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Evidence Based Practice in autism educational research: can we bridge the research and practice gap?

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Evidence Based Practice in autism educational research: can we bridge the research and practice gap?

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3 **Title:** Evidence Based Practice in autism educational research: can we bridge
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5 the research and practice gap?
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8 **Introduction**

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10 Debates around Evidence-Based Practice (EBP) in education highlight that
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12 teachers should be focusing on 'what works,' that research favours certain
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14 teaching methods for maximising pupil learning outcomes (Hattie, 2008), and
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16 that further work is needed to address how to best apply research to practice
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18 (DfE, 2014). Thus the Department for Education (DfE) in the UK allocated
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20 £135 million to improve quantitative data in education as well as adopting a
21
22 framework for conceptualising EBP focusing on the use and application of
23
24 research evidence in schools (DfE, 2014). Meanwhile, the US institute of
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26 Education Sciences takes a clear stand that education researchers need to
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28 develop interventions that are effective in raising student achievement and to
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30 validate the effectiveness of those interventions using rigorous methods
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32 (Lundahl, 2013). The 'Individuals with Disabilities Education Act' (IDEA,
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34 2008), ensures that services to children with disabilities require teachers to
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36 use EBPs by mandating the scientifically based research concept in education
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38 through the No Child Left Behind Act (NCLB) Act of 2001. This is now
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40 enshrined in law, with the NCLB addressing the need for standards and
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42 measurable goals with reliance on scientifically based research for
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44 interventions and teaching methods.
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52 Within this context, autism educational research is dominated by experimental
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54 research designs that should inform decisions teachers make on the ground.
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57 When the US National Research Council (NRC) conducted a rigorous
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3 assessment of intervention research studies in the field of autism, for
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5 example, studies needed to employ particular methodologies in order to be
6
7 considered an EBP and these included randomised, quasi-experimental or
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9 single-subject design studies. In a relatively recent National Professional
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11 Development Centre (NPDC) review of autism intervention research, 40% of
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13 studies used multiple baseline design, with 8% based on RCTs (Wong et al.,
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15 2014). Current research in autism is largely Single Subject Experimental
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17 Designs (SSED) with group designs becoming more common (Kasari &
18
19 Smith, 2013) and there is a clear dominance of empirical and technical
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21 instrumental research that is modeled on the natural sciences (see Dingfelder
22
23 & Mandell, 2011; Odom et al., 2005).
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30 The above hegemony of experimental designs has led to heated debate over
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32 the last few years about the way in which EBP is perceived, and the
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34 relationship between research and practice in autism educational research
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36 (de Bruin, 2015), with much discussion focusing on how to generate a positive
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38 relationship between educational research and teaching knowledge and
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40 practice (Tatto & Furlong, 2015; Pampaka et al., 2016) whilst recognising that
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42 there is a persistent gap between research and practice in autism education
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44 (Parsons & Kasari, 2013).
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50 In this paper, I focus on the particular form the gap between research and
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52 practice takes in the autism field, and I identify the methodological re-
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54 adjustments that are needed, recognising that broader discussions around
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56 'what works' have been problematic in both practice and theory, as well as in
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3 methodology (Smeyers & Depaepe, 2010). I focus on the need to broaden the
4
5 range of methodologies used so the field can draw on a wider knowledge
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7 base, as practice needs a much wider knowledge base than policy. By
8
9 addressing the need for a plurality of methodologies, and for further dialogue
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11 about what kind of knowledge we value in the field of learning disabilities
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13 (Gallagher, Connor & Ferri, 2011), autism educational research exemplifies
14
15 the methodological reorientation that is needed in educational research more
16
17 generally.
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21 I discuss the fact that whilst the 'what works' debate is designed to find
22
23 rigorous ways of using evidence to improve practice, the dominance of
24
25 experimental designs in autism education contribute to a schism between
26
27 research and practice in this field (Parsons & Kaskari, 2013; Parsons et al.
28
29 2015). This substantial gap between research and practice in autism
30
31 educational research is problematic (Damschroder et al., 2011; Parsons &
32
33 Kasari, 2013) because long-term outcomes for individuals with autism remain
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35 poor (Magiati, Tay & Howlin, 2012), leading to a need for practical solutions
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37 for education and life skills (Pellicano, Dinsmore & Charman, 2014).
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44 My paper therefore discusses the preconditions for developing better
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46 frameworks and tools for understanding variation across different contextual
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48 factors (Klingner & Boardman, 2011), and it underscores the need for a more
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50 balanced range of studies and research designs. It highlights that the field
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52 needs to become better at recognising that evidence applicable to education
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54 will occur in diverse forms and therefore needs to be gathered through diverse
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56 means. This includes objective measures obtained from controlled trials, *and*
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3 subjective perspectives that are grounded in professional understanding,
4 experiences and interpretations of teachers, in conjunction with approaches
5 that focus on methodologies and methods that respect and value both
6 researchers and practitioners (BERA-RSA, 2014).
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14 The aims are therefore to i) highlight how the dominance of experimental
15 designs leads to a schism between research and practice in this field; ii)
16 discuss how to develop better frameworks and tools for understanding
17 variation across different contextual factors and iii) put the case for
18 recognising that evidence applicable to education needs to take different
19 forms and therefore needs to be gathered through different means. In taking
20 the reader through this argument, I start by highlighting the range of
21 interventions that are present in the autism field and examine current attempts
22 to address the gap between research and practice, before putting the case for
23 a paradigm shift in autism education.
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39 **A broad range of interventions with different theoretical underpinnings**

40 A quick online search for 'autism interventions' gives over 38 million links so
41 there are clearly many strategies, approaches, therapies and interventions for
42 improving the lives of autistic people. 'Research Autism', a website dedicated
43 to researching the wide range of 'treatments' and 'interventions' in autism,
44 currently lists over a thousand of those in the field of autism along with
45 indications of the evidence base (Milton, 2014). These have a number of
46 different underlying theoretical perspectives. In autism, as in broader disability
47 studies, there are three main theoretical approaches (Arduin, 2015): the
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3 medical model through which autism is viewed through the lens of a
4 pathological or flawed existence (Hughes, 2000); the social model, which
5 posits that concepts of disability are culturally relative and the consequence of
6 particular cultural conditions (Corker & Shakespeare, 2002) and the
7 interactionist, human rights or transactional model which focuses on human
8 rights, and disability as being part of diversity, with difficulties arising from an
9 interaction between the individual and the environment (Prizant, 2015).
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21 Within these theoretical traditions, much of the emphasis on experimental
22 designs and quantitative studies around EBP in autism education tend to
23 emanate from a deficit based medical model, in which disability is defined as
24 'a physical or mental impairment' (DfE, 2014), with a high proportion of
25 intervention studies focusing on intensive behavioural interventions (Howlin,
26 2010) that are based on a normative focus on 'correcting deficits' (Milton,
27 2014).
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39 The above theoretical perspectives have a bearing not only on views about
40 how pupils learn, but also on how to conduct research, as they lead to
41 different foci in terms of the developmental areas they focus on, which in turn
42 affect how progress is measured (Howlin, 2010). Researchers with varying
43 theoretical perspectives will see the world differently and will therefore differ in
44 the questions they ask, what they examine in research as well as the
45 methodologies they consider valid for measuring pupil progress (Poplin,
46 2011). Hence, behaviourists will tend to define the behavior that is considered
47 desirable, then count the behavior, and reinforce it; cognitive theorists shift
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3 this to strategic academic behaviours they believe underpin academic
4 performance whilst constructivist focus the lens on the process of facilitating
5 an individuals construction of meaning (Poplin, 2011).
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10 11 **Methodological critiques of current intervention research**

12 Although a number of studies have provided some reliable knowledge about
13 which interventions 'work' and have helped practitioners make decisions in
14 selecting suitable interventions, reviews have highlighted that there is not
15 enough evidence to promote a specific form of intervention given the lack of
16 robust evidence coupled with the wide range of interventions in the field of
17 autism (Parsons et al. 2011; Odom et al., 2005; Howlin, 2010). Furthermore,
18 as well as intervention research involving many different strategies, there is
19 often a limited range of outcomes measured (Pasons et al., 2011). Effects of
20 interventions often impact on a narrow range of skills so a programme to
21 improve non-verbal communication will narrowly focus on that without
22 examining its effect on broader cognitive functioning, for example (Howlin,
23 2010).
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43 Furthermore, whilst current intervention research clearly represents a desire
44 to apply a rigorous and systematic approach to produce knowledge that can in
45 turn enable generalisation (de Bruin, 2015), the underlying assumption that
46 these designs infer causality and should be able to support professionals to
47 make decisions about 'what works' are problematic as there are clear
48 methodological challenges. Although many reviews and meta-reviews have
49 been undertaken in the field, the groups define different literature, use
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3 different definitions of EBP, lump or split interventions at different levels of
4 specificity and come to different conclusions (see Mesibov & Shea, 2010 and
5 Parsons et al., 2011). Furthermore, sample sizes tend to be limited, most
6 examine relatively short-term gains and there are problems sorting out
7 intervention effects compared to other variables (Horner et al., 2005). In
8 addition, most pupils receive more than one intervention at any one point in
9 time, making it difficult to separate out a particular element or type of
10 approach (Parsons et al., 2011).
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23 The perceived weaknesses of current intervention research have therefore led
24 to calls for more methodologically rigorous research (Parsons et al.; 2011;
25 Charman et al., 2011) with attempts to counter the narrow focus on specific
26 research designs as the only legitimate way of conducting research in the field
27 and with proposals for assessing the quality of a variety of research designs
28 (see Horner, et al., 2005 and Reichow et al. 2008).
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39 **The problem with applying experimental designs to school settings**

40 The field is currently dominated by efficacy studies that report the success or
41 failure of interventions in 'ideal' conditions that are carefully controlled. As a
42 result, arguments have been put forward for countering the narrow focus on
43 specific research designs as the only legitimate way of conducting research in
44 the field (see Horner, et al., 2005 and Reichow et al. 2008). This stems from
45 the recognition that it can be quite a challenge to gather efficacy for particular
46 methods as there are so many variables that can be difficult to pin down and
47 measure. Efficacy studies also tend to lack the flexibility that would allow one
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3 to capture and to understand what happens naturally or to predict all of the
4 many and varied consequences of a particular course of action due to the
5 context specific nature of education, as much of what happens depends upon
6 chance and dynamic combinations of different starting points, teacher skills
7 and understanding, the school context, and learning objectives (Biesta, et al.,
8 2014).

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18 Although efficacy studies contribute important new knowledge to the autism
19 field, we therefore need to stay mindful of the fact that even when there is
20 evidence for specific interventions in the highly controlled contexts in which
21 they were studied (Kasari & Smith, 2013), these might not be applicable to
22 educational contexts where individual teachers make judgements based on
23 available evidence. If intervention research is to have both scientific validity in
24 design and implementation as well as social validity within the broader
25 community, the field needs to find better ways of ensuring interventions are
26 evaluated in the area in which children are based, such as mainstream
27 primary schools (NAC, 2009). This has led to calls for conducting more
28 effectiveness studies, which focus on the sustainability of the intervention and
29 the importance of it to those participating in it in everyday conditions (Weisz &
30 Jensen, 1999; Kasari & Smith, 2013).

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50 The question is then whether this will go far enough in changing the fact that
51 University based autism intervention research is not evident in the child's
52 school in most schools in the UK and US, or if it is, it is changed so much that
53 it is different from the original intervention (Kasari & Smith, 2013).
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3 Practitioners rarely alter their practice by drawing on the evidence base from
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5 research (Lather, 2004) despite schools being under increasing pressure to
6
7 implement EBPs in order to meet the diverse needs of pupils with autism, with
8
9 many continuing to use practices that are unsupported by such research
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11 (Burns & Ysseldyke 2009; Carter et al., 2011). Teachers have reported that
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13 they view researchers as being out of touch with the realities of today's
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15 classroom contexts (Greenwood & Abbott, 2001), whilst being less concerned
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17 about EBPs and more interested in how the given solutions might fit with the
18
19 needs of individual children (Guldberg et al., 2011).
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25 Researchers have therefore begun exploring the barriers to implementing
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27 studies in schools (Locke et al., 2014). These barriers have been seen as
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29 relating to 'incompletely developed interventions, limited evidence of their
30
31 utility in promoting long term and meaningful change and poor fit with school
32
33 environments' (Kasari and Smith, 2013, p1). More specifically, barriers have
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35 been linked with lack of training of teachers (Dingfelder & Mandell, 2012), the
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37 competing priorities of staff, policies surrounding break times, lack of school
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39 support, and difficulty finding resources and time for implementing
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41 interventions in the school day (Locke et al., 2014). Whilst a focus on barriers
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43 to implementation is important, I go on to argue that a more fundamental
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45 paradigm shift is needed than current debates indicate.
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51 **The knowledge transfer model orthodoxy**

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53 The debates around efficacy, effectiveness and implementation problems in
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55 schools highlight that there is an assumption that effective practices have
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3 been produced, but that the issue is that teachers are not implementing these
4 EBPs. This narrative sees the problem as a 'translational one' in which
5 research dissemination is perceived as a linear, top-down transmission model
6 from which practitioners should draw knowledge. Research should then flow
7 from the journal to classroom practice without any real and sustained
8 engagement with teachers or pupils (Greenwood & Abbott, 2001). This model
9 posits the researcher as the "expert" and the teacher as simply the vehicle for
10 delivering the intervention (Trent, Artiles, & Englert, 1998).
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23 This 'knowledge transfer' model in autism education research can be
24 illustrated by the National Autism Centre's (2009) systematic review of both
25 SSED and group designs, identifying eleven 'treatments' for which they claim
26 there is evidence of effective practice, and moving from this to producing a
27 manual for EBP in schools and recommending a specific set of best practices
28 such as visual schedules and self management techniques (NAC, 2009).
29 Meanwhile, the National Professional Development Centre identified a larger
30 set of practices and made steps to operationalise these by producing step-by-
31 step reviews (Wong et al., 2014), focusing on the necessity of translating
32 scientific results into intervention practices or practitioner friendly summaries
33 so that users can be informed by those (Reichow, 2008), whilst also providing
34 'professional development and support for implementing the practices with
35 fidelity' (Wong et al., 2014, p. 34).
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54 **The need to take onboard different ways of knowing**

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3 The above solutions do not take account of the fact that a teacher's choice of
4 educational programmes tends to derive from a combination of educational,
5 behavioural and developmental research and theory (Howlin, 2010) resulting
6 in them employing an eclectic mix of strategies (Guldberg, 2010). Whilst the
7 science behind research-based instruction and intervention studies requires
8 fidelity of implementation, teachers tend to view good teaching as involving
9 innovation and an eclectic sampling from a variety of instructional or teaching
10 models (Greenwood & Abbott, 2001).
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23 Unfortunately the prevailing research culture of knowledge transfer in
24 evidence-based research diminishes the potential contributions of teachers
25 and pupils by prioritising particular ways of knowing. It ignores important
26 aspects of professional knowledge (Rynes, Bartunek & Daft, 2001) and the
27 situated nature of the experiences and expectations of teachers and children
28 in schools (Parsons et al., 2013), as well as the complex nature of schools
29 where it is often difficult to implement more rigid, experimental research
30 designs requiring strict adherence to planned protocols (Kasari & Smith,
31 2013).
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45 As far back as 1996, Guba noted that stakeholders should inform an integral
46 part of knowledge and that they would feel no obligation to abide by
47 knowledge if they do not have ownership of it (Guba, 1996). Yet the
48 prevailing culture of knowledge transfer puts agency in the hands of policy or
49 the intervention whilst there is actually a need to allow variation and mediation
50 between teachers, thus giving more agency of the whole process to the
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3 schools, pupils and their families (Gallagher et al., 2011). The issue of agency
4 is a crucial one in that it highlights the need to introduce methodologies that
5 position not only teachers, but also individuals with autism and their families at
6 the center of inquiry and knowledge. This can enable research to be both
7 practical in terms of day-to-day practice and modifiable to meet diverse pupil
8 needs.
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19 In order to identify the goals that are important for the autism community, for
20 families and for practitioners, meaning therefore needs to be found in lived
21 experiences, and research needs to invest in working *with* those stakeholders
22 rather than *on* them (Freire, 1972), with a concomitant reorientation towards
23 human subjectivity (Allan, 2011). It is difficult to see how a practice can be
24 effective at generating improvement if we do not also gain an understanding
25 of the way that the world is viewed and experienced by the individuals whose
26 outcomes we are aiming to improve. This is particularly pertinent as autistic
27 adults feel that 'research fails to speak to the reality of their lives in the here-
28 and-now' (Pellicano et al., 2014, p. 5). Individuals with autism have simply not
29 been involved in setting the agenda of working out what is important to focus
30 on (Pellicano et al. 2014) and this has led to a large mismatch between what
31 individuals with autism say they need in terms of what constitutes positive
32 outcomes, and what research tends to focus on.
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52 Wittemeyer et al., (2011) found that a good adult outcome needs to be
53 considered within the context of individual needs and aspirations; enabling a
54 person to make choices and giving them access to the right support when
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3 needed was seen as crucial. Milton (2014), an autistic sociologist, has echoed
4 this through advocating that care must be taken to ensure that structures are
5 put in place to encourage the learner's autonomy and reduce their stress.
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7 Evidence Based Practice therefore needs to take into account what it should
8 work for and who should have a say in determining the latter (Biesta, 2013).
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16 Given that findings from studies indicate that autistic individuals place
17 importance on outcomes that support choice and autonomy (Wittemeyer et
18 al., 2011; Pellicano et al., 2014; Milton, 2014), it is troubling that outcomes
19 such as these, which can seem loose and fuzzy, are seldom focused on in
20 autism research, with the consequence that interventions are limited to those
21 whose goals can be measured. We know very little about how changes in
22 standardised measures reflect changes in everyday life though and variables
23 that lend themselves to measurement and statistical analysis may not be
24 important for some of the long-term goals and outcomes of people with autism
25 such as life satisfaction, community participation and personal relationships
26 (Wittemeyer et al., 2011). A further a limitation of current research methods is
27 that we do not have objective measures that enable successful identification
28 and research on outcomes that support choice and autonomy.
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47 Many studies involving Early Intensive Behavioural Intervention, for example,
48 have used IQ as a principal outcome measure, yet even statistically significant
49 increases in IQ do not necessarily lead to improvement in other, more
50 practical day to day skills (Howlin, 2010). Neither does statistical significance
51 in controlled trials necessarily mean that pupils have improved in ways that
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3 are reflected in their everyday functioning (Mesibov and Shea, 2011). The
4 dangers of this approach are summed up by Poplin, who argues that 'when
5 the human sciences use only quantitative data, we end up with a narrow,
6 piecemeal view of reality' (Poplin, 2011, p150). She goes on to argue that
7 both inductive and deductive research is vital to understanding educational
8 contexts (Poplin, 2011) and it is this question I turn to next.
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19 **The argument for both inductive and deductive research**

20 Although much of the current autism research into interventions has come up
21 with information that is of general value, it has often been of little help in
22 deciding on a particular case (Jordan, 2005) as the classroom is very different
23 from an experimental or therapeutic setting. In classrooms that educate pupils
24 with autism, interventions need to be individualised according to pupil
25 characteristics, include real life outcome measures and be generalisable to
26 complex real-life conditions and multiple cultures and settings (Mesibov and
27 Shea, 2010). This means focusing the lens on the individual child, young
28 person or adult, rather than the 'model' or 'intervention' (Guldberg, 2010). The
29 teacher working with a child with autism needs to understand the child and
30 how autism impacts on the child and the family, before deciding which
31 strategies or interventions might work and how she might implement those in
32 the particular context in which she works (Jordan, 2005).
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51 Implementation often relies on a number of factors, including choice of
52 educational approach, attending to the responses of the child or children
53 whilst approaches are being implemented, gauging how children are
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3 responding to them, observing, reflecting and then possibly changing how an
4 approach is used depending on how the child responds (Guldberg et al.,
5 2011). This relies on knowledge and understanding of autism, values, tacit
6 judgements, experience, local knowledge, and skills (Parsons et al., 2015).
7 Furthermore, the ways teachers and pupils behave are strongly influenced by
8 one another and participants interpret and make sense of their world in
9 different ways (Biesta, 2013), with learning being situated and context
10 dependent (Wenger, 1998).
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22 This highlights that professional practice needs to move beyond the notion of
23 simply relying on 'what works', to ensuring that research can make a positive
24 contribution to each aspect of teachers' professional knowledge. This
25 professional knowledge embodies practical wisdom and critical reflection as
26 well as technical knowledge (Winch et al., 2015). Thus it is not enough to
27 purely focus on addressing how schools and teachers can become better
28 informed by data and robust evidence so they can access and interpret
29 different kinds of evidence and adapt it to their own settings and contexts
30 (Tatto & Furlong, 2015). Nor should discussion about the gap between
31 research and practice be too narrowly focused on the need for teachers to
32 develop research related skills and knowledge or to become better equipped
33 to engage with and become consumers of research.
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51 Rather, there needs to be acknowledgement of the fact that the knowledge of
52 educators is rooted in immersion and reflection, resulting in cumulative
53 knowledge arising from an accumulation of understandings rather than an
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3 accumulation of facts (Thomas, 2012b). This knowledge is practical and tacit,
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5 based upon personal experience and learning from the experience of others.
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7 Teachers deal with more than the simple application of strategies or
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9 techniques to bring about predetermined ends (Biesta et al., 2014), and their
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11 work is not necessarily open to objective assessment, neither is it technical
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13 (Biesta et al., 2014). Our focus therefore needs to shift more towards ensuring
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15 that the field gets a better understanding about what good teaching is and
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17 how it leads to learning (Sahlberg, 2010), and therefore to notions of 'good
18
19 autism practice' in education. This means recognizing the importance of
20
21 focusing on what Sahlberg and Hasak describe as 'small data'- 'the diversity
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23 and beauty that exists in every classroom, and the causation they reveal in
24
25 the present'. Thus a teacher will need to be able to draw upon both the
26
27 evidence base for research, such as the fact that many pupils with autism
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29 need visual augmentative strategies, whilst also being able to reflect on how
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31 those strategies are being implemented and responded to in the interactions
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33 and relationships that are developing in the classroom.
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41 The proposed core principles flowing from this then need to become that
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43 EBPs should have a cogent rationale for educational strategies. As Mesibov
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45 and Shea (2010) argue, this latter focus is productive because it encourages
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47 the use of diverse sources of information for developing and evaluating
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49 educational approaches and encourages a focus on how to respond to the
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51 varying needs of different pupils and what is feasible. This does not negate
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53 the importance of drawing upon research evidence to shape and enhance
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55 practice. Rather, it is about, as Pring and Thomas (2004) argue, questioning
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3 the nature of evidence and the potency assigned to particular types of
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5 evidence.
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10 What we therefore need more of in the field of autism intervention research, is
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12 a 'move from a narrowly defined epistemic science to one that articulates a
13
14 social science that integrates context-dependency with practical deliberation'
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16 (Lather, 2004). This is essential given that autism represents a complex
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18 spectrum of different abilities and difficulties that cannot be narrowly defined.
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20 It highlights the need for methodologies that stay close to the complexities
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22 and contradictions of existence, with the goal of also fostering understanding,
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24 reflection and action as well as translation of research into practice. This has
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26 in turn led to several scholars articulating the need to value qualitative
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28 methodologies on a par with the quantitative experimental designs that
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30 currently dominate the field (Poplin, 2011) calling for the use of a broader
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32 range of methods that allow us to look at phenomena in ways that reveal
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34 many facets of human experience (Kazdin, 2008). This can include in-depth
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36 evaluation, subjective views and how individuals react to their situations and
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38 contexts whilst looking for genuine change in functioning, meaning,
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40 experience and perception. It can include a whole range of methodologies
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42 that enable this kind of study, from case studies to action research,
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44 phenomenology or narrative research (Gallagher et al., 2011).
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52 Furthermore, the field would benefit from codifying experiences of teachers in
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54 practice and ensuring that accumulated data can be analysed in partnership
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56 with researchers (Kazdin, 2008), moving towards closer collaboration
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3 between researchers and practitioners, one in which the role of judgement,
4 expertise and context ought to be studied directly. Nastasi et al. (2000)
5 argued for participatory action research approaches that involve stakeholders
6 in intervention efforts in order to focus on interventions that consumers find
7 acceptable and to move towards a broad conception of integrity and
8 effectiveness. Participatory approaches to developing interventions should
9 include competencies that are relevant to the targeted culture, valuing
10 naturalistic enquiry, real-life contexts, and understanding, as well as the
11 importance of describing phenomena from the population, thus facilitating
12 culturally specific theory and intervention (Nastasi et al. 2000).
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27 **The case for rapprochement and change in emphasis**

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29 In discussing the divide between research and practice, Kazdin (2008)
30 therefore argued for rapprochement and changes in emphasis, highlighting
31 that both research and practice should contribute to our knowledge base. This
32 is aligned with the conception of 'Evidence Based Treatment' (EBT) that was
33 put forward by the American Psychological Association in 2006 and defined
34 as 'the integration of the best available research and clinical expertise within
35 the context of patient characteristics, cultures, values and preferences' (APA,
36 2006, p 273). Kazdin (2008) highlighted that it is very unfortunate to take a
37 narrow view of knowledge transfer in which research is seen as contributing to
38 the knowledge base and practice as an application of research. This way of
39 seeing the contributions of each of the domains, does in fact heighten the
40 research-practice gap as it negates the contribution that clinical, or
41 educational practice can contribute to the scientific knowledge base. As well
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3 as focusing on the expectation that educational practice should be the
4 application of research findings to practice, there is therefore clearly a need
5 for more rigorous examination of how educational practice can contribute to
6 the scientific knowledge base, promoting research designs that enable
7 teachers to both inform the research community and be informed by it.
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13 14 15 16 **Conclusions**

17 This paper has argued that there is a key danger in privileging a certain kind
18 of research evidence over evidence from other sources. There is a need to
19 move towards research designs that enable stakeholders to participate in
20 identifying the outcomes to focus on and to contribute data from the
21 classroom, including participatory approaches that are situated in the contexts
22 in which people live and work (Biesta, 2013) and that take into account the
23 concerns and experiences of individuals with autism, their families and the
24 practitioners who work with them.
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38 The autism field needs to move towards a double transformation of both
39 educational research and educational practice (Biesta et al., 2014), as factual
40 knowledge is never a sufficient determinant of good practice in education. The
41 problem with 'excessive quantification' and a focus solely on scientific
42 approaches is that it can push the field away from closer interactions with
43 policy and practice (Lagemann, 2000); it holds within it the danger of over-
44 simplifying the relationship of research to practice (Hammersley, 2005) and
45 negates the fact that multiple research designs are needed to address
46 different types of questions (APA, 2006; Mesibov & Shea, 2010). Research
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3 questions need to be more firmly focused on what constitutes a good outcome
4 for a person with autism. Autistic people, their families and the practitioners
5 who work with them, need to be involved in identifying those questions,
6 including a re-framing of which outcomes measures are important to focus on.
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14 The argument is not that different forms of evidence are incompatible, but
15 rather that both need to be taken into account and combined to offer a more
16 balanced insight into best educational practices. Thus, calls for a need for
17 educational sciences to be rooted at the practical level (Thomas & Pring,
18 2014) do not negate the need for controlled experimental approaches but
19 recognise the need to broaden the concept of EBP beyond the knowledge
20 transfer model. What is argued for is a broader conceptualisation of EBP that
21 is informed by experimental evidence, as well as by the perspectives and
22 needs of individuals with autism, their families and the practitioners who work
23 with them (Kazdin, 2006).
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38 Ultimately, to achieve this requires methodologies that ensure that teachers'
39 craft and tacit knowledge are both captured adequately and taken into
40 account *together with* the systematic knowledge generated by research
41 (Hammersley, 2005). To that end, scientific research and practice both have
42 in common that they need to be flexible, interpretative and reflective (Thomas,
43 2014).
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For Peer Review Only

Title: Evidence Based Practice in autism educational research: can we bridge the research and practice gap?

Minor revisions are outlined in the attached Table and changes are highlighted in the text using Track Changes.

Formatted: Justified

Reviewer Comment	Change
Page 1: The first sentence is not clear - the two 'strongly contested opinions' need to be reworded to ensure clarity from the start of the paper	This sentence has now been reworded.
The abbreviation for EBP is not always used - suggest consistency in writing	This has been addressed in the main text throughout.
Page 2: 'I argue that the gap between research and practice takes a particular form in the autism field, and there are lessons to be learnt from this field for educational research more broadly' - I am not convinced this is argued effectively in the main text of the paper, and would suggest further clarity on this point	I have adjusted this sentence to ensure it is more in line with what is effectively argued in the main text.
Page 8 line 38 missing word: 'if intervention research is to have both scientific validity in design and implementation as well AS social validity within the broader community...'	Corrected and the word 'as' has been added
Page 13 paragraph 2: it would be worth noting here that we don't have objective measures to enable successful identification and research on outcomes that support choice and autonomy - and that this is a limitation of current research methods	I have added this point to the relevant paragraph using Track Changes
Page 17: 'move from a narrowly defined epistemic science to one that articulates a social science that integrates context-dependency with practical deliberation' - to further highlight this point, it should be	I have added this important point using Track Changes.

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related to the fact that autism is, by definition, a spectrum of disorders and therefore this complexity cannot currently be narrowly defined	
Page 17 – you could go a step further and state how the qualitative and quantitative research can be combined in practical ways	This has been highlighted through the examples of participatory research

Introduction

~~Debates around Evidence-Based Practice (EBP) in education highlight is a hotly-contested subject at the moment, and has been for a while, with strong messages that teachers should be focusing on 'what works,' and that research favours certain teaching methods for maximising pupil learning outcomes (Hattie, 2008), and that further work is needed to address how to best apply research to practice (DfE, 2014), with researchers and government departments claiming that research favours certain teaching methods for maximising pupil learning outcomes (Hattie, 2008).~~ Thus the Department for Education (DfE) in the UK allocated £135 million to improve quantitative data in education as well as adopting a framework for conceptualising ~~EBP evidence-based teaching~~ focusing on the use and application of research evidence in schools (DfE, 2014). Meanwhile, the US institute of Education Sciences takes a clear stand that education researchers need to develop interventions that are effective in raising student achievement and to validate the effectiveness of those interventions using rigorous methods (Lundahl, 2013). The 'Individuals with Disabilities Education Act' (IDEA, 2008), ensures

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19 that services to children with disabilities require teachers to use EBPs by
20 mandating the scientifically based research concept in education through the
21 No Child Left Behind Act (NCLB) Act of 2001. This is now enshrined in law,
22 with the NCLB addressing the need for standards and measurable goals with
23 reliance on scientifically based research for interventions and teaching
24 methods.

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26 Within this context, autism educational research is dominated by experimental
27 research designs that should inform decisions teachers make on the ground.
28 When the US National Research Council (NRC) conducted a rigorous
29 assessment of intervention research studies in the field of autism, for
30 example, studies needed to employ particular methodologies in order to be
31 considered an EBP and these included randomised, quasi-experimental or
32 single-subject design studies. In a relatively recent National Professional
33 Development Centre (NPDC) review of autism intervention research, 40% of
34 studies used multiple baseline design, with 8% based on RCTs (Wong et al.,
35 2014). Current research in autism is largely Single Subject Experimental
36 Designs (SSED) with group designs becoming more common (Kasari &
37 Smith, 2013) and there is a clear dominance of empirical and technical
38 instrumental research that is modeled on the natural sciences (see Dingfelder
& Mandell, 2011; Odom et al., 2005).

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40 The above hegemony of experimental designs has led to heated debate over
41 the last few years about the way in which ~~EBP Evidence-Based Practice~~ is
42 perceived, and the relationship between research and practice in autism
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educational research (de Bruin, 2015), with much discussion focusing on how to generate a positive relationship between educational research and teaching knowledge and practice (Tatto & Furlong, 2015; Pampaka et al., 2016) whilst recognising that there is a persistent gap between research and practice in autism education (Parsons & Kasari, 2013).

In this paper, I ~~focus on argue that~~ the ~~particular form the~~ gap between research and practice takes ~~a particular form~~ in the autism field, and ~~I identify the methodological re-adjustments that are needed~~ ~~there are lessons to be learnt from this field for educational research more broadly, recognising~~ given that broader discussions around 'what works' have been problematic in both practice and theory, as well as in methodology (Smeyers & Depaepe, 2010). I focus on the need to broaden the range of methodologies used so the field can draw on a wider knowledge base, as practice needs a much wider knowledge base than policy. By addressing the need for a plurality of methodologies, and for further dialogue about what kind of knowledge we value in the field of learning disabilities (Gallagher, Connor & Ferri, 2011), autism educational research exemplifies the methodological reorientation that is needed in educational research more generally.

I discuss the fact that whilst the 'what works' debate is designed to find rigorous ways of using evidence to improve practice, the dominance of experimental designs in autism education contribute to a schism between research and practice in this field (Parsons & Kaskari, 2013; Parsons et al. 2015). This substantial gap between research and practice in autism educational research is problematic (Damschroder et al., 2011; Parsons &

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Kasari, 2013) because long-term outcomes for individuals with autism remain poor (Magiati, Tay & Howlin, 2012), leading to a need for practical solutions for education and life skills (Pellicano, Dinsmore & Charman, 2014).

My paper therefore discusses the preconditions for developing better frameworks and tools for understanding variation across different contextual factors (Klingner & Boardman, 2011), and it underscores the need for a more balanced range of studies and research designs. It highlights that the field needs to become better at recognising that evidence applicable to education will occur in diverse forms and therefore needs to be gathered through diverse means. This includes objective measures obtained from controlled trials, *and* subjective perspectives that are grounded in professional understanding, experiences and interpretations of teachers, in conjunction with approaches that focus on methodologies and methods that respect and value both researchers and practitioners (BERA-RSA, 2014).

The aims are therefore to i) highlight how the dominance of experimental designs leads to a schism between research and practice in this field; ii) discuss how to develop better frameworks and tools for understanding variation across different contextual factors and iii) put the case for recognising that evidence applicable to education needs to take different forms and therefore needs to be gathered through different means. In taking the reader through this argument, I start by highlighting the range of interventions that are present in the autism field and examine current attempts to address the gap between research and practice, before putting the case for

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a paradigm shift in autism education.

A broad range of interventions with different theoretical underpinnings

A quick online search for 'autism interventions' gives over 38 million links so there are clearly many strategies, approaches, therapies and interventions for improving the lives of autistic people. 'Research Autism', a website dedicated to researching the wide range of 'treatments' and 'interventions' in autism, currently lists over a thousand of those in the field of autism along with indications of the evidence base (Milton, 2014). These have a number of different underlying theoretical perspectives. In autism, as in broader disability studies, there are three main theoretical approaches (Arduin, 2015): the medical model through which autism is viewed through the lens of a pathological or flawed existence (Hughes, 2000); the social model, which posits that concepts of disability are culturally relative and the consequence of particular cultural conditions (Corker & Shakespeare, 2002) and the interactionist, human rights or transactional model which focuses on human rights, and disability as being part of diversity, with difficulties arising from an interaction between the individual and the environment (Prizant, 2015).

Within these theoretical traditions, much of the emphasis on experimental designs and quantitative studies around EBP in autism education tend to emanate from a deficit based medical model, in which disability is defined as 'a physical or mental impairment' (DfE, 2014), with a high proportion of intervention studies focusing on intensive behavioural interventions (Howlin,

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2010) that are based on a normative focus on 'correcting deficits' (Milton, 2014).

The above theoretical perspectives have a bearing not only on views about how pupils learn, but also on how to conduct research, as they lead to different foci in terms of the developmental areas they focus on, which in turn affect how progress is measured (Howlin, 2010). Researchers with varying theoretical perspectives will see the world differently and will therefore differ in the questions they ask, what they examine in research as well as the methodologies they consider valid for measuring pupil progress (Poplin, 2011). Hence, behaviourists will tend to define the behavior that is considered desirable, then count the behavior, and reinforce it; cognitive theorists shift this to strategic academic behaviours they believe underpin academic performance whilst constructivist focus the lens on the process of facilitating an individuals construction of meaning (Poplin, 2011).

Methodological critiques of current intervention research

Although a number of studies have provided some reliable knowledge about which interventions 'work' and have helped practitioners make decisions in selecting suitable interventions, reviews have highlighted that there is not enough evidence to promote a specific form of intervention given the lack of robust evidence coupled with the wide range of interventions in the field of autism (Parsons et al. 2011; Odom et al., 2005; Howlin, 2010). Furthermore, as well as intervention research involving many different strategies, there is often a limited range of outcomes measured (Pasons et al., 2011). Effects of

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interventions often impact on a narrow range of skills so a programme to improve non-verbal communication will narrowly focus on that without examining its effect on broader cognitive functioning, for example (Howlin, 2010).

Furthermore, whilst current intervention research clearly represents a desire to apply a rigorous and systematic approach to produce knowledge that can in turn enable generalisation (de Bruin, 2015), the underlying assumption that these designs infer causality and should be able to support professionals to make decisions about 'what works' are problematic as there are clear methodological challenges. Although many reviews and meta-reviews have been undertaken in the field, the groups define different literature, use different definitions of EBP, lump or split interventions at different levels of specificity and come to different conclusions (see Mesibov & Shea, 2010 and Parsons et al., 2011). Furthermore, sample sizes tend to be limited, most examine relatively short-term gains and there are problems sorting out intervention effects compared to other variables (Horner et al., 2005). In addition, most pupils receive more than one intervention at any one point in time, making it difficult to separate out a particular element or type of approach (Parsons et al., 2011).

The perceived weaknesses of current intervention research have therefore led to calls for more methodologically rigorous research (Parsons et al., 2011; Charman et al., 2011) with attempts to counter the narrow focus on specific research designs as the only legitimate way of conducting research in the field

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and with proposals for assessing the quality of a variety of research designs (see Horner, et al., 2005 and Reichow et al. 2008).

The problem with applying experimental designs to school settings

The field is currently dominated by efficacy studies that report the success or failure of interventions in 'ideal' conditions that are carefully controlled. As a result, arguments have been put forward for countering the narrow focus on specific research designs as the only legitimate way of conducting research in the field (see Horner, et al., 2005 and Reichow et al. 2008). This stems from the recognition that it can be quite a challenge to gather efficacy for particular methods as there are so many variables that can be difficult to pin down and measure. Efficacy studies also tend to lack the flexibility that would allow one to capture and to understand what happens naturally or to predict all of the many and varied consequences of a particular course of action due to the context specific nature of education, as much of what happens depends upon chance and dynamic combinations of different starting points, teacher skills and understanding, the school context, and learning objectives (Biesta, et al., 2014).

Although efficacy studies contribute important new knowledge to the autism field, we therefore need to stay mindful of the fact that even when there is evidence for specific interventions in the highly controlled contexts in which they were studied (Kasari & Smith, 2013), these might not be applicable to educational contexts where individual teachers make judgements based on available evidence. If intervention research is to have both scientific validity in

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design and implementation as well as social validity within the broader community, the field needs to find better ways of ensuring interventions are evaluated in the area in which children are based, such as mainstream primary schools (NAC, 2009). This has led to calls for conducting more effectiveness studies, which focus on the sustainability of the intervention and the importance of it to those participating in it in everyday conditions (Weisz & Jensen, 1999; Kasari & Smith, 2013).

The question is then whether this will go far enough in changing the fact that University based autism intervention research is not evident in the child's school in most schools in the UK and US, or if it is, it is changed so much that it is different from the original intervention (Kasari & Smith, 2013). Practitioners rarely alter their practice by drawing on the evidence base from research (Lather, 2004) despite schools being under increasing pressure to implement EBPs in order to meet the diverse needs of pupils with autism, with many continuing to use practices that are unsupported by such research (Burns & Ysseldyke 2009; Carter et al., 2011). Teachers have reported that they view researchers as being out of touch with the realities of today's classroom contexts (Greenwood & Abbott, 2001), whilst being less concerned about EBPs and more interested in how the given solutions might fit with the needs of individual children (Guldberg et al., 2011).

Researchers have therefore begun exploring the barriers to implementing studies in schools (Locke et al., 2014). These barriers have been seen as relating to 'incompletely developed interventions, limited evidence of their

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19 utility in promoting long term and meaningful change and poor fit with school
20 environments' (Kasari and Smith, 2013, p1). More specifically, barriers have
21 been linked with lack of training of teachers (Dingfelder & Mandell, 2012), the
22 competing priorities of staff, policies surrounding break times, lack of school
23 support, and difficulty finding resources and time for implementing
24 interventions in the school day (Locke et al., 2014). Whilst a focus on barriers
25 to implementation is important, I go on to argue that a more fundamental
26 paradigm shift is needed than current debates indicate.

27 **The knowledge transfer model orthodoxy**

28 The debates around efficacy, effectiveness and implementation problems in
29 schools highlight that there is an assumption that effective
30 ~~practices/treatments~~ have been produced, but that the issue is that teachers
31 are not implementing these ~~EBP/evidence-based treatments~~. This narrative
32 sees the problem as a 'translational one' in which research dissemination is
33 perceived as a linear, top-down transmission model from which practitioners
34 should draw knowledge. Research should then flow from the journal to
35 classroom practice without any real and sustained engagement with teachers
36 or pupils (Greenwood & Abbott, 2001). This model posits the researcher as
37 the "expert" and the teacher as simply the vehicle for delivering the
38 intervention (Trent, Artiles, & Englert, 1998).

39 This 'knowledge transfer' model in autism education research can be
40 illustrated by the National Autism Centre's (2009) systematic review of both
41 SSED and group designs, identifying eleven 'treatments' for which they claim
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19 there is evidence of effective practice, and moving from this to producing a
20 manual for EBP in schools and recommending a specific set of best practices
21 such as visual schedules and self management techniques (NAC, 2009).
22 Meanwhile, the National Professional Development Centre identified a larger
23 set of practices and made steps to operationalise these by producing step-by-
24 step reviews (Wong et al., 2014), focusing on the necessity of translating
25 scientific results into intervention practices or practitioner friendly summaries
26 so that users can be informed by those (Reichow, 2008), whilst also providing
27 'professional development and support for implementing the practices with
28 fidelity' (Wong et al., 2014, p. 34).

29 **The need to take onboard different ways of knowing**

30 The above solutions do not take account of the fact that a teacher's choice of
31 educational programmes tends to derive from a combination of educational,
32 behavioural and developmental research and theory (Howlin, 2010) resulting
33 in them employing an eclectic mix of strategies (Guldberg, 2010). Whilst the
34 science behind research-based instruction and intervention studies requires
35 fidelity of implementation, teachers tend to view good teaching as involving
36 innovation and an eclectic sampling from a variety of instructional or teaching
37 models (Greenwood & Abbott, 2001).

38 Unfortunately the prevailing research culture of knowledge transfer in
39 evidence-based research diminishes the potential contributions of teachers
40 and pupils by prioritising particular ways of knowing. It ignores important
41 aspects of professional knowledge (Rynes, Bartunek & Daft, 2001) and the
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situated nature of the experiences and expectations of teachers and children in schools (Parsons et al., 2013), as well as the complex nature of schools where it is often difficult to implement more rigid, experimental research designs requiring strict adherence to planned protocols (Kasari & Smith, 2013).

As far back as 1996, Guba noted that stakeholders should inform an integral part of knowledge and that they would feel no obligation to abide by knowledge if they do not have ownership of it (Guba, 1996). Yet the prevailing culture of knowledge transfer puts agency in the hands of policy or the intervention whilst there is actually a need to allow variation and mediation between teachers, thus giving more agency of the whole process to the schools, pupils and their families (Gallagher et al., 2011). The issue of agency is a crucial one in that it highlights the need to introduce methodologies that position not only teachers, but also individuals with autism and their families at the center of inquiry and knowledge. This can enable research to be both practical in terms of day-to-day practice and modifiable to meet diverse pupil needs.

In order to identify the goals that are important for the autism community, for families and for practitioners, meaning therefore needs to be found in lived experiences, and research needs to invest in working *with* those stakeholders rather than *on* them (Freire, 1972), with a concomitant reorientation towards human subjectivity (Allan, 2011). It is difficult to see how a practice can be effective at generating improvement if we do not also gain an understanding

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of the way that the world is viewed and experienced by the individuals whose outcomes we are aiming to improve. This is particularly pertinent as autistic adults feel that 'research fails to speak to the reality of their lives in the here-and-now' (Pellicano et al., 2014, p. 5). Individuals with autism have simply not been involved in setting the agenda of working out what is important to focus on (Pellicano et al. 2014) and this has led to a large mismatch between what individuals with autism say they need in terms of what constitutes positive outcomes, and what research tends to focus on.

Wittemeyer et al., (2011) found that a good adult outcome needs to be considered within the context of individual needs and aspirations; enabling a person to make choices and giving them access to the right support when needed was seen as crucial. Milton (2014), an autistic sociologist, has echoed this through advocating that care must be taken to ensure that structures are put in place to encourage the learner's autonomy and reduce their stress. Evidence Based Practice therefore needs to take into account what it should work for and who should have a say in determining the latter (Biesta, 2013).

Given that findings from studies indicate that autistic individuals place importance on outcomes that support choice and autonomy (Wittemeyer et al., 2011; Pellicano et al., 2014; Milton, 2014), it is troubling that outcomes such as these, which can seem loose and fuzzy, are seldom focused on in autism research, with the consequence that interventions are limited to those whose goals can be measured. We know very little about how changes in standardised measures reflect changes in everyday life though and variables

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19 that lend themselves to measurement and statistical analysis may not be
20 important for some of the long-term goals and outcomes of people with autism
21 such as life satisfaction, community participation and personal relationships

(Wittemeyer et al., 2011). [A further a limitation of current research methods is
22 that we do not have objective measures that enable successful identification
23 and research on outcomes that support choice and autonomy.](#)

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25 Many studies involving Early Intensive Behavioural Intervention, for example,
26 have used IQ as a principal outcome measure, yet even statistically significant
27 increases in IQ do not necessarily lead to improvement in other, more
28 practical day to day skills (Howlin, 2010). Neither does statistical significance
29 in controlled trials necessarily mean that pupils have improved in ways that
30 are reflected in their everyday functioning (Mesibov and Shea, 2011). The
31 dangers of this approach are summed up by Poplin, who argues that 'when
32 the human sciences use only quantitative data, we end up with a narrow,
33 piecemeal view of reality' (Poplin, 2011, p150). She goes on to argue that
34 both inductive and deductive research is vital to understanding educational
35 contexts (Poplin, 2011) and it is this question I turn to next.

36 **The argument for both inductive and deductive research**

37 Although much of the current autism research into interventions has come up
38 with information that is of general value, it has often been of little help in
39 deciding on a particular case (Jordan, 2005) as the classroom is very different
40 from an experimental or therapeutic setting. In classrooms that educate pupils
41 with autism, interventions need to be individualised according to pupil
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characteristics, include real life outcome measures and be generalisable to complex real-life conditions and multiple cultures and settings (Mesibov and Shea, 2010). This means focusing the lens on the individual child, young person or adult, rather than the 'model' or 'intervention' (Guldberg, 2010). The teacher working with a child with autism needs to understand the child and how autism impacts on the child and the family, before deciding which strategies or interventions might work and how she might implement those in the particular context in which she works (Jordan, 2005).

Implementation often relies on a number of factors, including choice of educational approach, attending to the responses of the child or children whilst approaches are being implemented, gauging how children are responding to them, observing, reflecting and then possibly changing how an approach is used depending on how the child responds (Guldberg et al., 2011). This relies on knowledge and understanding of autism, values, tacit judgements, experience, local knowledge, and skills (Parsons et al., 2015). Furthermore, the ways teachers and pupils behave are strongly influenced by one another and participants interpret and make sense of their world in different ways (Biesta, 2013), with learning being situated and context dependent (Wenger, 1998).

This highlights that professional practice needs to move beyond the notion of simply relying on 'what works', to ensuring that research can make a positive contribution to each aspect of teachers' professional knowledge. This professional knowledge embodies practical wisdom and critical reflection as

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19 well as technical knowledge (Winch et al., 2015). Thus it is not enough to
20 purely focus on addressing how schools and teachers can become better
21 informed by data and robust evidence so they can access and interpret
22 different kinds of evidence and adapt it to their own settings and contexts
23 (Tatto & Furlong, 2015). Nor should discussion about the gap between
24 research and practice be too narrowly focused on the need for teachers to
25 develop research related skills and knowledge or to become better equipped
26 to engage with and become consumers of research.

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28 Rather, there needs to be acknowledgement of the fact that the knowledge of
29 educators is rooted in immersion and reflection, resulting in cumulative
30 knowledge arising from an accumulation of understandings rather than an
31 accumulation of facts (Thomas, 2012b). This knowledge is practical and tacit,
32 based upon ~~using~~ personal experience and learning from the experience of
33 others. Teachers deal with more than the simple application of strategies or
34 techniques to bring about predetermined ends (Biesta et al., 2014), and their
35 work is not necessarily open to objective assessment, neither is it technical
36 (Biesta et al., 2014). Our focus therefore needs to shift more towards ensuring
37 that the field gets a better understanding about what good teaching is and
38 how it leads to learning (Sahlberg, 2010), and therefore to notions of 'good
39 autism practice' in education. This means recognizing the importance of
40 focusing on what Sahlberg and Hasak describe as 'small data'- 'the diversity
41 and beauty that exists in every classroom, and the causation they reveal in
42 the present'. Thus a teacher will need to be able to draw upon both the
43 evidence base for research, such as the fact that many pupils with autism

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need visual augmentative strategies, whilst also being able to reflect on how those strategies are being implemented and responded to in the interactions and relationships that are developing in the classroom.

The proposed core principles flowing from this then need to become that EBPs should have a cogent rationale for educational strategies. As Mesibov and Shea (2010) argue, this latter focus is productive because it encourages the use of diverse sources of information for developing and evaluating educational approaches and encourages a focus on how to respond to the varying needs of different pupils and what is feasible. This does not negate the importance of drawing upon research evidence to shape and enhance practice. Rather, it is about, as Pring and Thomas (2004) argue, questioning the nature of evidence and the potency assigned to particular types of evidence.

What we therefore need more of in the field of autism intervention research, is a 'move from a narrowly defined epistemic science to one that articulates a social science that integrates context-dependency with practical deliberation' (Lather, 2004). This is essential given that autism represents a complex spectrum of different abilities and difficulties that cannot be narrowly defined. It highlights the need for methodologies that means staying close to the complexities and contradictions of existence, with the goal of also fostering understanding, reflection and action as well as translation of research into practice. This has in turn led to several scholars articulating the need to value qualitative methodologies on a par with the quantitative experimental designs

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that currently dominate the field (Poplin, 2011) calling for the use of a broader range of methods that allow us to look at phenomena in ways that reveal many facets of human experience (Kazdin, 2008). This can include in-depth evaluation, subjective views and how individuals react to their situations and contexts whilst looking for genuine change in functioning, meaning, experience and perception. It can include a whole range of methodologies that enable this kind of study, from case studies to action research, phenomenology or narrative research (Gallagher et al., 2011).

Furthermore, the field would benefit from codifying experiences of teachers in practice and ensuring that accumulated data can be analysed in partnership with researchers (Kazdin, 2008), moving towards closer collaboration between researchers and practitioners, one in which the role of judgement, expertise and context ought to be studied directly. Nastasi et al. (2000) argued for participatory action research approaches that involve stakeholders in intervention efforts in order to focus on interventions that consumers find acceptable and to move towards a broad conception of integrity and effectiveness. Participatory approaches to developing interventions should include competencies that are relevant to the targeted culture, valuing naturalistic enquiry, real-life contexts, and understanding, as well as the importance of describing phenomena from the population, thus facilitating culturally specific theory and intervention (Nastasi et al. 2000).

The case for rapprochement and change in emphasis

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19 In discussing the divide between research and practice, Kazdin (2008)
20 therefore argued for rapprochement and changes in emphasis, highlighting
21 that both research and practice should contribute to our knowledge base. This
22 is aligned with the conception of 'Evidence Based Treatment' (EBT) that was
23 put forward by the American Psychological Association in 2006 and defined
24 as 'the integration of the best available research and clinical expertise within
25 the context of patient characteristics, cultures, values and preferences' (APA,
26 2006, p 273). Kazdin (2008) highlighted that it is very unfortunate to take a
27 narrow view of knowledge transfer in which research is seen as contributing to
28 the knowledge base and practice as an application of research. This way of
29 seeing the contributions of each of the domains, does in fact heighten the
30 research-practice gap as it negates the contribution that clinical, or
31 educational practice can contribute to the scientific knowledge base. As well
32 as focusing on the expectation that educational practice should be the
33 application of research findings to practice, there is therefore clearly a need
34 for more rigorous examination of how educational practice can contribute to
35 the scientific knowledge base, promoting research designs that enable
36 teachers to both inform the research community and be informed by it.

37 Conclusions

38 This paper has argued that there is a key danger in privileging a certain kind
39 of research evidence over evidence from other sources. There is a need to
40 move towards research designs that enable stakeholders to participate in
41 identifying the outcomes to focus on and to contribute data from the
42 classroom, including participatory approaches that are situated in the contexts

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in which people live and work (Biesta, 2013) and that take into account the concerns and experiences of individuals with autism, their families and the practitioners who work with them.

The autism field needs to move towards a double transformation of both educational research and educational practice (Biesta et al., 2014), as factual knowledge is never a sufficient determinant of good practice in education. The problem with 'excessive quantification' and a focus solely on scientific approaches is that it can push the field away from closer interactions with policy and practice (Lagemann, 2000); it holds within it the danger of oversimplifying the relationship of research to practice (Hammersley, 2005) and negates the fact that multiple research designs are needed to address different types of questions (APA, 2006; Mesibov & Shea, 2010). Research questions need to be more firmly focused on what constitutes a good outcome for a person with autism. Autistic people, their families and the practitioners who work with them, need to be involved in identifying those questions, including a re-framing of which outcomes measures are important to focus on.

The argument is not that different forms of evidence are incompatible, but rather that both need to be taken into account and combined to offer a more balanced insight into best educational practices. Thus, calls for a need for educational sciences to be rooted at the practical level (Thomas & Pring, 2014) do not negate the need for controlled experimental approaches but recognise the need to broaden the concept of EBP beyond the knowledge transfer model. What is argued for is a broader conceptualisation of EBP that

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19 is informed by experimental evidence, as well as by the perspectives and
20 needs of individuals with autism, their families and the practitioners who work
21 with them (Kazdin, 2006).

22
23 Ultimately, to achieve this requires methodologies that ensure that teachers'
24 craft and tacit knowledge are both captured adequately and taken into
25 account *together with* the systematic knowledge generated by research
26 (Hammersley, 2005). To that end, scientific research and practice both have
27 in common that they need to be flexible, interpretative and reflective (Thomas,
28 2014).

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