Critical Review:
Are technology-based interventions more effective than traditional interventions at teaching children with Autism Spectrum Disorder (ASD) social communication skills?

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This critical review examines the current evidence comparing the effectiveness of technology-based interventions to non-technology-based interventions in teaching social-communication skills to children with autism spectrum disorder (ASD). A search of the literature yielded nine relevant papers, of which eight were single-subject designs and one was a randomized controlled trial design. These studies provided suggestive evidence that technology-based interventions are an effective means to teach social-communication skills to children with ASD. Conclusions about the comparative effectiveness of technology-based and non-technology based interventions could not be made due to several limitations within the studies. Clinical implications and recommendations for future research are discussed.

According to the Centers for Disease Control and Prevention (2014), roughly 1 in every 68 children are identified with Autism Spectrum Disorders (ASD),

completed. Mean ratings on the social validity measure suggested that video modeling was considered to be an acceptable procedure to teach requesting and could be implemented independently within the constraints and demands associated with therapists' jobs. However, there were several differences between the two intervention conditions, including differences between the length of time and schedule of reinforcement. Additionally, generalization of treatment gains was not assessed, limiting the external validity of the results. Considering the strengths and limitations, this study provides suggestive evidence regarding the effectiveness of video modeling on teaching children with ASD to request.

Randomized Controlled Trials:

Srinivasan, Eigsta, Gifford, & Bhat (2016) compared the effects of rhythm, robotic and Applied Behavioural Analysis (ABA)-based interventions on the spontaneous verbal communication skills of 36 children with ASD (5-12 years; m=7.63). Recruitment details and inclusion criteria were well-specified and ASD diagnosis was confirmed using gold standard diagnostic measures. Participants were matched on age, level of functioning, and amount of prior services, and then randomly allocated to an intervention group (n=12). The rhythm and robotic interventions utilized whole-body imitation games, with the rhythm and robotic therapy being administered by either a human trainer or a robot trainer. In contrast, the comparison ABA intervention included sedentary activities typical of those included in school-based therapy sessions. Treatment contact time was kept similar across groups, and was conducted over ten weeks, with the children receiving two trainer-led sessions and two parent-led sessions per week.

A modified version of a standardized test of joint attention (JTAT) (Bean & Eigsti, 2012) was administered in the first and last weeks of the study to assess the children's responsive and non-verbal communication skills. However, three children were reported to not cooperate during JTAT administration, resulting in data being reported for only 11 children per group. Additionally, the children's responses to social bids and their total duration spent spontaneously or responsively verbalizing to themselves, their social partners, and the robot were coded by a single observer at three time points (early, mid, and late sessions). Intra- and inter-rater reliability was reported to be within acceptable range. Social bids were not administered to two children within the rhythm group due to lack of cooperation during the given session.

Using appropriate tests of difference, no significant differences were found between the intervention groups in JTAT performance, although the rhythm and ABA groups but not the robotic group, increased their total scores post-intervention. Children in the robotic group were found to engage the most in self-directed vocalization, while the children in the ABA and rhythm groups exhibited greater spontaneous social verbalization. Within the robotic and rhythm groups, the children showed an overall increase in social verbalization from early to late sessions, while no training-related improvements in social verbalization was observed in the ABA group.

One limitation is that some children in the study did not cooperate with the study administration, resulting in the researchers not having complete data from entire sample. Furthermore, a single coder was reported to have completed the data analysis with no mention of blinding, which could result in the data being subject to bias. This study also did not perform follow-up testing to assess the carry- over and generalizability of the training. Overall, this study provides strongly suggestive evidence against the effectiveness of robotic interventions to increase social verbalization in children with ASD.

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Overall, findings provided suggestive evidence that technology-based interventions are an effective therapy delivery method to teach social-com

participant acts as their own control, allowing for the systemic manipulation of the variables. This design is particularly useful to evaluate intervention effectiveness, especially when it is difficult to obtain a homogenous group of participants, as it is with ASD. Srinivasan et al. (2016) utilized a randomized clinical trial (RCT) design. RCTs randomly assign participants to conditions to measure the dependent variable under controlled conditions, which better allows for cause-and-effect relationships to be determined. Overall, the choice of designs utilized by the included studies were appropriate and provided a high level of evidence as to whether the various interventions were effective.

A limitation across the majority of the studies was the use of small sample sizes (<10 participants). Although this is a limitation inherent to SSRDs, small sample sizes can impact the external validity and ability to generalize the intervention outcomes to the greater population of children with ASD. However, it should be noted that these studies provided detailed descriptions of the participant characteristics. This information can be useful when clinicians are determining the suitability of an intervention for a child their similarity to the