and the use of any intervention examined. Due to these apparently contradictory findings, further investigation regarding the relationship between family income and intervention decisions would be useful.

Erba (2000) reported that mothers who themselves used 'alternative' treatments for their personal health care were more likely to use CAM interventions and/or alternative educational and therapy-based interventions (such as auditory integration, facilitated communication, and sensory integration) with their children with ASD than those who did not use alternative healthcare treatments. The possible relationship between one or both parents' use of CAM interventions and the use of CAM interventions (alone) with their child with ASD is yet to be examined.

Implicit Child Factors

Child factors may also play an implicit role in the choice of interventions. Although Salomone at al. (Salomone et al., 2015) reported that the use of the CAM interventions examined in their study were not associated with the child's age, relationships have been found in other studies. Bowker, D'Angelo, Hicks, and Wells (2011), Denne et al. (2018), Goin-Kochel, Myers, and Mackintosh (2007), Mire, Raff, Brewton, and Goin-Kochel (2015), and Salomone et al. (2016) all reported associations between the age of children and some variations in types of interventions used. Furthermore, Green et al. (2006) found that more interventions were used with younger children and when the child was described as having 'severe autism' and fewer when the child was described as having Asperger syndrome. The apparent severity of the diagnosis was described in Green et al. (2006) as also influencing the type of

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interventions used. Other researchers have investigated the relationship between severity of ASD symptoms and CAM use. Both Christon, Mackintosh, and Myers (2010) and Hall and Riccio (2012) reported that the total number of CAM interventions used increased with the apparent severity of ASD diagnosis. Hanson et al. (2007) reported that CAM use was significantly associated with a more severe diagnosis. In contrast, Dardennes et al. (2011) did not report any associations between the number of observed ASD symptoms and the use of any of the examined interventions. These inconsistent findings suggest that child factors such as age and severity of ASD symptomatology may be related to parent decision-making, but that further research is needed to provide a full picture of the context in which these factors are most likely to influence decision-making.

The child commencing school may also influence intervention decision-making. Early intervention services tend to be offered within the family-systems model of service delivery, where the role of the whole family system is recognised as important to the development of the child, and families are empowered to make decisions about their needs, priorities, and supports (Dunst & Trivette, 2009). There is some evidence to suggest that the decision-making role of the parents changes when children commence school; for example, parents are likely to employ the interventions offered at the child's school rather than actively choosing to commence or continue to use similar interventions available outside of school (Akshoomoff, Stahmer, Corsello, & Mahrer, 2010; Thomas, Morrissey, & McLaurin, 2007). This may be a reflection of decreased parent involvement in the decisions regarding intervention use once the child commences school and schoolteachers assuming some of these responsibilities.

The Australian Context

The unique structure of funding for interventions in Australia may mean that different factors may be related to decisions made by those living in Australia compared to those in other areas of the world. In Australia at the time of the present study, the federal government offered some funding for parents of preschool-age children with ASD through the Helping Children with Autism (HCWA) package (Australian Government Department of Social Services, 2019). This funding could be used to access interventions delivered by approved providers but is currently being rolled over into a new funding system, the Early Childhood Early Intervention (ECEI) component of the federal government–funded National Disability Insurance Scheme (NDIS; Australian Government Department of Social Services, 2019). The ECEI component of the NDIS provides individually allocated funding for early intervention supports for those under 7 years of age who have a developmental delay or disability (National Disability Insurance Agency, 2019). Within both the HCWA and the ECEI NDIS funding models, parents are empowered to choose which interventions are used.

Implications for the Present Study

In summary, a modest number of factors have been implicated as associated with parental decision-making with regard to interventions used with children with ASD, but findings have not always been consistent across studies. No studies have been conducted with an Australian sample (although some included a small number of Australian participants within mainly North American samples; e.g., Goin-Kochel et al., 2007; Green et al., 2006). Investigation of implicit factors that predict selection of interventions by parents of children with ASD may assist in both understanding factors that affect decision-making and in providing guidance to parents in this process. The time prior to their child starting school appears to be the most active time for parent involvement in and control over the choice of interventions used. Therefore, parents of preschool-age children may be an ideal target population through which to examine implicit decision-making factors in an Australian context.

Aim and Research Questions

The present study provided an investigation of the possible implicit underlying parent and child factors related to intervention choices of Australian parents of preschool-age children (i.e., those under 7 years

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of age who had not yet started school) with ASD. Specifically, through secondary analysis of data collected in Carlon, Carter, and Stephenson (2015), the following questions were addressed:

1. Do implicit parent factors (education level, age, causal beliefs about ASD, CAM use, or family income) or child factors (time since diagnosis, or perceived severity of ASD) predict the number of interventions used by parents?
2. Do implicit parent or child factors predict the type of interventions used by parents?

Method

This research was part of a wider study of the importance that parents place on different factors in decision-making (Carlon et al., 2015). The description of the participants, materials and design, and procedures was adapted from Carlon et al. (2015). The aim of the study was to investigate possible implicit underlying parent and child factors related to intervention choices of Australian parents of preschool-age children with ASD. A survey design was appropriate for collecting these data.

Participants

The participants were parents of preschool-age children with ASD. All children were aged 6 years or younger and had not yet started school. The children were receiving autism-specific early intervention services from one of three providers in New South Wales (NSW): Autism Spectrum Australia (Aspect), Playgroup NSW, or Autism Behavioural Intervention (ABI) NSW. Surveys were distributed to 175 parents and 75 were returned (return rate = 42.9%). One participant who did not provide any data for the section of the survey regarding intervention use was excluded from the current analyses. Participant characteristics are shown in Table 1. All participants reported that their child had received a formal diagnosis of ASD (85.1% autistic disorder). The children were aged between 34 and 75 months ($M = 51.3$), and the time since diagnosis ranged from 2 to 36 months ($M = 16.4$).

Instrument

The first three authors developed a paper survey containing five sections. The first section was designed to collect demographic information. This included items regarding the child's diagnosis, the parent's rating of the severity of their child's ASD (mild, moderate, or severe), both parents' education levels (high school; Technical and Further Education [TAFE], college or further training; undergraduate university; or postgraduate university), both parents' own use of CAM interventions within the last 12 months, annual family income, and the primary intervention decision-maker in the household. Additionally, a checklist of nine causal beliefs about ASD was developed from those commonly reported in the literature (Dardennes et al., 2011; Furnham & Buck, 2003; Mercer, Creighton, Holden, & Lewis, 2006), and participants were asked to select those they thought may cause or contribute to the development of ASD. They could select multiple beliefs and were also invited to add beliefs not listed. Participants were not required to rate the strength of each casual belief selected but simply to indicate that they held the belief. The second section consisted of a checklist for parents to nominate sources of information used in making decisions about interventions.

In the third section, a list of interventions available in NSW was developed from the guidelines for funding in Australia through the federal government's HCWA package (Australian Government Department of Families, Housing, Community Services and Indigenous Affairs, 2012) and parent reports of interventions used in a recent study of preschool-age children with ASD in NSW (Carter et al., 2011). This list was presented and participants were asked to indicate whether they (a) had not heard of the intervention, (b) considered using it but decided not to, (c) were currently using it, or (d) had used it in the past. Parents were also invited to add interventions to the list. The final two sections of the survey addressed the importance placed by parents on different factors in decision-making and are not relevant to the present analysis (see Carlon et al., 2015, for further details).

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Table 1. Participant Characteristics ($N = 74$)

Characteristic	Number of participants	% of total sample
Respondent		
Mother	63	85.1
Father	10	13.5
Other (foster mother)	1	1.4
Mother's age		
<25 years	1	1.4
25–34 years	18	24.3
35–44 years	55	74.3
Father's age		
25–34 years	11	14.9
35–44 years	49	66.2
>44 years	10	13.5
Unreported	4	5.4
Mother's education		
High school or equivalent	12	16.2
TAFE, college, or further training	23	31.1
Undergraduate university degree	23	31.1
Postgraduate university degree	15	20.3
Unreported	1	1.4
Father's education		
High school or equivalent	9	12.2
TAFE, college, or further training	26	35.1
Undergraduate university degree	22	29.7
Postgraduate university degree	12	16.2
Unreported	5	6.8
Annual family income		
<$40,000	10	13.5
$40,000–$80,000	29	39.2
$80,000–$120,000	22	29.7
>$120,000	13	17.6
Primary decision-maker regarding intervention use		
Mother	33	44.6
Father	2	2.7
Both parents together	39	52.7
Child's gender		
Male	68	91.9
Female	6	8.1

(*Continued*)

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Table 1. (*Continued*)

Characteristic	Number of participants	% of total sample
Child's diagnosis		
Autistic disorder	63	85.1
Asperger's disorder	2	2.7
PDD-NOS	8	10.8
Other (high-functioning autism)	1	1.4
Additional diagnoses	8	10.8
Parent rating of severity of ASD		
Mild	28	37.8
Moderate	35	47.3
Severe	7	9.5
Unreported	1	1.4
Others		
Mild to moderate	2	2.7
Moderate to severe	1	1.4

Note. TAFE = Technical and Further Education; PDD-NOS = pervasive developmental disorder not otherwise specified; ASD = autism spectrum disorder.

Procedures

Approval for conducting the study (and for the use of an incentive prize draw) was obtained from the relevant ethics committees. The cover page of the survey included the statement 'Participation is voluntary and returning this survey indicates that you consent to participating'. Implied consent as opposed to verbal or written consent was used due to the anonymous nature of the survey. Surveys were distributed to parents of preschool-age children with ASD using one of three autism-specific early intervention services in NSW. These were (a) Building Blocks, a centre-based early intervention program delivered by Aspect (the largest provider of autism-specific early intervention services in NSW); (b) the Footprints 'Stepping into Learning' program (commonly known as 'ABI'), a home-based autism-specific early intervention program based on the principles of ABA, provided by ABI NSW and funded in part by the NSW Government Department of Ageing, Disability and Home Care; and (c) PlayConnect Playgroups, ASD-specific playgroups delivered by Playgroup NSW as part of the federal government's HCWA package. The Building Blocks and ABI services were selected because they were delivered by the two largest autism-specific early intervention service providers in NSW. The PlayConnect Playgroups were included because they were delivered by a community-based organisation and offered the opportunity of potentially reaching a broad sample of families.

Where it was practical to do so, the first author visited the centre-based (group) services and provided the parents with a brief overview of the project before distributing the surveys. The early intervention staff later collected surveys from those parents who wished to participate and posted them back to the first author. For the home-based services and centre-based groups where it was not practical for the first author to attend, the early intervention staff also distributed and collected the surveys.

It was possible that families may have been using more than one of the three services. To avoid distributing the surveys to the same families more than once, parents were asked if they had received the survey from a different service provider. Surveys were only distributed to those who had not already received one. Participants were given the option to provide contact details for the incentive prize draw and/or to be informed of future research opportunities. Two return envelopes were provided to each

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parent with the survey so that those wishing to provide their contact details could submit their details and the anonymous survey separately.

Analysis

Data preparation

Initially, descriptive statistics were calculated and interventions were collapsed into six overarching groups to facilitate further analyses (as shown in Table 2). There is no generally agreed upon classification system for ASD interventions, and interventions have been grouped in several different ways by researchers in previous survey studies (e.g., Carter et al., 2011; Goin-Kochel et al., 2007; Green et al., 2006; Patten et al., 2013; Salomone et al., 2015). In the present study, the classification system used by Green et al. (2006) was used as a general framework. The behavioural interventions group was based on the Green et al. (2006) category of skills training based on the principles of ABA. The group of non-behavioural autism-specific interventions included those interventions that were autism-specific but not primarily based on the principles of ABA. It encompassed the two categories of relationship-based treatments and combined programs as used by Green et al. (2006). CAM-based interventions included those that were classified by Green et al. (2006) as detoxification, physiological, alternative diets, vitamin supplements, or alternative therapies/medicines. The primary feature of CAM-based interventions was that they are not broadly accepted by conventional medical and educational professionals. Therapy-based interventions were a group of interventions commonly delivered in Australia by conventional therapists (e.g., occupational therapists, speech therapists) or interventions typically associated with these therapists. It primarily consisted of interventions classified by Green et al. (2006) as standard therapies, along with some specific therapy interventions such as sensory integration (classified by Green et al., 2006, as physiological interventions). The group of generic interventions included non-autism-specific interventions such as preschool and social skills training, and was based on the other skills-based category used by Green et al. (2006). The final group was medications.

Causal beliefs about ASD were collapsed into four categories: neurological/medical, psychological, environmental, and unknown. The neurological/medical category included genetics/hereditary, abnormality/chemical imbalance in the brain, and illness or complications during pregnancy (all listed in the survey), plus premature birth or complications during birth, and a different brain structure (additional 'other' causes added by participants). The psychological category included traumatic experiences early in life and the child's upbringing. The environmental category included allergies to some foods, environmental triggers, and vaccinations (all listed in the survey), plus the use of antibiotics and vaccinations during pregnancy, and preservatives (additional 'other' causes added by parents). Unknown causes were a standalone category.

Participants were required to select the severity of their child's ASD (mild, moderate, or severe). In two cases, participants indicated 'mild to moderate', and in one case, 'moderate to severe'. In these cases, the most conservative rating of severity (i.e., the least severe option) was used in the analyses. Pearson and Spearman correlation coefficients were calculated to test for correlations between (a) the mother's education levels and father's education levels, (b) the mother's age and father's age, and (c) the child's age and time since diagnosis. Both the mother's education levels and father's education levels and the mother's age and father's age were significantly correlated, so only the mother's education level and mother's age were used in the regression analyses. The child's age and time since diagnosis were also significantly correlated. Although other researchers (e.g., Bowker et al., 2011; Goin-Kochel et al., 2007) have used the child's age when assessing child factors related to intervention use, the age range of the children in those studies was much wider. Given that the children's ages were restricted to 6 years and under in the present study, we believed that it was more appropriate to use the measure of time since diagnosis in our analyses.

Data analysis

A series of regression analyses were run to answer the research questions, namely which implicit parent or child factors predict the number of interventions used, and whether such factors predict the type of

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Table 2. Interventions Used Currently and Ever Used (Currently or Previously) by Category ($N = 74$)

Intervention	Currently using *n* (%)	Ever used *n* (%)
Behavioural interventions		
Applied behaviour analysis (ABA)	17 (23.0)	19 (25.7)
Autism behavioural intervention (ABI)	24 (32.4)	33 (44.6)
Lovaas/discrete trial training	0 (0)	1 (1.4)
Total number of parents using interventions in category	**35 (47.3)**	**42 (56.8)**
Non-behavioural autism-specific interventions		
Autism-specific early intervention program	55 (74.3)	58 (78.4)
Autism-specific playgroup	31 (41.9)	52 (70.3)
Floortime	11 (14.9)	23 (31.1)
More Than Words: The Hanen Program for parents of children with ASD	13 (17.6)	27 (36.5)
Relationship Development Intervention (RDI)	2 (2.7)	2 (2.7)
TalkAbility: The Hanen Program for parents of verbal children with ASD	0 (0)	1 (1.4)
Total number of parents using interventions in category	**64 (86.5)**	**71 (95.9)**
CAM-based interventions		
Acupuncture	2 (2.7)	3 (4.1)
Chiropractic	4 (5.4)	7 (9.5)
Detoxification treatments (e.g., chelation)	4 (5.4)	5 (6.8)
Dietary restrictions	12 (16.2)	20 (27.0)
Stem cell therapy	1 (1.4)	1 (1.4)
Sound/auditory treatment (e.g., Tomatis, Berard)	5 (6.8)	5 (6.8)
Vitamin, mineral, or dietary supplements	30 (40.5)	39 (52.7)
Total number of parents using interventions in category	**39 (52.7)**	**48 (64.9)**
Therapy-based interventions		
Multisensory therapy	1 (1.4)	1(1.4)
Music therapy	9 (12.2)	19 (25.7)
Occupational therapy	57 (77.0)	68 (91.9)
Play therapy	19 (25.7)	28 (37.8)
Physiotherapy	3 (4.1)	10 (13.5)
Sensory integration	19 (25.7)	29 (39.2)
Speech therapy	66 (89.2)	72 (97.3)
Psychology	1 (1.4)	1 (1.4)
Total number of parents using interventions in category	**72 (97.3)**	**74 (100)**
Generic interventions		
Child care	39 (52.7)	54 (73.0)
Cognitive training	1 (1.4)	1 (1.4)
Generic (non-autism-specific) early intervention	15 (20.3)	28 (37.8)

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Table 2. (*Continued*)

Intervention	Currently using *n* (%)	Ever used *n* (%)
Generic (non-autism-specific) playgroup	15 (20.3)	37 (50.0)
Gymnastics	1 (1.4)	1 (1.4)
Preschool	55 (74.3)	58 (78.4)
Swimming	1 (1.4)	1 (1.4)
Social skills training	16 (21.6)	20 (27.0)
Total number of parents using interventions in category	**69 (93.2)**	**73 (98.6)**
Medication		
Medication (to treat the symptoms of ASD – not for other reasons)	**8 (10.8)**	**10 (13.5)**

Note. Italicised interventions were volunteered by parents, not listed in the survey. ASD = autism spectrum disorder; CAM = complementary and alternative medicine.

interventions used. The number of interventions currently used in total across all groups of interventions and the number of interventions currently used from each of the five groups of interventions separately (behavioural, non-behavioural autism-specific, CAM-based, therapy-based, and generic) were the dependent variables (interval-level variables in the form of number of interventions used) in the first round of linear regression analyses. The predictor variables used in the regression analyses included both categorical variables (one or both parents' use of CAM treatments within the last 12 months, mother's education level, neurological/medical causal beliefs, psychological causal beliefs, environmental causal beliefs, and unknown causal beliefs) and continuous variables (time since diagnosis, perceived severity of ASD, mother's age, and family income). Multicollinearity of predictors was checked and no problematic multicollinearity was present. All variance inflation factor values were below 4. In this initial round of analyses, a binary logistic regression was also run using the predictor variables previously described and the current use of medication as the outcome variable, coded as either currently using or not currently using, as no parent reported more than one currently used medication.

Some of the data collected in the present study paralleled data collected by Dardennes et al. (2011) and Patten et al. (2013). Therefore, a second round of targeted analyses replicating the work of Dardennes et al. (2011) and Patten et al. (2013) was undertaken. Dardennes et al. (2011) included the current use of specific interventions (rather than groups of interventions, coded as binary variables, using each specific intervention versus not using each intervention) as the dependent variables in their analyses of causal beliefs about autism as predictors of intervention use. Therefore, binary logistic regressions using the same predictor variables as used in the first round of analyses were run, with those individual interventions common to Dardennes et al. (2011) and the present study as the binary dependent variables. These were ABA, detoxification, dietary interventions, and vitamins/minerals/supplements. Patten et al. (2013) used the current and/or past use of groups of interventions as the dependent variables in their analyses. Furthermore, they divided the CAM interventions into vitamin therapy and/or gluten-free/casein-free diets and other CAM. Therefore, linear regressions were run using the same predictor variables and groups of interventions as used in the first round of analyses, with the number of interventions ever used (currently or previously, an interval-level variable) in total across all groups of interventions and the number of interventions ever used (currently or previously, interval-level) from each of the five groups of interventions separately (behavioural, non-behavioural autism-specific, CAM-based, therapy-based, and generic), plus the current and/or past use of dietary interventions and/or vitamins/minerals/supplements (interval-level) as dependent variables. Finally, a binary logistic regression was repeated using the same predictor variables and the current and/or past

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Table 3. General Linear Model Analyses of the Number of Interventions Used

	Currently used			Ever used		
Predictor variable	*B*	*SE*	*p*	*B*	*SE*	*p*
Parental CAM use	.743	.668	.271	2.047	.886	.024
Belief in neuromedical aetiology of ASD	.662	.714	.357	.735	.947	.441
Belief in psychological aetiology of ASD	.531	.989	.594	.764	1.312	.563
Belief in environmental aetiology of ASD	−.896	.627	.158	−.261	.831	.754
Belief in unknown aetiology of ASD	−1.402	.610	.025	−.315	.809	.699
High school education[a]	−1.06	1.051	.318	−1.274	1.394	.365
TAFE, college, or equivalent education[a]	−1.049	.905	.251	.097	1.2	.936
Undergraduate university education[a]	−2.177	.847	.013	−.749	1.124	.508
Time since diagnosis	.018	.037	.639	.145	.049	.005
Severity of ASD	.519	.522	.325	−4.0	.693	.566
Mother's age	−.761	.666	.258	−.398	.883	.654
Family income	−.948	.338	.007	−.863	.449	.059

Note. CAM = complementary and alternative medicine; ASD = autism spectrum disorder; TAFE = Technical and Further Education.
[a]Baseline measure is postgraduate university education.

use of medications as the outcome variable (binary). All analyses were conducted using SPSS (Version 24.0). The critical α value for individual independent variables was .05, and this was Bonferroni corrected for multiple comparisons on categorical variables.

Results

Interventions Used

The interventions used currently and ever used are shown in Table 2. A mean of 7.3 interventions were reported to be used currently (range: 2–14 interventions) and 2.7 in the past (range: 0–10). The interventions most commonly used (as measured by current use and/or past use) were the therapy-based interventions speech therapy and occupational therapy. These were followed by the generic interventions preschool and child care, and the non-behavioural autism-specific interventions autism-specific early intervention and autism-specific playgroups.

Predictors of Interventions Used

Predictors of number of interventions used

The general linear model (GLM) procedure was used with the number of interventions currently used as the outcome variable and repeated with the number of interventions ever used (currently or previously) as the outcome variable. The overall corrected models for both the number of interventions currently used, $R^2 = .374$, $F(12,56) = 2.786$, $p = .005$, and the number of interventions ever used, $R^2 = .309$, $F(12,56) = 2.084$, $p = .033$, were significant. The GLM analyses are shown in Table 3. As shown in Table 3, parents who believed in an unknown aetiology of ASD currently used fewer interventions than those who only attributed ASD to specific causes. Those with a higher annual family income currently used fewer interventions than those with a lower annual family income. Mothers with an undergraduate university education currently used fewer interventions than those with a postgraduate university education. Those with a longer time since diagnosis used a greater number of

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Table 4. General Linear Model Analyses of the Number of Behavioural Interventions Used

	Currently used			Ever used		
Predictor variable	*B*	*SE*	*p*	*B*	*SE*	*p*
Parental CAM use	−.26	.176	.147	−.159	.205	.443
Belief in neuromedical aetiology of ASD	−.247	.189	.196	−.074	.22	.737
Belief in psychological aetiology of ASD	.187	.261	.478	.345	.304	.262
Belief in environmental aetiology of ASD	.025	.166	.882	.134	.193	.488
Belief in unknown aetiology of ASD	−.12	.161	.743	−.095	.188	.615
High school education[a]	−.132	.278	.636	.031	.323	.924
TAFE, college, or equivalent education[a]	.008	.239	.973	.175	.278	.532
Undergraduate university education[a]	−.258	.224	.254	−.108	.261	.68
Time since diagnosis	.013	.01	.188	.015	.011	.194
Severity of ASD	−.112	.138	.419	−.147	.161	.635
Mother's age	−.653	.176	<.001	−.501	.205	.018
Family income	.121	.089	.181	.092	.104	.380

Note. CAM = complementary and alternative medicine; ASD = autism spectrum disorder.
[a]Baseline measure is postgraduate university education.

interventions ever (currently and/or previously), and families in which one or both parents used CAM within the last year used more interventions ever than those in which neither parent used CAM within the last year. No other significant relationships were found.

Predictors of types of interventions used

The logistic regressions did not reveal any significant relationships between the predictor variables and the current or lifetime use (current and/or past) of medications. The GLM procedure was used with the number of interventions currently used from each of the five groups of interventions separately (behavioural, non-behavioural autism-specific, CAM-based, therapy-based, and generic) as the outcome variables, and repeated with the number of interventions ever used (currently or previously) from each of the five groups of interventions separately as the outcome variables. The same independent variables as those used in the previous analyses were used in all analyses.

The overall corrected model for the current use of behavioural interventions was significant, $R^2 = .304$, $F(12,56) = 2.037$, $p = .037$; however, the overall corrected model for interventions ever used was not significant, $R^2 = .211$, $F(12,56) = 1.273$, $p = .274$. The GLM analyses for behavioural interventions are shown in Table 4. As shown in Table 4, older mothers were both currently using fewer behavioural interventions than younger mothers and used fewer behavioural interventions ever (currently or previously) than younger mothers. No other significant relationships were found.

The overall corrected model for the current use of non-behavioural autism-specific interventions was significant, $R^2 = .380$, $F(12,56) = 2.858$, $p = .004$. The GLM analysis for the current use of non-behavioural autism-specific interventions is shown in Table 5. As shown in Table 5, families with higher annual family incomes were currently using fewer non-behavioural autism-specific interventions than those with lower family incomes. Those who believed that the aetiology of ASD was related to neuromedical factors currently used more non-behavioural autism-specific interventions than those who did not hold this belief. Conversely, those who believed that the aetiology of ASD was related to psychological factors currently used fewer non-behavioural autism-specific interventions than those who did not hold this belief. Those who believed that the aetiology of ASD was unknown currently

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Table 5. General Linear Model Analysis of the Number of Non-Behavioural Autism-Specific Interventions Currently Used

Predictor variable	*B*	*SE*	*p*
Parental CAM use	−.326	.23	.161
Belief in neuromedical aetiology of ASD	.623	.246	.014
Belief in psychological aetiology of ASD	−.849	.341	.016
Belief in environmental aetiology of ASD	−.035	.216	.873
Belief in unknown aetiology of ASD	−.499	.210	.021
High school education[a]	−.328	.362	.368
TAFE, college, or equivalent education[a]	−.407	.312	.179
Undergraduate university education[a]	−.626	.292	.036
Time since diagnosis	−.018	.013	.169
Severity of ASD	.224	.18	.219
Mother's age	.376	.229	.107
Family income	−.298	.116	.013

Note. CAM = complementary and alternative medicine; ASD = autism spectrum disorder.
[a]Baseline measure is postgraduate university education.

used fewer non-behavioural autism-specific interventions than those who only attributed ASD to specific causes. Finally, those with an undergraduate university education used fewer non-behavioural autism-specific interventions than those with a postgraduate university education. No other significant relationships were found and no significant relationships were found when the GLM was repeated using the number of non-behavioural autism-specific interventions ever used (currently or previously) as the outcome variable.

The overall corrected model for the current use of CAM-based interventions was not significant, $R^2 = .238$, $F(12,56) = 1.454$, $p = .170$, but for use ever (currently or previously), the overall corrected model was significant, $R^2 = .415$, $F(12,56) = 3.315$, $p = .001$. The GLM analyses for CAM-based interventions are shown in Table 6. As shown in Table 6, families in which one parent or both parents had used CAM within the last year used more CAM interventions both currently and ever (currently or previously) than those in which neither parent had used CAM within the last year. No other significant relationships were found.

The overall corrected models for both the number of therapy-based interventions currently used, $R^2 = .311$, $F(12,56) = 2.11$, $p = .031$, and ever used, $R^2 = .308$, $F(12,56) = 2.077$, $p = .034$, were significant. The GLM analyses for therapy-based interventions are shown in Table 7. As shown in Table 7, those with higher annual family incomes were both currently using fewer therapy-based interventions and had used fewer therapy-based interventions ever (currently or previously) than those with lower family incomes. Additionally, those with a longer time since diagnosis had used more therapy-based interventions ever than those who were more recently diagnosed with ASD. No other significant relationships were found.

The overall corrected model for the current use of generic interventions was not significant and no significant relationships were found. When the GLM was repeated using the number of generic interventions ever used as the outcome variable, the overall corrected model was also not significant, $R^2 = .238$, $F(12,56) = 1.455$, $p = .169$. However, a significant negative correlation between severity of ASD and use ever of generic interventions (B = –.707, $p = .015$) indicated that parents who rated their child's ASD as more severe had used fewer generic interventions ever (currently or previously)

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Table 6. General Linear Model Analyses of the Number of CAM-Based Interventions Used

	Currently used			Ever used		
Predictor variable	*B*	*SE*	*p*	*B*	*SE*	*p*
Parental CAM use	.645	.273	.022	1.08	.258	<.001
Belief in neuromedical aetiology of ASD	−.207	.292	.48	−.243	.276	.382
Belief in psychological aetiology of ASD	.423	.404	.3	.472	.383	.222
Belief in environmental aetiology of ASD	.012	.256	.963	−.014	.242	.953
Belief in unknown aetiology of ASD	−.242	.249	.337	−.123	.236	.606
High school education[a]	−.197	.430	.648	−.496	.406	.227
TAFE, college, or equivalent education[a]	−.198	.370	.594	−.048	.35	.891
Undergraduate university education[a]	−.282	.346	.419	−.214	.328	.517
Time since diagnosis	<.001	.015	.985	.003	.014	.839
Severity of ASD	.258	.213	.232	.331	.202	.107
Mother's age	−.253	.272	.357	−.281	.257	.280
Family income	−.071	.138	.607	−.088	.131	.505

Note. CAM = complementary and alternative medicine; ASD = autism spectrum disorder.
[a]Baseline measure is postgraduate university education.

Table 7. General Linear Model Analyses of the Number of Therapy-Based Interventions

	Currently used			Ever used		
Predictor variable	*B*	*SE*	*p*	*B*	*SE*	*p*
Parental CAM use	.383	.323	.241	.554	.294	.064
Belief in neuromedical aetiology of ASD	.346	.345	.322	.139	.314	.659
Belief in psychological aetiology of ASD	.365	.479	.449	.152	.435	.728
Belief in environmental aetiology of ASD	−.239	.303	.434	−.141	.276	.611
Belief in unknown aetiology of ASD	−.311	.295	.297	−.094	.268	.728
High school education[a]	−.497	.509	.337	−.603	.462	.197
TAFE, college, or equivalent education[a]	−.578	.438	.192	−.412	.398	.305
Undergraduate university education[a]	−.794	.41	.058	−.322	.372	.391
Time since diagnosis	.002	.018	.904	.043	.016	.011
Severity of ASD	.422	.253	.101	.014	.23	.953
Mother's age	−.11	.322	.734	−.012	.293	.966
Family income	−.441	.164	.009	−.447	.149	.004

Note. CAM = complementary and alternative medicine; ASD = autism spectrum disorder.
[a]Baseline measure is postgraduate university education.

than those who gave a less severe rating. Additionally, there was a significant positive association between time since diagnosis and use ever of generic interventions (B = .05, $p = .015$).

In the second round of regression analyses for the current use of the interventions tested in replication of the Dardennes et al. (2011) study (ABA, detoxification, dietary interventions, and

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vitamins/minerals/supplements), no significant relationships were found between the predictor variables and the current use of ABA, detoxification, or vitamins/minerals/supplements. A test of the full model for the current use of dietary interventions against a constant model was not statistically significant, $\chi^2(12, n = 69) = 15.83$, $p = 0.199$; however, one predictor variable was significantly associated with the current use of dietary interventions. The model correctly classified 84.1% of cases. Parental use of CAM within the last year made a significant contribution to prediction. Being in a family in which neither parent had used CAM within the last year decreased the odds of the child currently using dietary interventions compared with being in a family in which one or both parents had used CAM within the last year, Exp(B) = 0.139, $SE = .974$, $p = .43$.

Finally, in replication of Patten et al. (2013), the GLM procedure was used with the current or previous use of dietary interventions and/or vitamins/minerals/supplements as the outcome variable. The overall corrected model was not significant, $R^2 = .280$, $F(12,56) = 1.816$, $p = .068$. However, a significant positive association between parental CAM use and the use of dietary interventions and/or vitamins/minerals/supplements (B = .751, $p = .001$) indicated that families in which one parent or both parents had used CAM within the last year used significantly more dietary interventions and/or vitamins/minerals/supplements (currently or previously) than those in which neither parent had used CAM within the last year. No other significant relationships were found.

Discussion

In the present study, relationships between implicit parent and child factors and the number and type of interventions employed by parents of preschoolers with ASD were examined. These will be discussed, along with implications for future research and practice, and comparisons with the previous research of Dardennes et al. (2011) and Patten et al. (2013), followed by limitations of the present study.

Implicit Factors in Decision-Making

The belief in an unknown aetiology of ASD was significantly negatively associated with the total number of interventions currently used. This was somewhat surprising because it seems logical that parents who selected the uncertain option (even when other possible causes were also selected) might try a number of different interventions with their child rather than committing to a small number of interventions. Time since diagnosis was significantly positively associated with both the number of interventions ever used (currently or previously) and specifically with the number of generic and therapy-based interventions ever used. Given that it is common for parents of children with ASD to try and then discontinue interventions (Carlon et al., 2014), it is not surprising that those whose children had been diagnosed for a longer time would have tried more interventions than those who had been recently diagnosed.

It might be assumed that those with a higher family income level would more easily afford to employ a greater number of interventions. However, in the present study, family income was significantly negatively associated with the total number of interventions currently used. In addition, those with higher incomes also used fewer non-behavioural autism-specific interventions currently and fewer therapy-based interventions currently and ever (currently or previously) than those with lower incomes. A possible explanation for this result is that those with a higher income were accessing fewer interventions but using such interventions intensively. Siller, Reyes, Hotez, Hutman, and Sigman (2014) reported that preschool-age children in families with higher incomes received more intense individual services than those with lower family incomes. In contrast, Irvin et al. (2012) did not find a significant relationship between socioeconomic status and the amount of time spent by the preschool-age children using interventions outside of the educational environment. Thus there is some evidence that families with higher incomes may be more likely to use fewer but more intensive interventions, but further examination of this issue may be appropriate.

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The number of interventions ever used was significantly positively associated with one or both parents having personally used CAM within the last year. Additionally, families in which parents used CAM themselves (within the last year) used more CAM interventions with their children than those in which neither parent used CAM (within the last year). This relationship was also found for the use of the specific CAM intervention diets and/or vitamins/minerals/supplements. It is logical that parents who are open to using CAM interventions themselves would be more likely to try a greater number of these with their children than those who have chosen not to use CAM personally. A somewhat surprising finding was that parental CAM use was the only examined implicit factor that was significantly associated with the current or lifetime (current or previous) use of CAM interventions. In contrast, in previous studies CAM use with children with ASD has been associated with higher parental education levels (e.g., Hall & Riccio, 2012; Hanson et al., 2007; Salomone et al., 2015; Wong & Smith, 2006) and with increased severity of ASD as reported by the parent (e.g., Christon et al., 2010; Hall & Riccio, 2012; Hanson et al., 2007). It should be noted that these previous studies were conducted with mainly North American samples and included children of a wider age range than those in the present study.

Green et al. (2006) reported that more interventions were currently being used by those who reported their child as having 'severe autism'. In the present study, however, parent-reported severity was not associated with the total number of interventions used. The only significant findings related to parent-reported severity were that those who reported that the ASD was more severe used fewer generic interventions, both currently and ever (currently or previously). The difference in the two findings could be reflective of underlying differences between the mainly North American sample (including only one third of the children younger than 6 years of age) in Green et al. (2006) and the Australian sample including children of preschool-age only in the present study.

The findings of the present study and the studies of Dardennes et al. (2011) and Patten et al. (2013) were compared. Consistent with the findings of Dardennes et al. (2011), in the present study the implicit factors of the parent's education level and parent's age were not associated with the use of any of the following individual interventions: ABA, detoxification, dietary interventions, or vitamins/minerals/supplements. When considering the use of different types of interventions, the significant findings were also limited; mother's age was negatively associated with the number of behavioural interventions used, both currently and ever (currently or previously), and those with an undergraduate university degree used fewer non-behavioural autism-specific interventions currently than those with a postgraduate university degree.

The findings of Dardennes et al. (2011) indicated that some causal beliefs about ASD were associated with the use of particular interventions. In contrast, in the present study the only significant findings relating to causal beliefs about ASD related to the number of non-behavioural autism-specific interventions currently used (which were not examined by Dardennes et al., 2011). Causal beliefs were not found to be significantly associated with the use of ABA (or behavioural interventions), detoxification, dietary interventions, or vitamins/minerals/supplements. It appears somewhat counterintuitive that in the present study causal beliefs related to environmental aetiology of ASD did not increase the probability of parents using CAM interventions or the individual interventions detoxification, dietary interventions, or vitamins/minerals/supplements, especially given that Dardennes et al. (2011) reported that beliefs related to food allergies were positively associated with the use of those individual interventions.

These apparently contradictory findings may be related to differences in the design of the two studies. In Dardennes et al. (2011) very specific beliefs were examined (e.g., food allergies), whereas in the present study beliefs were collapsed into categories (e.g., environmental) to allow for analysis. Additionally, the way in which beliefs were measured varied between the studies. In Dardennes et al. (2011), participants were required to indicate the extent to which they believed in different statements regarding the aetiology of ASD on a 7-point Likert-type scale. In contrast, a broader approach was taken in the present study in which parents were asked to indicate which of the listed causal beliefs they agreed with and to add beliefs not listed. Given that many participants who indicated they held environmental causal beliefs also held beliefs in one or more of the other categories, possible subtle

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differences related to the influence of the strength of different beliefs may not have been identified in the present study. Alternatively, the differences in findings could be a result of differences between the two samples. The sample in Dardennes et al. (2011) was French parents and no restriction was placed on the age of the children ($M = 13.5$ years), whereas the sample in the present study was Australian parents of preschool-age children.

Patten et al. (2013) found that few of the examined implicit factors were significantly associated with the use of the interventions examined, which was consistent with the findings in the present study. Patten et al. (2013) did report, however, a significant positive association between higher parental education levels and the use of gluten-free/casein-free diets and/or vitamin therapy, a finding that was not replicated in the present study. Other research conducted in North America has also revealed relationships between higher parental education levels and the use of CAM interventions (e.g., Hanson et al., 2007; Wong & Smith, 2006), yet in the French study of Dardennes et al. (2011) no such relationships were found. It is possible that social and cultural differences could affect findings, and this is a potential avenue for future research.

In summary, in the present study relationships between a number of implicit parent and child factors and the number and type of interventions employed by parents of preschoolers with ASD were examined. Few significant associations were found and there were inconsistencies with previous research in the area. It is possible that this was because the intervention decisions of the parents were influenced by implicit factors that were not examined, such as marital status (Hall & Riccio, 2012) or caregiver/parental stress (Irvin et al., 2012; Konstantareas, Homatidis, & Cesaroni, 1995). However, the finding of a limited number of significant predictive relationships was generally consistent with previous research in the area (e.g., Dardennes et al., 2011; Hall & Riccio, 2012, Patten et al., 2013). It may therefore be more reflective of the complexity and idiosyncratic nature of the interplay between different factors (both implicit and those explicitly acknowledged by parents) in parent decision-making.

Limitations

Some limitations of the present study should be acknowledged. As the participants were recruited through service providers of autism-specific intervention programs, almost all of the children were currently using autism-specific early intervention and all of them had used it in the past. Nevertheless, parents were using an average of approximately seven interventions that included a wide range of possible options. In the future, researchers could include both participants who choose to use the most commonly used interventions for ASD, such as therapy-based interventions (Carlon et al., 2014), as well as those who decide not to employ these, to allow for examination of the possible implicit factors related to their use. Due to the anonymous nature of the survey, we relied on parental reports of diagnosis as opposed to obtaining documented confirming evidence, but this is a common practice in surveys of this type (e.g., Denne et al., 2018; Green et al., 2006; Salomone et al., 2015). Although the sample size in the present study was modest ($N = 74$), it was comparable with others in the area (e.g., Dardennes et al., 2011, $N = 78$; Patten et al., 2013, $N = 70$; Siller et al., 2014, $N = 70$). Finally, parents were asked to provide an overall rating of the severity of their child's ASD, but data related to the severity of ASD across multiple domains (such as behaviour, communication, social and cognitive) were not collected. This enabled the survey to be kept to a manageable length for participants to complete. However, the collection of severity ratings across several domains could have allowed for examination of potential relationships between severity ratings and intervention use at a finer level.

Implications and Future Directions

Although understanding parental decision-making processes may be potentially important in providing guidance and support to families, available research provides an inconsistent picture. It may be appropriate to expand the range of predictors examined in future studies and possibly attempt to integrate consideration of both implicit and declared factors in decision-making into predictive models.

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Future research may be undertaken with larger and more diverse samples to allow for the examination of possibly subtle differences in characteristics of those more likely not to use commonly employed interventions and to explore possible differences related to geography. The instruments used in future research could be refined; for example, a more sensitive tool for the measurement of causal beliefs could be used to investigate the influence of the strength of different causal beliefs with children of varying ages, and measurements of severity of ASD could be collected across the behavioural, social, communication, and cognitive domains. In addition, a qualitative component could be added to these future studies to enable richer data to be collected.

Future researchers may also consider more explicitly structuring their research around developmental or conceptual frameworks such as the family systems framework (Dunst & Trivette, 2009) or the ecological systems theory (Onwuegbuzie, Collins, & Frels, 2013). This could assist the researchers to identify other potential questions that remain about declared and implicit factors that may influence parent decision-making.

Conclusion

Consistent with previous research, few significant relationships between implicit child and parent factors and the number and type of interventions used by parents of preschool-age children with ASD were found. This may be reflective of a complex interplay between idiosyncratic implicit and explicitly declared factors in parental decision-making. Some specific findings of previous research could not be replicated in the present study. This indicates that factors influencing parental decision-making may not be consistent across samples from different geographic locations and/or including children of different ages. Although reliable predictive models of parental decision-making do not yet exist, practitioners working in early intervention with children with ASD may support parents in their decision-making through providing accurate information about the efficacy of interventions.

References

Akshoomoff, N., Stahmer, A. C., Corsello, C., & Mahrer, N. E. (2010). What happens next? Follow-up from the children's toddler school program. *Journal of Positive Behavior Interventions*, *12*, 245–253.

Australian Government Department of Families, Housing, Community Services and Indigenous Affairs. (2012). *Helping children with autism*. Retrieved 1 October 2012 from http://www.fahcsia.gov.au/our-responsibilities/disability-and-carers/program-services/for-people-with-disability/helping-children-with-autism - 7h

Australian Government Department of Social Services. (2019). *Helping Children with Autism (HCWA) and Better Start for Children with Disability (Better Start)*. Retrieved 18 May 2019 from https://www.dss.gov.au/disability-and-carers-programs-services-for-people-with-disability/helping-children-with-autism-hcwa-and-better-start-for-children-with-disability-better-start

Bowker, A., D'Angelo, N. M., Hicks, R., & Wells, K. (2011). Treatments for autism: Parental choices and perceptions of change. *Journal of Autism and Developmental Disorders*, *41*, 1373–1382. https://doi.org/10.1007/s10803-010-1164-y

Carlon, S., Carter, M., & Stephenson, J. (2013). A review of declared factors identified by parents of children with autism spectrum disorders (ASD) in making intervention decisions. *Research in Autism Spectrum Disorders*, *7*, 369–381. https://doi.org/10.1016/j.rasd.2012.10.009

Carlon, S., Carter, M., & Stephenson, J. (2015). Decision-making regarding early intervention by parents of children with autism spectrum disorder. *Journal of Developmental and Physical Disabilities*, *27*, 285–305. https://doi.org/10.1007/s10882-014-9415-z

Carlon, S., Stephenson, J., & Carter, M. (2014). Parent reports of treatments and interventions used with children with autism spectrum disorders (ASD): A review of the literature. *Australasian Journal of Special Education*, *38*, 63–90. https://doi.org/10.1017/jse.2014.4

Carter, M., Roberts, J., Williams, K., Evans, D., Parmenter, T., Silove, N., … Warren, A. (2011). Interventions used with an Australian sample of preschool children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *5*, 1033–1041. https://doi.org/10.1016/j.rasd.2010.11.009

Christon, L. M., Mackintosh, V. H., & Myers, B. J. (2010). Use of complementary and alternative medicine (CAM) treatments by parents of children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *4*, 249–259. https://doi.org/10.1016/j.rasd.2009.09.013

https://doi.org/10.1017/jsi.2019.9 Published online by Cambridge University Press

Dale, E., Jahoda, A., & Knott, F. (2006). Mothers' attributions following their child's diagnosis of autistic spectrum disorder: Exploring links with maternal levels of stress, depression and expectations about their child's future. *Autism*, *10*, 463–479. https://doi.org/10.1177/1362361306066600

Dardennes, R. M., Al Anbar, N. N., Prado-Netto, A., Kaye, K., Contejean, Y., & Al Anbar, N. N. (2011). Treating the cause of illness rather than the symptoms: Parental causal beliefs and treatment choices in autism spectrum disorder. *Research in Developmental Disabilities*, *32*, 1137–1146. https://doi.org/10.1016/j.ridd.2011.01.010

Denne, L. D., Hastings, R. P., & Hughes, C. J. (2018). Common approaches to intervention for the support and education of children with autism in the UK: An internet-based parent survey. *International Journal of Developmental Disabilities*, *64*, 105–112. https://doi.org/10.1080/20473869.2016.1275439

Dunst, C. J., & Trivette, C. M. (2009). Capacity-building family-systems intervention practices. *Journal of Family Social Work*, *12*, 119–143. https://doi.org/10.1080/10522150802713322

Erba, H. W. (2000). *An exploration of alternative treatment use in young children with autistic spectrum disorders* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses Global database. (UMI no. 9993303).

Furnham, A., & Buck, C. (2003). A comparison of lay-beliefs about autism and obsessive-compulsive disorder. *International Journal of Social Psychiatry*, *49*, 287–307. https://doi.org/10.1177/0020764003494006

Goin-Kochel, R. P., Myers, B. J., & Mackintosh, V. H. (2007). Parental reports on the use of treatments and therapies for children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *1*, 195–209. https://doi.org/10.1016/j.rasd.2006.08.006

Green, V. A., Pituch, K. A., Itchon, J., Choi, A., O'Reilly, M., & Sigafoos, J. (2006). Internet survey of treatments used by parents of children with autism. *Research in Developmental Disabilities*, *27*, 70–84. https://doi.org/10.1016/j.ridd.2004.12.002

Hall, S. E., & Riccio, C. A. (2012). Complementary and alternative treatment use for autism spectrum disorders. *Complementary Therapies in Clinical Practice*, *18*, 159–163. https://doi.org/10.1016/j.ctcp.2012.03.004

Hanson, E., Kalish, L. A., Bunce, E., Curtis, C., McDaniel, S., Ware, J., & Petry, J. (2007). Use of complementary and alternative medicine among children diagnosed with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *37*, 628–636. https://doi.org/10.1007/s10803-006-0192-0

Harrington, J. W., Patrick, P. A., Edwards, K. S., & Brand, D. A. (2006). Parental beliefs about autism: Implications for the treating physician. *Autism*, *10*, 452–462. https://doi.org/10.1177/1362361306066609

Harrington, J. W., Rosen, L., Garnecho, A., & Patrick, P. A. (2006). Parental perceptions and use of complementary and alternative medicine practices for children with autistic spectrum disorders in private practice. *Journal of Developmental & Behavioral Pediatrics*, *27*(Suppl. 2), S156–S161. https://doi.org/10.1097/00004703-200604002-00014

Hebert, E. B., & Koulouglioti, C. (2010). Parental beliefs about cause and course of their child's autism and outcomes of their beliefs: A review of the literature. *Issues in Comprehensive Pediatric Nursing*, *33*, 149–163. https://doi.org/10.3109/01460862.2010.498331

Irvin, D. W., McBee, M., Boyd, B. A., Hume, K., & Odom, S. L. (2012). Child and family factors associated with the use of services for preschoolers with autism spectrum disorder. *Research in Autism Spectrum Disorders*, *6*, 565–572. https://doi.org/10.1016/j.rasd.2011.07.018

Konstantareas, M., Homatidis, S., & Cesaroni, L. (1995). Brief report: Variables related to parental choice to medicate their autistic children. *Journal of Autism and Developmental Disorders*, *25*, 443–452. https://doi.org/10.1007/BF02179378

Levy, S. E., Frasso, R., Colantonio, S., Reed, H., Stein, G., Barg, F. K., … Fiks, A. G. (2016). Shared decision making and treatment decisions for young children with autism spectrum disorder. *Academic Pediatrics*, *16*, 571–578. https://doi.org/10.1016/j.acap.2016.04.007

Mercer, L., Creighton, S., Holden, J. J. A., & Lewis, M. E. S. (2006). Parental perspectives on the causes of an autism spectrum disorder in their children. *Journal of Genetic Counseling*, *15*, 41–50. https://doi.org/10.1007/s10897-005-9002-7

Mire, S. S., Raff, N. S., Brewton, C. M., & Goin-Kochel, R. P. (2015). Age-related trends in treatment use for children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, *15–16*, 29–41. https://doi.org/10.1016/j.rasd.2015.03.001

National Autism Center. (2015). *Findings and conclusions: National standards project, phase 2: Addressing the need for evidence-based practice guidelines for autism spectrum disorder*. Randolph, MA: Author.

National Disability Insurance Agency. (2019). *Help for children under 7*. Retrieved 18 May 2019 from https://www.ndis.gov.au/understanding/how-ndis-works/help-children-under-7

Onwuegbuzie, A. J., Collins, K. M. T., & Frels, R. K. (2013). Using Bronfenbrenner's ecological systems theory to frame quantitative, qualitative, and mixed research. *International Journal of Multiple Research Approaches*, *7*, 2–8. https://doi.org/10.5172/mra.2013.7.1.2

Patten, E., Baranek, G. T., Watson, L. R., & Schultz, B. (2013). Child and family characteristics influencing intervention choices in autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, *28*, 138–146. https://doi.org/10.1177/1088357612468028

Salomone, E., Beranová, S., Bonnet-Brilhault, F., Briciet Lauritsen, M., Budisteanu, M., Buitelaar, J., … Charman, T. (2016). Use of early intervention for young children with autism spectrum disorder across Europe. *Autism*, *20*, 233–249. https://doi.org/10.1177/1362361315577218

https://doi.org/10.1017/jsi.2019.9 Published online by Cambridge University Press

Salomone, E., Charman, T., McConachie, H., & Warreyn, P. (2015). Prevalence and correlates of use of complementary and alternative medicine in children with autism spectrum disorder in Europe. *European Journal of Pediatrics*, *174*, 1277–1285. https://doi.org/10.1007/s00431-015-2531-7

Siller, M., Reyes, N., Hotez, E., Hutman, T., & Sigman, M. (2014). Longitudinal change in the use of services in autism spectrum disorder: Understanding the role of child characteristics, family demographics, and parent cognitions. *Autism*, *18*, 433–446. https://doi.org/10.1177/1362361313476766

Thomas, K. C., Morrissey, J. P., & McLaurin, C. (2007). Use of autism-related services by families and children. *Journal of Autism and Developmental Disorders*, *37*, 818–829. https://doi.org/10.1007/s10803-006-0208-9

Wong, H. H. L., & Smith, R. G. (2006). Patterns of complementary and alternative medical therapy use in children diagnosed with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *36*, 901–909. https://doi.org/10.1007/s10803-006-0131-0

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