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Brief Report: Perceived Evidence and Use of Autism Intervention Strategies in Early Intervention Providers

Running head: Perceived Evidence and Use of Autism Strategies

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Abstract

Use of empirically unsupported practices is a challenge in the field of autism spectrum disorder (ASD). We explored whether attitudes and perceived evidence were linked to intended practice use in early intervention staff. Seventy-one participants completed ratings of the evidence base, current and future use of six ASD intervention practices, and reported attitudes to research and evidence-based practice. Participants reported greater use and rated the evidence base higher for the empirically supported practices. However, variability in accuracy of evidence base ratings was observed across individuals. Higher perceived evidence was linked to greater future use intentions for empirically supported and unsupported practices. The need for accurate information across practice types is highlighted. Self-report methodology limitations and future research directions are discussed.

Keywords: Misinformation; Autism Spectrum Disorder; Debunking; Evidence-based practice; Knowledge Translation

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Abstract

Use of empirically unsupported practices is a challenge in the field of autism spectrum disorder (ASD). We explored whether attitudes and perceived evidence were linked to intended practice use in early intervention staff. Seventy-one participants completed ratings of the evidence base, current and future use of six ASD intervention practices, and reported attitudes to research and evidence-based practice. Participants reported greater use and rated the evidence base higher for the empirically supported practices. However, variability in accuracy of evidence base ratings was observed across individuals. Higher perceived evidence was linked to greater future use intentions for empirically supported and unsupported practices. The need for accurate information across practice types is highlighted. Self-report methodology limitations and future research directions are discussed.

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Autism spectrum disorder (ASD) intervention decisions are made in a context *"ripe with misinformation and quackery"* (Paynter, Ecker, Trembath, Sulek and Keen, in press, p. 6). While recent reviews have identified individual practices with sufficient research evidence to be classified as empirically supported (National Autism Center [NAC] 2015; Wong et al. 2015), over a thousand additional *unsupported* practices have been documented (see Research Autism, 2018). Empirically-supported practices in these reviews (NAC, 2015; Wong et al. 2015) have been classified as such based on the consistency of the empirical evidence in terms of a combination of high-quality group and/or a series of experimental single case design studies. Conversely, unsupported practices are those with a lack of empirical evidence and/or those with empirical evidence of ineffectiveness. These unsupported practices are often aggressively marketed, often using misinformation (e.g., claims of empirical support) regarding their evidence base (McDonald, Pace, Blue and Schwartz, 2012; Paynter et al. in press).

Misconceptions regarding the evidence base of practices have been documented in allied health professionals working with people with ASD, with such misconceptions being linked to higher use of unsupported practices and lower use of empirically-supported practices (Paynter, Sulek, Luskin-Saxby, Trembath and Keen, 2018). Similar findings have been reported when pre-service teachers rated general teaching practices (Carter, Stephenson and Hopper 2015). However, it has not yet been investigated whether understanding of the evidence base influences practice selection in early intervention (EI) staff (e.g., teachers, paraprofessionals), who play a vital role in direct service delivery, intervention strategy selection, and parent upskilling (consistent with clinician roles outlined in Ridge and Guerin 2011). For the purposes of this article, early intervention is used to refer to intervention (including, but not limited to, specialist education, speech language pathology and

occupational therapy) provided in the years prior to entry to formal education for children with, or at risk of, a disability.

Previous research has highlighted the continued use of unsupported practices alongside empirically-supported practices in EI staff. Perceived knowledge of practices, and individual attitudes (e.g., openness to using evidence-based practices) have been linked to uptake of both empirically-supported and unsupported practices in previous research (Paynter et al. 2017; Paynter and Keen 2015; Stahmer, Collings and Palinkas 2005). However, the perceived evidence base of interventions (and potential misconceptions) have not been explored as determinants of intervention selection. Therefore, to provide further insight into factors that may affect use of both empirically-supported and unsupported practices, the present study explored how EI staff rate the evidence base of three empirically-supported and three unsupported practices and how this related to reported use.

To this end, we selected a range of focused intervention practices (i.e., those that address a single/specific skill). Our aim was to investigate the use of unsupported practices and factors linked to their use, rather than to compare all available interventions. We focused on specific practices rather than comprehensive treatment models (i.e., sets of practices packaged around a theoretical orientation typically addressing a range of goals over an extended period, e.g., Early Start Denver Model, Vismara and Rogers, 2008), as focused intervention practices are the *"building blocks of educational programs for children"* (Wong et al., 2015, p. 1952), and EI practitioners are frequently faced with the need to select from these practices. By contrast, comprehensive models are typically selected and implemented at an organisational level. In addition to perceived evidence base, the impact of individual attitudes (to evidence-based practice and to research broadly) was also explored.

Research questions included:

1. How accurately do EI staff rate the evidence base of ASD intervention practices?

2. Do EI staff use empirically-supported practices more than unsupported practices?
3. Do perceived evidence and attitudes relate to intended future use of empirically-supported and unsupported practices?

It was anticipated, based on previous research (Paynter et al. 2017; Paynter and Keen 2015), that EI staff would use more empirically-supported than unsupported practices. Further, following from research with allied health professionals (Paynter et al. 2018) and pre-service teachers (Carter et al. 2015), it was hypothesised that perceived evidence of practices would be linked to their use.

Methods

Ethical and gatekeeper approvals were obtained (*approval numbers blinded for peer review*). Data were extracted from a larger study into evaluation of debunking strategies (see *blinded for peer review* for the full study details).

Participants

Participants were recruited from four EI services for young children with ASD across four Australian states, which served pre-school children with ASD (aged 15 months – 6 years). Each organisation provided early intervention within a long day-care setting and were funded through a combination of federal funding (the same funding scheme at each site) and parent fees (that were subsidised by the Australian government based on family income). Demographics varied across these regions, given that regions spanned both regional and urban areas with varying socioeconomic status. This was a convenience sample with centres invited based on existing networks, with all staff at each centre invited to participate. Release-time payment was provided for the 71 staff who participated (out of a possible 86; 82.55% response rate). Participants were varied in age (< 25 years, $n = 21$; 26-35, $n = 28$; 36-50, $n = 16$; and >50, $n = 6$); predominantly female (66/71); and a mixture of early learning/childcare professionals (40/71), teachers (9/71), allied health professionals

(occupational therapists, *n* = 5; behaviour analyst, *n* = 3; speech pathologist, *n* = 6), one social worker, and seven indicating an "other" role (e.g., manager). Highest academic qualifications ranged from senior certificate (end of 12 years of formal schooling in Australia, *n* = 1), vocational certificate (*n* = 14), vocational diploma (*n* = 23), bachelor's degree (*n* = 23), to postgraduate degree (*n* = 10). Fifteen participants reported a disability-specific qualification, and 13 reported personal experience (e.g., family member) with ASD.

Measures

Practice use and knowledge of the evidence base.

The Intervention Practices Scale (adapted from Paynter et al. 2017) focused on six practices, including three empirically-supported practices (Antecedent Based Interventions [ABI]; Exercise; Picture Exchange Communication System [PECS]), and three unsupported practices (Auditory Integration Training [AIT]; Facilitated Communication [FC]; Gluten/Casein Free Diet [GFCF]). These were classified based on recent reviews (National Autism Center 2015; Wong et al. 2015) and selected as commonly available in Australia by the authors including pairs of practices (unsupported and supported) addressing a similar domain (i.e., communication: PECS and FC, behaviour: ABI and AIT, and behaviour/well-being: exercise and GFCF). Participants received brief definitions of practices, in random order, and rated each practice on evidence base, current use, and intended future use, on a five-point scale, see Table 1. Ratings of individual practices were analysed as separate dependent variables due to poor internal consistencies of combining these into ratings of empirically supported (α = .26) vs. unsupported (α = .59).

[*Insert Table 1 about here*]

Attitudes towards evidence-based practice.

We used the openness and divergence subscales of the Evidence-Based Practice Attitude Scale (Aarons 2004). Participants rated their level of agreement with each item on a

five-point scale. The openness scale showed good internal consistency (α = .84). The four-item divergence scale showed poor internal consistency (α = .40), so a two-item scale ("*Clinical experience is more important than using manualised therapy/interventions*" and "*Research-based treatments/interventions are not clinically useful*"; α = .69) was used for analysis.

Attitude to research.

The Attitude to Research scale (Dixon, McKeever, Holton, Clarke and Eosco, 2015) includes four items that assess attitudes to research/researchers, rated on a six-point scale. It showed acceptable internal consistency (α = .70).

Procedure

Data were collected online using a Qualtrics survey (June-August, 2017). Informed consent was obtained from all individual participants included in the study. The survey was completed anonymously in approximately 30 minutes.

Results

Evidence Base Ratings

Ratings of the evidence base differed significantly (using a Friedman test, a non-parametric alternative to a one-way repeated measures ANOVA that may be used for ordinal data and does not require a normal distribution, see Laerd Statistics, 2015 for further information) across practices, with a strong effect, $\chi^2(5) = 170.90$, $p < .001$, $W = .49$. Pairwise comparisons were performed with a Bonferroni correction. For each domain the empirically supported practice was rated as having a higher level of evidence than the paired unsupported practice including communication (PECS > FC, $p < .001$), behaviour (ABI > AIT, $p < .001$), and behaviour/well-being practices (exercise > GFCF, $p = .002$). However, while the empirically supported practices PECS and ABI were rated higher on their evidence base than any of the unsupported practices (all ps < .007), exercise (a supported practice) was not rated

significantly differently to FC (an unsupported practice), $p = 1.00$, although it was rated higher than GFCF ($p = .002$), and AIT ($p < .01$). At an individual level, a number of participants incorrectly rated FC (21/71: 30%), AIT (4/71: 6%), and GFCF (7/70: 10%) as established practices, giving them ratings of 4 (i.e., empirically supported), see Table 2.

[Insert Table 2 about here]

Practice Use: Current and Future

Reported current and intended future use differed significantly across practices, with large effects [current use, $\chi^2(5) = 171.96$, $p < .001$, $W = .49$; future use, $\chi^2(5) = 181.02$, $p < .001$, $W = .52$]. Pairwise comparisons were performed with a Bonferroni correction. For each domain participants reporter higher current and intended future use of the empirically supported practice compared to the paired unsupported practice including for communication (PECS > FC, ps < .001), behaviour (ABI > AIT, ps < .001), and behaviour/well-being practices (exercise > GFCF, current, $p = .009$; future, $p = .001$). However, while the empirically supported practices PECS and ABI were used and intended to be used in future more often than any of the unsupported practices (all ps < .02), no significant differences between FC and exercise were found for either current or future use (both $p = 1.00$). All practices were used by at least a minority of participants, including frequently reported use (highest rating of 4) of the unsupported practices FC ($n = 12$, 16.90%), AIT ($n = 2$, 2.81%), and GFCF ($n = 7$, 9.86%). Similarly, at least some participants intended to use each practice frequently (rating of 4) in the future, including the unsupported practices FC ($n = 22$, 30.98%), AIT ($n = 6$, 8.45%), and GFCF diets ($n = 7$, 9.86%).

Predictors of Intended Future Use

Ordinal logistic regression analysis was conducted to determine the predictors of intended future use of each practice, including perceived research evidence and attitudes (openness, divergence, and attitude to research). For each practice, the model explained a

significant proportion of the variance in future use, see Table 3. Only perceived research evidence had significant independent associations with intended use across all six practices with an odds ratio of up to 11.69 (ABI). Openness and divergence did not show significant contributions to prediction of future use for most practices, with the exception of exercise, where a significant independent contribution of both openness and divergence was found. Attitude to research did not significantly predict future use for most practices, with one exception being FC.

[Insert Table 3 about here]

Discussion

Consistent with previous research (Paynter et al. 2017; Paynter and Keen 2015; Stahmer et al. 2005), we found self-reported use of both empirically-supported and unsupported practices. Two empirically-supported practices (PECS and ABI) were used more often than all three unsupported practices. At a group level comparing interventions targeting a similar domain (communication: PECS vs. FC; behaviour: ABI vs. AIT; behaviour/well-being: exercise vs. GFCF), the empirically-supported practices were used significantly more than the unsupported. However, similar levels of use/intended future use of exercise (supported) and FC (unsupported) were reported. At an individual level, continued use of unsupported practices was observed, with a minority of participants reporting frequent current or intended future use. For example, over 30% of participants reported intending to use FC in the future. This is a serious concern, as this practice has been widely shown to be both ineffective and linked to risk of serious harm (Lilienfeld, Marshall, Todd, & Shane, 2014).

Across all practices, perceived evidence was a statistically significant unique predictor of intended future use. This was consistent with predictions and previous research with other groups (Carter et al. 2015; Paynter et al. 2018). This suggests that continued use of unsupported practices may not reflect negative attitudes to research per se, but

misconceptions about which practices are empirically supported. In fact, misinformation regarding the evidence base of practices, specifically FC, may explain why positive attitudes to research were ironically a statistically significant predictor of use. Overall, however, attitudes did not generally link to intended future use in a statistically significant manner, in contrast to previous literature (Paynter et al. 2017; Paynter et al. 2018).

This research addressed a novel area—the impact of perceived evidence base (and potential misinformation) on selection and reported use of ASD early intervention practices. We acknowledge, however, that the data collected do not afford insights into whether practice use reflects decision making consistent with the broader evidence-based practice framework (Sackett et al., 1996), that is, decision making that considers not only the best available empirical evidence, but also the practitioner expertise and individual client characteristics. We note that best available evidence has been defined in recent reviews as evidence from high quality single or group designs in experimental settings (e.g., Wong et al., 2015), with many empirically-supported practices showing more limited evidence of social validity (see review by Callahan et al., 2017). The need for high quality randomised control trials as well as research into real-world effectiveness and social validity is highlighted to improve the evidence base in the future. Understanding how practitioners balance knowledge of the empirical evidence drawn predominantly from experimental designs in controlled settings with effectiveness research and clinical experience through the use of clinical vignettes or decision-making tasks would be a valuable target for future research. In sum, we have provided initial evidence for the role of misinformation in the continued use of unsupported practices. However, the limited range of practices, analysis of single items due to poor psychometrics of combining practices, use of a convenience sample that may not be representative of the broader EI population, and reliance on self-reports are acknowledged limitations. Future research should aim to explore clinical decision making in context (e.g.,

using vignettes or direct observation), assess how practitioner experience and client preferences are balanced along with empirical evidence, and examine concordance between self-reports and actual practice. Debunking misinformation about the evidence base of practices in ASD (see *blinded for peer review*) may be important to closing the "research-to-practice" gap in EI to support clinical decision making and implementation of evidence-based practices by frontline practitioners in order to achieve the best possible outcomes for children with ASD.

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(One reference omitted for blinding)

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Table 1

Practice Definitions and Ratings

Practice Definitions		
	Empirically Supported Practices	*Unsupported Practices*
	Antecedent Based Intervention. This intervention involves anticipating and arranging events or circumstances that come before a challenging behaviour with the aim of reducing or preventing the behaviour. This intervention is sometimes used as part of the Positive Behaviour Support model which includes strengthening positive behaviours as well as anticipating and preventing challenging behaviours.	*Auditory Integration Training.* This intervention involves the presentation of modulated sounds through headphones to retrain an individual's auditory system with the goal of improving sensory processing of sound.
	Exercise. These interventions involve an increase in physical exertion as a means of reducing problem behaviours or increasing appropriate behaviour.	*Special Diets (e.g., Gluten and casein free diet).* These interventions involve dietary intervention, such as eliminating gluten (e.g., wheat, barley, rye) or casein (e.g., dairy products) with the goal of improving child general functioning and/or autism symptoms.
	Picture Exchange Communication System (PECS). This intervention involves teaching children to exchange pictures with others to communicate.	*Facilitated Communication.* This intervention involves a 'facilitator' making physical contact with the hand, wrist, arm, or shoulder of a person with a disability as that person touches symbols (letters, words, pictures) on an augmentative and alternative communication (AAC) system or computer keyboard. The messages produced during this process are interpreted by those providing FC to be the person's communication.
Items, Questions, and Rating Scales for each Practice		
Item	*Question*	*Rating Scale*
Research evidence	Research shows this practice is	0 = Ineffective: Research shows this practice is not effective 4 = Established: This practice has established its efficacy in high quality research
Current use	My current use of (practice name) is	0 = Never: I do not use this practice 4 = Frequently
Future use	My intended future use in my current role with children at (centre) as well as others	0 = Never: I will not use this practice 4: Frequently

Table 2

ASD Intervention Practices Perceived Evidence, Current Use, and Intended Future Use.

Perceived Research Evidence							
			Number (%)*				
Practice	*Classification*	*Median*	*0 Ineffective*	*1*	*2*	*3*	*4 Established*
Picture Exchange Communication System (PECS)	ESP	4.00	0 (0)	0 (0)	2 (2.8)	11 (15.5)	58 (81.7)
Antecedent-based Intervention (ABI)	ESP	4.00	1 (1.4)	2 (2.8)	11 (15.5)	20 (28.2)	36 (50.7)
Exercise (ECE)	ESP	2.00	2 (2.8)	13 (18.3)	21 (29.6)	20 (28.2)	14 (19.7)
Facilitated Communication (FC)	US	2.00	14 (19.7)	7 (9.9)	17 (23.9)	12 (16.9)	21 (29.6)
GFCF Diet (GFCF)	US	1.00	17 (23.9)	19 (26.8)	24 (33.8)	3 (4.2)	7 (9.9)
Auditory Integration Training (AIT)	US	1.00	11 (15.5)	25 (35.2)	20 (28.2)	11 (15.5)	4 (5.6)
Reported Current Use							
Practice	*Classification*	*Median*	*0 Never*	*1*	*2*	*3*	*4 Frequently*
Picture Exchange Communication System (PECS)	ESP	4.00	0 (0)	2 (2.8)	11 (15.5)	13 (18.3)	45 (63.4)
Antecedent-based Intervention (ABI)	ESP	3.00	8 (11.3)	6 (8.5)	15 (21.1)	10 (14.1)	31 (43.7)
Exercise (ECE)	ESP	2.00	18 (25.4)	10 (14.1)	16 (22.5)	15 (21.1)	11 (15.5)
Facilitated Communication (FC)	US	2.00	29 (40.8)	6 (8.5)	13 (18.3)	11 (15.5)	12 (16.9)
GFCF Diet (GFCF)	US	0	39 (54.9)	16 (22.5)	6 (8.5)	2 (2.8)	7 (9.9)
Auditory Integration Training (AIT)	US	0	60 (84.5)	7 (9.9)	2 (2.8)	0 (0)	2 (2.8)
Intended Future Use							
Practice	*Classification*	*Median*	*0 Never*	*1*	*2*	*3*	*4 Frequently*
Picture Exchange Communication System (PECS)	ESP	4.00	0 (0)	0 (0)	2 (2.8)	12 (16.9)	57 (80.3)
Antecedent-based Intervention (ABI)	ESP	4.00	2 (2.8)	5 (7.0)	8 (11.3)	14 (19.7)	41 (57.7)
Exercise (ECE)	ESP	2.00	7 (9.9)	13 (18.3)	21 (29.6)	11 (15.5)	18 (25.4)
Facilitated Communication (FC)	US	2.00	15 (21.1)	12 (16.9)	14 (19.7)	8 (11.3)	22 (31.0)
GFCF Diet (GFCF)	US	1.00	21 (29.6)	28 (39.4)	10 (14.1)	4 (5.6)	7 (9.9)
Auditory Integration Training (AIT)	US	1.00	21 (29.6)	31 (43.7)	11 (15.5)	2 (2.8)	6 (8.5)

* ESP (Empirically Supported Practices); US (Unsupported Practices); % may not add to 100% due to missing data

Table 3

Predictors of Intended Future Use

Practice		Perceived Research Evidence[a]	Attitude: Openness	Attitude: Divergence	Attitude to Research
Antecedent-based Intervention (ABI), χ^2 (4) = 55.01, p < .001***, R^2 = .34[b]	*B*	2.46***	.13	.32	.45
	(SE)	(.42)	(.35)	(.35)	(.41)
	OR	11.69	1.14	1.38	1.56
	(95% CI)	(5.15-26.52)	(.57-2.28)	(.70-2.73)	(.71-3.45)
Exercise (ECE) $\chi^2(4)$ = 77.875, p < .001***, R^2 = .36[b]	*B*	2.41***	.74*	.87*	-.32
	(SE)	(.37)	(.33)	(.34)	(.35)
	OR	11.16	2.09	2.39	.73
	(95% CI)	(5.38-23.13)	(1.10-3.96)	(1.24-4.61)	(.37-1.45)
Picture Exchange Communication System (PECS) $\chi^2(4)$ = 14.04, p = .007**, R^2 = .17[b]	*B*	2.09***	.28	-.18	.20
	(SE)	(.59)	(.43)	(.39)	(.45)
	OR	8.05	1.33	.84	.84
	(95% CI)	(2.52-25.72)	(.57-3.07)	(.39-1.80)	(.39-1.80)
Facilitated Communication (FC) $\chi^2(4)$ = 75.81, p < .001***, R^2 = .35[b]	*B*	1.96***	.31	.10	1.06**
	(SE)	(.30)	(.31)	(.31)	(.39)
	OR	7.07	1.36	1.11	2.88
	(95% CI)	(3.96-12.65)	(.74-2.52)	(.60-2.06)	(1.34-6.18)
Gluten Free Casein Free Diet (GFCF) $\chi^2(4)$ = 50.41, p < .001***, R^2 = .26[b]	*B (SE)*	1.50***	1.10	.84	-.31
		(.27)	(.35)	(.31)	(.35)
	OR	4.49	3.00	2.32	.73
	(95% CI)	(2.65-7.62)	(1.50-5.99)	(1.26-4.27)	(.37-1.45)
Auditory Integration Training (AIT) $\chi^2(4)$ =35.11, p < .001***, R^2 = .19[b]	*B (SE)*	1.35***	.58	.39	.36
		(.27)	(.31)	(.28)	(.34)
	OR	3.86	1.78	1.48	1.43
	(95% CI)	(2.2-6.50)	(.96-3.30)	(.85-2.57)	(.74-2.75)

[a]Perceived research evidence for the specific practice (e.g., ABI for ABI future intended use); [b] R^2 = McFadden Pseudo-R^2; * p < .05; ** p < .01, ***p < .001; OR= Odds Ratio.

Author Note

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