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Rapid Prompting Method and Autism Spectrum Disorder: Systematic Review Exposes Lack of Evidence

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Abstract

This systematic review is aimed at examining the effectiveness of the rapid prompting method (RPM) for enhancing motor, speech, language, and communication and for decreasing problem behaviors in individuals with autism spectrum disorder (ASD). A multi-faceted search strategy was carried out. A range of participant and study variables and risk and bias indicators were identified for data extraction. RPM had to be evaluated as an intervention using a research design capable of empirical demonstration of RPM's effects. No studies met the inclusion criteria, resulting in an empty review that documents a meaningful knowledge gap. Controlled trials of RPM are warranted. Given the striking similarities between RPM and Facilitated Communication, research that examines the authorship of RPM-produced messages needs to be conducted.

Keywords Autism spectrum disorder · Facilitated communication · Rapid prompting method · Systematic review

The Centers for Disease Control and Prevention estimate that 1 in 59 children (1.7%) aged 8 years meet criteria for a diagnosis of autism spectrum disorder (ASD) and that this condition occurs in all ethnic, racial, and socio-economic groups (Baio et al. 2018). Individuals with ASD are characterized

by deficits in social communication (American Psychological Association 2017) and often experience marked difficulties with, or an absence of, spoken language (Mirenda and Iacono 2009). In fact, between 25 and 30% of children with ASD present with little or no functional speech

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even after years of intervention (Anderson et al. 2009; Rose et al. 2016; Tager-Flusberg and Kasari 2013). These children are often introduced to augmentative and alternative communication (AAC) interventions and systems to enable more effective communication (Mirenda and Iacono 2009). AAC interventions supplement or replace a child's natural speech, handwriting, or both by using one or a combination of gestures, manual signs, communication boards and books, and speech output technologies from dedicated speech-generating devices or specialized applications on mobile technologies (Beukelman and Mirenda 2013; McNaughton and Light 2013; Shane et al. 2012). Several systematic reviews and meta-analyses have concluded that, as a class, AAC interventions are effective in improving communication and communication-related skills in individuals with ASD (Allen et al. 2017; Ganz 2015; Ganz et al. 2012a, b; Iacono et al. 2016; Schlosser and Wendt, 2008). Subsets of AAC interventions or specific AAC modalities and strategies examined by systematic reviews include aided AAC approaches at large (Ganz et al., 2012a, b), speech output technologies (Lorah et al. 2015; Schlosser and Koul 2015), and the Picture Exchange Communication System (Flippin et al. 2010; Ganz et al., 2012a, b).

Rapid Prompting Method

What Is It?

Over the past few years, however, a superficially similar but markedly different technique, rapid prompting method (RPM), has been gaining popularity. RPM is described by its developer, Soma Mukhopadhyay, the Executive Director of Education at Helping Autism for Learning and Outreach (HALO) as an instructional, therapeutic, and communication technique (Mukhopadhyay 2008). Information about RPM is available primarily through the HALO website and in Mukhopadhyay's growing list of private and self-published RPM instructional books (Mukhopadhyay 2008, 2011, 2013, 2014, 2015, 2016a, b, 2017a, b). According to the HALO website, RPM is a "brain-based" teaching and assistive method that is aimed at establishing and promoting pointing-, typing-, or writing-based textual communication in people with intellectual and developmental disabilities, who are verbal or nonverbal and low functioning or high functioning. It is further asserted that RPM is derived broadly from the cognitive-developmental psychology of Jean Piaget and neuro-sensory theories of A. Jean Ayers and is aimed at remediating or accommodating problems in cognition and sensory sensitivities. Procedurally, RPM comprises a series of "teach-ask" trials of graduated difficulty, with the student first being prompted to choose a correct answer from two written options and later being prompted to point to printed

letters on a card. The technique presumes linguistic competence (i.e., unconscious knowledge of grammar that allows a speaker to use and understand a language), and learning materials are presented verbally and textually at a chronological age level rather than at a level of complexity informed by assessment of the child's developmental and language levels (Mukhopadhyay 2008; Todd 2015).

A Brief History

The Cure Autism Now Foundation introduced RPM to the USA in 2001 (<http://www.halo-soma.org>). The foundation website asserts that Soma Mukhopadhyay's son (aged 30 years), who was diagnosed with ASD at age three, was introduced to his mother's "own intensive educational curriculum ... Activities included reading textbooks and classics, prompting him to point to numbers and letters, and physically motoring his body through the motions." At six years old, her son was said to write independently. In 2001, the Cure Autism Now Foundation offered Mukhopadhyay a fellowship to implement her teaching method at a school in Los Angeles, working with nine children with ASD. Since then, Mukhopadhyay has refined and trademarked RPM and trained "hundreds of students throughout the United States" (<http://www.halo-soma.org>).

Similarities and Differences between RPM and FC

RPM bears considerable similarities to Facilitated Communication (FC) (aka "supported typing"), a technique whereby individuals with disabilities and communication impairments select letters by typing on a keyboard while receiving physical support (e.g., on the hand, arm, elbow, shoulder), emotional encouragement, and other communication supports from facilitators (Institute for Community Inclusion, n.d.). Both RPM and FC are facilitator-dependent techniques designed for AAC alphabet/letter/word boards or speech-generating devices to support communication or education (Tostanoski et al. 2013). In its standard form, RPM differs from FC in that facilitators do not typically physically support the child's hand or arm. Rather facilitators hold and move a letter board while the child makes selections, repositions the board between selections, and provides ongoing repeated verbal and gestural prompts for pointing to letters to spell out words (Mukhopadhyay 2008; Todd 2015). However, the possibility of facilitator influence on the message still exists. Tostanoski et al. (2013) argued that "it is irrelevant whether the facilitator's unconscious bias and expectations are introduced via moving the person's hand to touch the letter board, as in FC, or moving the letter board to touch the person's hand, as in RPM" (p. 220). They go on to note that Mukhopadhyay (2008) does not address the fact that a letter board can be more

easily repositioned than the manipulation of someone else's hand or wrist.

Even though there is a standard form of RPM, it is not unusual to see RPM facilitators touching individuals in ways that could guide pointing. Todd's (2015) analysis of training videos and depictions of RPM in popular movies revealed that, whether intended or unintended, facilitators may guide responding by (a) offering a pointer on each trial close to the desired letter board target, (b) leaning against the client in a manner that could move the pointing hand, or (c) touching the individual's thigh, back, or other body part in a way that could provide pointing cues (Amora 2012; Mukhopadhyay 2008; Pluktelevision 2010; Suefinnes 2013; Todd 2015). Ochs et al. (2005), who conducted ethnographic research on RPM use, also acknowledged the use of physical support. Finally, Mukhopadhyay (2008) acknowledged that "if the teacher is in a hurry to push through this stage, there is a risk of using facilitated communication (when the teacher physically touches the learner's arm/elbow/shoulder while the learner is communicating)" (p. 192) in the process of transitioning to letter board usage.

For FC, a corpus of 51 studies scrutinized across seven reviews in peer-reviewed journals indicates that, when facilitator's knowledge of the content to be communicated is controlled, messages generated via FC are authored by the facilitator (Felce 1994; Jacobson et al. 1995; Mostert 2001, 2010; Probst 2005; Schlosser et al. 2014; Wehrenfennig and Surian 2008). This finding strongly suggests that the alleged efficacy and effectiveness of FC is in fact attributable to the ideomotor effect (Hyman 1999), whereby facilitators inadvertently influence hand and finger movements of individuals with ASD as they facilitate (Jacobson et al., 1995). For RPM, the empirical question of who is authoring the messages remains unresolved.

Previous Reviews

Deacy et al. (2016) published the only review of RPM in the peer-reviewed literature. Based on the analysis of three studies (Chen et al. 2012; Gernsbacher 2004; Solomon 2006) they concluded that (a) there appears to be an association between using RPM and a decrease in repetitive behavior and (b) "further research in the area of RPM is warranted in order for it to be considered an evidence-based practice" (p. 92). This review contained several methodological limitations (Hemsley 2016), including (a) unclear review questions, (b) absence of design-related inclusion criteria (e.g., inclusion of three descriptive studies incapable of validating efficacy), (c) omission of a rigorous appraisal of study quality, and (d) lack of identifying conflicts of interests related to funding sources. Furthermore, their review did not delineate the specific sources searched (e.g., databases, trial registers, and book chapters). In sum, their review falls short of being systematic.

Rationale for the Present Systematic Review

The impetus for conducting this review stems from several considerations. First, to date, there is no systematic review of RPM that would provide a higher level of scientific evidence than individual studies. Second, ASD has been associated with a large number of popular but unsubstantiated interventions, including FC (Lilienfeld et al. 2014). For example, Smith's (2008) review produced a list of 50 unsupported or weakly supported interventions for ASD, and a recent survey of 535 special educators of students with ASD and/or intellectual disability revealed that RPM was used more than empirically supported methods such as video modeling and the Picture Exchange Communication System (Knight et al. 2019). Likewise, recent surveys of early-intervention staff in Australia (Paynter and Keen 2015; Paynter et al. 2017) suggest that unsupported interventions, such as RPM, continue to be used. Additionally, several parent surveys indicate that most children with ASD receive between four to seven interventions (Schreck et al. 2014), many of which are unsubstantiated and without evidence (Deyro et al., 2014; Nach 2009). Furthermore, a study of variables influencing parental choices of treatments revealed that parents were overwhelmed with confusing and often conflicting information regarding ASD treatment options (Frame 2014). Considering the widespread use of RPM, the popularity of unsubstantiated interventions in the field of ASD at large, and the marked similarities between RPM and FC, a systematic review to inform the practice of pediatricians, child psychiatrists, child psychologists, special educators, and others is warranted.

A third impetus relates to the increasing attention received by RPM in the popular media and via regulatory and political discourse. For example, Senator Rónán Mullen advocated for the increased use of RPM to the Irish Senate in 2014, portraying it as an effective method that has helped thousands of people over 10 years in the USA (Upper House of the Irish Legislature, 2014). In February 2017, The Washington Post published an article on RPM juxtaposing the opinions of an increasing number of parents of children with ASD wishing to consider using RPM in schools with the views of scientists who expressed skepticism regarding its effectiveness as well as concern for user safety and autonomy (Chandler 2017). RPM has also been featured in several documentary films including the 2010 film "A Mother's Courage: Talking back to Autism."

Finally, a systematic review is needed to support the role of professionals (e.g., pediatricians, speech-language pathologists, occupational therapists, and special educators) in assisting families of children with ASD to choose interventions that are evidence based. Developmental and behavioral disorders such as ASD are by far the most prevalent chronic conditions encountered by general pediatricians. Nevertheless, in the USA, there are only 750 board-certified

developmental-behavioral pediatricians (Bridgemohan et al. 2018; <https://www.abp.org/content/developmental-behavioral-certification>), who may be trained to discriminate between validated evidence-based interventions and those without evidence. In contrast, there are approximately 4,000,000 infants born in the USA every year (<https://www.cdc.gov/nchs/fastats/births.htm>), suggesting an incidence rate of 68,000 new births of children with ASD each year (i.e., $4,000,000 \times 0.017$). Thus, most children with ASD need to be managed by their primary pediatric health care providers (Patterson et al. 2012), and these and other providers need to know which interventions for ASD are truly evidence based. Given that there is no cure for most developmental disorders, understandably anxious, unsuspecting parents seeking ways to improve communicative competence are at significant risk of pursuing often harmful non-evidence based treatments for their children. In sum, parents, pediatricians, educators, speech-language pathologists, and other professionals who serve children with ASD are entitled to the best available scientific evidence efficiently accessed via a systematic review that can establish the degree of empirical support for RPM.

Objective

The aim of this systematic review was to determine whether RPM is effective for individuals with ASD in terms of (a) improving body motor skills, speech, communication, communication-related cognition, and/or (b) reducing problem behavior (including ritualistic or repetitive behaviors). Treatment comparisons were desirable but not necessary for inclusion.

Method

This systematic review was registered a priori with the PROSPERO database—International Prospective Register of Systematic Reviews under the following registration number: PROSPERO 2016 CRD42016047871. The protocol can be accessed here: https://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42016047871.

Search Methods

The original search was conducted in March 2017, repeated in November 2017, and April 2018, and repeated once more on September 30, 2018. A multi-faceted search strategy was employed (Schlosser et al. 2005). The following databases were searched: Cochrane Library, ComDisDome (ProQuest), Cumulative Index of Nursing and Allied Health Literatures (EBSCO Host), Education Journals (ProQuest), Education Research Complete (EBSCO Host), Education Resources

Information Clearinghouse (ProQuest), Google Scholar, Linguistics and Language Behavior Abstracts (ProQuest), Medline (Pubmed), ProQuest Dissertations and Theses Global, PsycINFO (ProQuest), Psychology and Behavioral Science Collection (ProQuest), and Web of Science. In addition, the following publisher-specific databases were searched: Sage Journals Premier, ScienceDirect (Elsevier), SpringerLink Journals, and Taylor & Francis Online. To identify potentially unpublished studies or work in progress, the following trial registers were searched: EU Clinical Trial Register (<https://www.clinicaltrialsregister.eu>), Australian New Zealand Clinical Trials Registry (<http://www.anzctr.org.au/Default.aspx>), ClinicalTrials.gov (<https://clinicaltrials.gov>), and ClinicalTrialSearch.org (<https://www.clinicaltrialsearch.org>).

Ancestry searches were conducted of studies considered for inclusion, as well as other relevant studies, reviews, book chapters, and books. Further, forward citation searches of included studies had been planned (via the Web of Sciences), but not implemented because no studies qualified for inclusion (see **Results**). Authors of screened articles were contacted to request copies of unpublished or any other related literature.

We searched for the phrase “Rapid Prompting Method” as a free text phrase in title, abstract, and/or full text (as available in bibliographic databases). Our preliminary search revealed that the search for “RPM” as an acronym was overinclusive, yielding too many unrelated entries (e.g., revolutions per minute). Further, our preliminary search revealed that an author search for the developer of the RPM was feasible only if the bibliographic database permitted the searching of the authors full name (Mukhopadhyay) with at least the first initial (S.), otherwise there were too many unrelated entries. A preliminary search also showed that it was not necessary to combine “Rapid Prompting Method” with any autism-related keywords due to the relatively low number of relevant results. Databases were also searched for “informative pointing” as a free text word in title, abstract, and/or full text (as available in bibliographic databases) because it describes a similar if not identical method (Iversen 2007). We did not deem it necessary to impose a temporal limit onto the search in terms of specific years searched.

Criteria for Inclusion and Exclusion

Inclusion criteria were as follows:

- (a) Participants of any age with a diagnosis of ASD (i.e., autism prototype disorder, childhood disintegrative disorder, Asperger disorder, pervasive developmental disabilities-not otherwise specified) regardless of comorbid diagnoses.
- (b) The study employed a (1) single-case experimental design capable of establishing the effectiveness of RPM

- (e.g., ABAB, alternating treatments design, adapted alternating treatments design, multiple baseline design, multiple probe design, parallel treatments design) or a (2) group experimental design capable of establishing the effectiveness of RPM (e.g., randomized controlled trials).
- (c) Group experimental designs that offered only group-level data and/or analyses required that all participants have a diagnosis of ASD.
 - (d) Single-case experimental designs required that at least one of the participants had a diagnosis of ASD and data were provided for that individual.
 - (e) RPM was the intervention under investigation as evidenced by specific reference/s made to writings of its developer Mukhopadhyay (2008) or any of the following guides subsequently authored by Mukhopadhyay (2011, 2013, 2014, 2015, 2016a, b, 2017a, b).
 - (f) The study was written in English (i.e., a preliminary search in preparation for the PROSPERO registration revealed sources in English only), published in a peer-reviewed journal, and was available as an unpublished doctoral dissertation or master's thesis, or a full manuscript length unpublished report (e.g., grant report).

Exclusion criteria were as follows:

- (a) Studies involving participants described as "autistic-like" or individuals whose Diagnosis was not confirmed.
- (b) Pre-experimental single-case designs (e.g., AB design, ABA design) or pre-experimental group designs (e.g., pretest-posttest design) because they do not permit the establishment of a functional relation between intervention and outcome.
- (c) Studies in languages other than English.
- (d) Abbreviated manuscripts such as brief abstracts published exclusively in conference proceedings, etc.

Study Selection and Data Extraction

The first and second authors independently applied the inclusion checklist to 100% of the retrieved records. Decisions ("in" or "out") were then compared and disagreements were resolved through consensus building (see below).

The following data extraction procedures were planned but not implemented because the review turned out to be empty. Using a pilot-tested coding form, at least two review team members aimed to independently code all included studies to extract the following data categories: (a) sample or n , (b) participant characteristics and demographics, (c) intervention setting, (d) study design, (e) # of sessions per week, (f) fidelity of implementation, (g) types of outcomes targeted, (h)

generalization assessed, (i) maintenance assessed, (j) inter-observer agreement on outcome variables, (k) effect size (group designs), and (l) effect size indicators (single-case experimental designs).

Data extraction from included studies was planned to occur blinded in the sense that the methods section of each study was to be separated from the results and coded first, followed by the coding of the result-related sections. We intended to calculate inter-rater agreement between the first and second rater. Disagreements between the two reviewers were to be resolved through consensus and, if necessary, the tie was to be broken by a third reviewer.

Risk of Bias (Quality) Assessment

For group design studies, we intended to use the PEDro scale, which includes 11 items related to (a) subject eligibility, (b) random allocation, (c) allocation method, (d) baseline equivalence, (e) blinding of subjects, (f) blinding of treatment agents, (g) blinding of assessors, (h) relation of # of allocated subjects to # of subjects from which outcomes were obtained, (i) between-group statistical comparisons for at least one outcome, and (j) point and variability measures for at least one outcome (<http://www.pedro.org.au/english/downloads/pedro-scale/>). In addition, each group study was to be assessed for the availability of data on treatment integrity.

For studies using single-case experimental designs, we planned to use yes/no items from the EVIDAAC Single-Subject Scale (Schlosser 2011) which is largely based on Horner et al. (2005). Additionally, we planned to use the certainty of evidence framework originally developed by Simeonsson and Bailey (1991) and subsequently modified and applied in several systematic reviews (e.g., Granlund and Olsson 1999; Millar et al. 2006; Schlosser and Koul 2015; Schlosser and Sigafoos 2006; Schlosser and Wendt, 2008). This framework groups the quality of evidence according to four categories by examining three features of a study: design, inter-observer agreement of the dependent variable, and treatment integrity: (a) conclusive, (b) preponderant, (c) suggestive, and (d) inconclusive. For definitions of these categories, please consult the PROSPERO protocol (https://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42016047871).

Strategy for Data Synthesis

For group designs, we intended to use a quantitative synthesis (via Hedges' g) provided that the data are sufficiently homogenous in terms of participant characteristics and outcomes targeted. This, however, was deemed unlikely to occur since we anticipated a relatively small number of included trials ($n < 10$) and relatively small number of participant in trials.

If quantitative synthesis was not going to be possible, we aimed to report effect sizes per study and synthesize the results narratively along with a tabular format. For single-case experimental designs, we aimed to use a quantitative synthesis provided that the studies to be aggregated were sufficiently homogenous in terms of participant characteristics and outcomes targeted. If possible, we planned to use the following effect size indicators: (a) percentage of non-overlapping data (Schlosser et al. 2008; Scruggs et al. 1987); (b) improvement rate difference (Parker et al. 2009); and (c) percent zero data (only for interventions that is aimed at reducing problem behavior; Scotti et al. 1991). If the data set had turned out too heterogeneous, we would have provided the above metrics per study only in tabular format.

Results

Number of Studies Screened and Excluded

The PRISMA 2009 Flow Chart (see Fig. 1) (Moher et al. 2009) illustrates the screening steps and associated number of studies at each step of the process. Initially, 164 records

were located. After removing duplicates, 108 records were submitted for screening. After screening title and abstract, 102 records were removed. Many of these records mentioned “Rapid Prompting Method” in the title, abstract, or body of the text without actually studying RPM as an intervention, for example, a discussion paper of (un)supported treatments in ASD. For the remaining 6 records, full texts were screened. None of the studies met the inclusion criteria.

Log of Rejected Studies/Papers and Primary Reasons for Rejection

Table 1 provides a summary of the reasons why the six papers (Chen et al. 2012; Cleveland 2008; Gernsbacher 2004; Solomon 2006; Van Acker 2006; Van der Meer et al. 2012) subjected to full-text review were excluded. Several of the papers failed to meet design-related requirements (criterion # 2); descriptive designs such as case studies and ethnographic studies were not suitable for establishing effectiveness. Several manuscripts did not study RPM as an intervention (criterion # 5) (see Table 1 for exclusionary notes).

Fig. 1 PRISMA 2009 flow chart

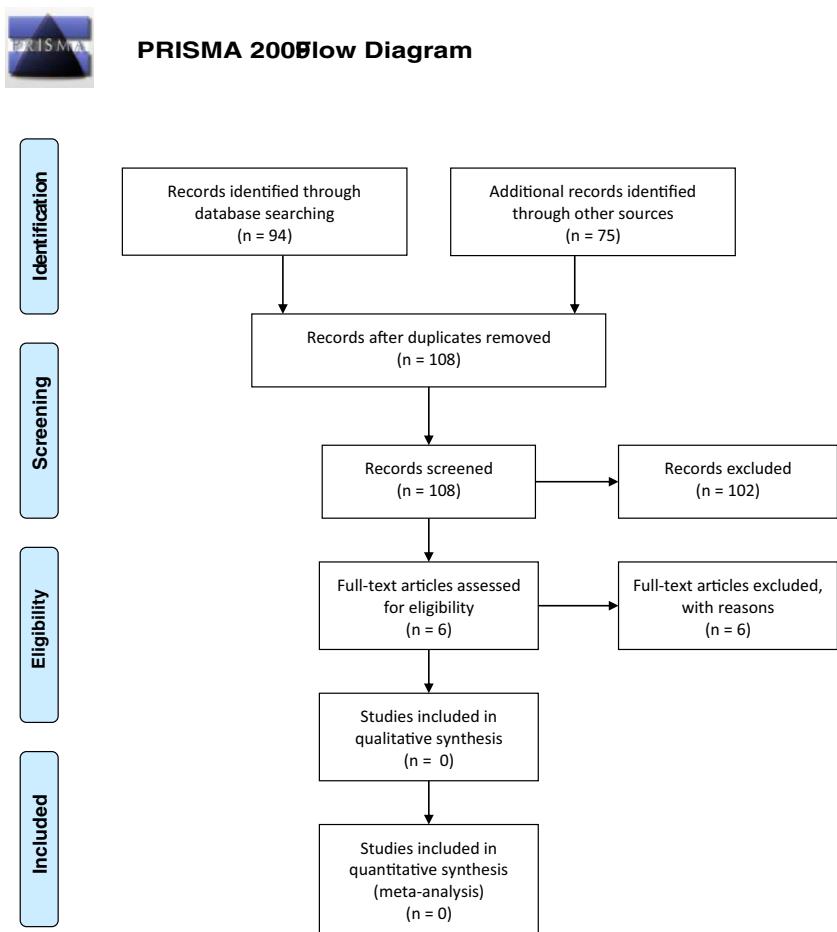


Table 1 Reasons for exclusion of papers that underwent full-text review

Paper—full-text review	Checklist item/s not met	Exclusion notes
Chen et al. (2012)	# 2	Descriptive study
Cleveland (2008)	# 5	Although Mukhopadhyay's work is reviewed in the literature section, the procedure described (p. 11) has components of RPM but is not specifically RPM as described by Mukhopadhyay
Gernsbacher (2004)	# 2, # 5	# 2: Descriptive case study # 5: The mother had met with Mukhopadhyay and as a result adapted some of her modalities. For example, she tried handwriting as a form of AAC. It is stated she would not go through the procedures at great length as described by the developer
Solomon (2006)	# 2, # 5	# 2: Ethnographic study # 5: Even though RPM was studied, it was examined as a practice rather than an intervention—comparing the practices of RPM at HALO versus by parents elsewhere
Van Acker (2016)	# 1, # 2, # 5	# 1, # 2: Discussion paper without participants or design # 5: RPM was mentioned in the text but was not studied as an intervention
Van der Meer et al. (2012)	# 5	RPM was mentioned in the text but was not studied as an intervention

Inter-rater Agreement on Inclusion/Exclusion

To determine inter-rater agreement on inclusion and exclusion decisions, each record submitted to the inclusion checklist was independently reviewed by the first rater and the second rater. Proportional agreement on the primary inclusion decision (“in” or “out”) was calculated by taking the number of agreements divided by the number of agreements plus disagreements, multiplied by 100. We then calculated item-specific inter-rater agreement, which involved responses to each of the six items on the inclusion checklist per record. This procedure yielded an agreement of 91.18%. An analysis of initial disagreements revealed that many resulted from differential responding to whether an item should be rated as “N/A” or “No.” A few disagreements were attributable to incorrect interpretation of the definitions. After consensus-building, these disagreements were resolved, yielding 100% agreement.

Discussion

After an exhaustive search and a rigorous process of applying a priori stated inclusion criteria, this systematic review yielded no evidence for or against the effectiveness of RPM for individuals with ASD. A review in which no studies can be located that meet pre-stated inclusion criteria is termed an “empty review” (Higgins and Green 2011; Schlosser and Sigafoos 2009; Yaffe et al. 2012). Sometimes, empty reviews may arise from very stringent design-related inclusion criteria such as allowing only randomized controlled trials (Yaffe et al. 2012) or from including only very narrow outcomes. Nevertheless, this conclusion is not applicable here given that any design that permitted documentation of effectiveness or efficacy was considered. Relatedly, a wide range of dependent variables were permitted including motor, speech, language,

communication, communication-related cognition, and problem behaviors. Our review suggests that despite many years passing since RPM’s development, there is as yet no evidence for its efficacy or effectiveness.

Empty reviews, which refer to an absence of evidence rather than evidence of absence of an effect, play a critical role in identifying gaps in knowledge and future research needs (Slyer 2016). Such reviews are premised on the legitimate assumption that the onus of proof for novel interventions falls on their proponents (Pigliucci and Boudry 2014) given (a) the existence of empirically supported interventions for ASD and (b) RPM’s similarities to a scientifically discredited technique, in this case, FC. Given that RPM involves facilitation closely akin to FC, the most critical need is to conduct studies to determine who is authoring the messages generated using RPM. The descriptive studies on RPM to date (Chen et al. 2012; Gernsbacher 2004; Solomon 2006) along with their review by Deacy et al. (2016) were predicated on the assumption that the participants were the authors of the messages generated, without first verifying that this was the case. In light of the notable similarities of RPM with FC in terms of facilitator behavior and the likelihood of ideomotor effects (Hyman 1999), this assumption is tenuous at best.

Deacy et al. (2016) concluded their review by saying that future research is needed before RPM can be identified as an evidence-based practice. Although we do not disagree with this conclusion, our empty review highlights that there is not a single study that demonstrates a causal relation between RPM and outcomes, and therefore RPM is utterly untested and not close to earning the status of an evidence-based intervention. In a peculiar way, this state of the literature is not entirely tragic because it offers an opportunity to first rule in or out whether RPM is pseudoscientific—potentially saving valuable resources and minimizing potential harms.

If authorship studies were to determine that RPM is valid, it is imperative that future studies interrogating the effectiveness of RPM in terms of social-communication and behavioral outcomes thoroughly assess and document the literacy skills of individuals prior to intervention. This desideratum is critical to ensure that any observed “effects” are not due simply to the individual lacking appropriate opportunity, expectation, and access to materials to demonstrate her or his existing literacy skills, which could have been achieved through the provision of evidence-based AAC approaches. Additionally, future effectiveness studies should (a) be aimed at meeting the inclusion criteria of this review, (b) meet accepted quality indicators for the respective research design chosen, and (c) be independently replicated by more than one research team. Because there is no current objective scientific evidence for RPM, the scientifically and ethically sound recommendation is to not initiate its use until trials are completed and the intervention is demonstrated to be safe (e.g., that it does not result in uncorroborated accusations of sexual abuse against family members, a known risk of FC) and effective.

Limitations

We included studies written in English only and our search efforts did not explicitly target non-English sources. Although RPM was developed in the English-speaking context (i.e., India and subsequently the USA (Todd 2015)) and our preliminary search had revealed no non-English sources, we cannot rule out a language bias.

Conclusions

This systematic review was deemed empty and revealed no evidence in relation to RPM’s effectiveness meeting our inclusion criteria. The developers of RPM and its proponents have yet to fulfill the crucial burden of proof requirement demanded for novel interventions. Although lack of evidence does not necessarily demonstrate a lack of effect, until future trials have demonstrated safety and effectiveness, and perhaps more importantly, have first clarified the authorship question, we strongly discourage clinicians, educators, and parents of children with ASD from using RPM.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent N/A.

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