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The Effectiveness of Video Modelling on Social and Communication Skills: A Systematic Review*

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***Abstract*:** Individuals with autism spectrum disorders (ASD) have deficits in language, communication, and social interaction skills. This lack of social and communication skills affected the individual with ASDs lives directly or indirectly. Therefore, many researchers have developed interventions that are improving these behaviours for individuals with ASD. Video modelling (VM) is one of the effective interventions in teaching social and communication behaviours for children with ASD. The purpose of the study was to conduct a systematic review on the effects of VM in social communication skills. In this systematic review, from 1990 to 2017 published studies yielded 11 articles that met the current study's inclusion criteria. As a result of the review, VM appears to be effective for teaching social communication skills for children with ASD. Implications and directions for future research are discussed.
***Keywords**:* Autism spectrum disorder (ASD), social communication, video modelling.

Video Modelle Öğretimin Sosyal ve İletişim Becerileri Üzerindeki Etkisi: Sistematik Bir İnceleme

***Özet*:** Otizm spektrum bozukluğu (OSB) olan bireylerin dil, iletişim ve sosyal etkileşim becerilerinde eksiklikler vardır. Sosyal ve iletişim becerilerinin eksikliği, OSB'li bireyleri doğrudan veya dolaylı olarak etkilemiştir. Bu nedenle, birçok araştırmacı, OSB'li bireyler için bu davranışları iyileştirmeye yönelik müdahaleler geliştirmiştir. Video modelle öğretim (VM), OSB'li çocuklara sosyal ve iletişim davranışlarını öğretmede etkili müdahalelerden biridir. Çalışmanın amacı, video modelle öğretimin sosyal iletişim becerilerindeki etkilerine ilişkin sistematik bir inceleme yapmaktır. Bu sistematik derlemede, 1990'dan 2017 yılına kadar yayımlanan, dahil edilme kriterlerini karşılayan 11 makale incelenmiştir. Analiz sonucuna göre, video modelle öğretim yöntemi OSB'li çocuklara sosyal iletişim becerilerinin öğretilmesinde etkili görünmektedir. Gelecekteki araştırmalar için çıkarımlar ve yönelimler tartışılmıştır.
Anahtar Kelimeler: Otizm spektrum bozukluğu (OSB), sosyal iletişim, video model.

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Introduction

Autism spectrum disorder (ASD) is a complicated neurobiological disorder with symptoms that influence individuals' verbal and nonverbal communication and their social interaction capabilities in addition to limited repertoires interest and activities (Bauminger-Zviely et al., 2013). Therefore, exhibiting a lack of social interaction and a lack of language and communication skills for individuals with ASD are typical characteristic features. Boesch and colleagues (2013) stated that according to the report of The National Institute of Deafness and Other Communication Disorders (2010), 25% of individuals with ASD were not able to use their national speech as their communication mode. Also, these communication deficits can cause undesired behaviours for individuals with ASD. The study of Iwata and colleagues in 1994 pointed out that many researchers have found that social and communication deficit can cause challenging behaviours (O'Reily et al., 2006) because individuals with ASD struggle to communicate. Therefore, they used challenging behaviours in order to communicate. For instance, they might want to interact with another person (attention), or they might want to terminate the situation (escape) (O'Reily et al., 2006). For this reason, improving communication skills is necessary for individuals with autism to both communicate and develop appropriate social skills (Hardan et al., 2015).

According to Boesch et al. (2013), the preferred intervention for individuals with ASD generally target speech and social skills measured by number of spoken words, number of interaction, eye contact, appropriate facial affect, appropriate content of speech, and appropriate motor movements among other consideration. Therefore, many researchers have developed treatments and interventions to improve these skills for individuals with ASD.

Over the past decade, the use of technology-based intervention for individuals with ASD has been implemented effectively via the use of iPods, iPad, and Tablet computers (Bauminger-Zviely et al., 2013). The application of social and communication intervention such as augmentative alternative communication (AAC) is based on the use of technological and portable devices in schools and communities (Ganz et al., 2014). Technology helps to create new ways of learning and teaching. Additionally, it provides opportunities to student engage is basic drill on practice, simulations, exploratory activities that are appropriate for the individuals' needs and abilities (Fernandez-Lopez et al., 2013).

One of the popular and effective technology-based intervention is video modelling (VM) intervention (Park et al., 2019). VM is an evidence-based practice for teaching a variety of skills, such as social and communication behaviours for children with ASD. VM intervention involves showing a video display of an individual performing a specific behaviour related to the same behaviour to the target student for teaching the target behaviour to the child. (Plavnick et al., 2015). According to Plavnick and colleagues (2015), the VM was based on the early work of Miller and Dollard in 1941 about observational learning and, on Albert Bandura's post-1977 social learning theory. During the 1960s, Bandura presented the concept of the observational learning model according to which young children reacted more aggressive behaviour toward a toy after watching a same-age model demonstrated aggressive behaviour toward the same toy (Sherer et al., 2001). After technological developments, researchers used his studies to develop modelling to include the use of video to teach the variety of skills. These skills were followed as included motor behaviours such as swimming, and social behaviours, such as conversation in addition to decrease undesired behaviours or states of mind, such as anxiety (Sherer et al., 2001).

Banda and colleagues (2007) pointed out that VM intervention enhances the social and communication skills of children with ASD. Additionally, many researchers found that VM intervention enhances and facilitates the generalization of social and communication skills.

Maione and Miranda (2006) argued that many types of video-based interventions had been targeted at the primary social skills of a fundamental, imitative nature. These skills including greetings, verbal statements, gestures, facial expressions and initiations, requesting desired items or activities, responding in a scripted manner to specific questions and then asking the same questions back in role format, and engaging in scripted conversation. Therefore, the purpose of this review was to conduct the effectiveness of video modelling intervention on improving social and communication skills on preschool aged and kindergarten aged children with ASD.

Methodology

Search Procedure

The author examined the research studies published from 1990 to 2017 that examined social communication using VM interventions for children with autism spectrum disorders (ASD). She used the year 1990 as the beginning of the search because the VM intervention was created based on Bandura's social learning theory in the 1990s (Wilson, 2013). Many studies were identified through multiple electronic databases including EBSCOhost, PsychInfo, Academic Research Complete Education Resources Information Center (ERIC), Education Source, Google Scholar, and the University of Massachusetts library catalog using keywords "social," "communication," "autism," "video," and "ASD." She eliminated dissertations, book chapters, reports, video records, news articles, and conference papers. Additionally, the author excluded the articles in languages other than English. The research yielded articles in 4640 peer-reviewed journals in the English language. She reviewed the titles and abstracts of studies to determine if the studies included VM and students with autism. As a result of this process, she found a total of 136 eligible articles.

Inclusion Criteria

The author used five inclusion criteria to determine which articles would be included in this review. The inclusion criteria were as follows: (a) empirical research, including single-subject research, qualitative research, quantitative research, experimental research, and mixed-method research; (b) video modelling, including video-based intervention, point-of-view video modelling (POVVM), video-self modelling (VSM), video modelling (VM), and other types of interventions using with video modelling together (e.g., PECS combined with video modelling), (c) PreK, that is four-, five-, or six-year-old children (d) autism/ ASD/ at-risk group, including children with autism, Asperger syndrome, Rett syndrome, PDD-NOS, and childhood disintegrative disorder, as well as children at risk for autism, and e) social/communication skills, including social interaction, social initiation, facial expressions, social cues, imitation play skills, functional play skills, role play skills, and sharing items, activities or interest.

Intercoder Agreement

The author examined the abstracts of the studies based on the inclusion criteria. She transferred 136 articles' abstracts into a database and included a column for each indicator. She coded each abstract with 1 when met the criteria, and she coded 0 for each abstract when did not meet the criteria. Two Ph.D. students worked as independent reviewers and coded each of the abstracts according to each of the inclusion criteria. These Ph.D. students assessed whether the 136 identified abstracts met the inclusion criteria. The percentage of agreement was 100% for the inclusion of empirical study, 85% for the inclusion of VM, 96% for the inclusion of PreK, 100% for the inclusion of autism spectrum disorder (ASD), and 68% for the inclusion of

social/communication skills. Then, the author met with the reviewers to discuss the areas in which their assessment disagreed. Consequently, the author and the reviewers applied a standard of 100% agreement with all criteria. As a result of this revision, she discarded 67 studies from 136 articles because they did not meet all of the inclusion criteria.

After this revision, the author examined the remaining 69 articles based on the purpose and method of the studies. In this examination, the inclusion criteria were the same previous criteria but empirical research. She used "single-case design" as a criterion instead of empirical research, and thus, she added only a single-case design study. The author also added "settings" as an inclusion criterion. She excluded home setting studies. She used the same coding system. The author coded 1 when the study met the inclusion criteria and coded 0 when it did not meet the inclusion criteria. One Ph.D. student, as an independent reviewer, coded each of the studies for each of the inclusion criteria. The independent reviewer identified the 69 studies as appropriate to the inclusion criteria. The percentage of agreement was 100% for the inclusion of single-subject design, 100% for the inclusion of settings, 80% for the inclusion of PreK, 100% for the inclusion of video modelling, 100% for the inclusion of ASD, and 75% for the inclusion of social/communication skills.

Similarly, after this revision, the author met with the reviewer to discuss areas where they disagreed. As a result of the discussion, they applied a standard of 100% of agreements for all the criteria. At the end of the revision, ten studies met all of the inclusion criteria. The author also considered ten articles' reference lists of identified studies for additional possible inclusion. She obtained one more study that met the inclusion criteria. After all these examinations, she yielded eleven articles.

Criteria for Indicators

Eleven peer-reviewed studies were included in this review. All studies were regarding effectiveness of VM intervention on the improvement social or communication skills for PreK children with autism spectrum disorder (ASD). When the author analyzed the each of the studies in the literature review, she found that the researchers of the studies developed different types of interventions such as PECS and video modelling using with together. Two of the eleven studies were about comparing video modelling with in vivo modelling. Four of the eleven studies were regarding video-self modelling. Two studies in the literature review were about video modelling combining with another intervention. One study was about peer-video modelling. The rest of the three studies were regarding video modelling.

In the method section, it is given to the readers as detailed as possible that convincingly coincides with the reasons why the methods, tools and analysis techniques to be applied are selected in the direction of the research purpose. Detailed explanations are given in such a way that the researcher can carry out it again.

Results

The author analyzed the results and discussion sections from the eleven studies to identify the key findings across the articles. Therefore, she used a modified form of content analysis to interpret the outcomes. She used original copies of the key conclusions of each article. She reduced the results into condensed meaning units containing a more general description. For instance, if a study stated that the participants with ASD demonstrated more spontaneous requesting with the video modelling intervention rather than with the in vivo intervention, the condensed meaning would be that the video modelling intervention is more

effective than the in vivo intervention for all children with ASD for learning spontaneous requesting.

The author then reduced the condensed meaning units into categories. For example, when condensed meaning was that all students increased independent initiations and reached the criteria more quickly in VM in conjunction with PECS than in the PECS only session, the category was PECS using with VM is more effective than the using PECS itself. She then reduced the categories into five themes: Social Communication, In Vivo Modelling vs. Video Modelling, Spontaneous Requesting, Social Initiation, and Generalization.

Social Communication

Authors of three studies found that video modelling (VM) improved the social and communication behaviours of children with autism spectrum disorder (ASD) (Apple, Billingsley, & Schwartz, 2005; Jones, Lerman, & Lechago, 2014; Wilson, 2013). Different types of video modelling were used for social communication skills among the participants. For example, Jones et al. (2014) showed that VM intervention improved social responses behavio3ers for the children with autism. The authors focused on enhancing the generalization of the social response skills among young children with ASD. They used the adults as recipients of the social interaction and assessed the performance of the generalization to adults and peers who had no training of the intervention. The participants' generalization of the social interaction performance with adults was better than with the peer's performance. However, the participants' performance with a peer was better than their performance with an adult when the participants have displayed a video clip about a peer-engaging social behaviour to another peer that provided social reinforcement for the social response. Therefore, video modelling intervention was more useful to promote generalization to the peers.

In Vivo Modelling vs. Video Modelling

Researchers and educators mostly use observational learning for children with autism. Video modelling and in vivo modelling are two types of observational learning methods. In vivo or live modelling is one of the observational techniques in which children imitates the adults' or peers' target skills performance in real time. On the other hand, video modelling involves watching an adult or peer engaging in target behaviours on a video (Darden-Brunson, et al., 2008). Video modelling and in-vivo modelling are based on Bandura's social learning theory (Wilson, 2013). Video modelling includes a videotape model, whereas in vivo modelling consists of a live model. Charlop-Christy and colleagues (2000) indicated that many studies showed that video modelling and in vivo modelling were effective strategies both for teaching new skills and generalizing and maintaining these new skills for children with ASD (Charlop-Christy et al., 2000). For this reason, many studies compared the efficacy of these two methods.

Plavnick and Vitale's (2016) and Wilson's (2013) studies compared these two models. Plavnick and Vitale (2016) compared the effectiveness of video modelling with in vivo modelling for improving vocal manding skills. The result of the research showed that the video modelling was more effective strategy for improving vocal manding behaviours in children with autism. Wilson's (2013) study found that in vivo modelling was more effective intervention for improving social communication behaviours for children with autism. On the other hand, Wilson (2013) found that the video modelling strategy was a more effective method for improving visual attention skills in children with autism.

Spontaneous Requesting

Authors of two studies (Plavnick & Vitale, 2016; Wert & Neisworth, 2003) showed that video modelling was an effective strategy for teaching spontaneous requesting skills. Plavnick and Vitale (2016) found that the video modelling strategy was an effective intervention for teaching mand skills. Similarly, Wert and Neisworth (2003) showed that the video modelling intervention improved spontaneous requesting among children with autism.

Social Initiation

Authors of six studies (Bellini, Akullian, & Hopf, 2007; Buggey, 2012; Cihak, Smith, Cornett, & Colemann, 2012; Plavnick et al., 2015; Buggey, Hoomes, Sherberger, & Williams, 2011; Simpson et al., 2004) used various types of video-based intervention to improve social initiation skills. For example, authors showed that the video-self modelling interventions were effective for improved social initiations (Bellini et al., 2007) and unprompted social engagement with peers (Buggey et al., 2011) among the participants. Buggey et al. (2011) investigated the effectiveness of the VSM intervention in facilitating social initiation skills on a playground among four children with autism. The results of the study were mixed. Two of the children displayed significant treatment effect, one of the children had a small observed effect, and one child had no improvement in social initiations. The findings of Bellini et al. (2007) were positive. During the VSM intervention, the participants improved unprompted social engagement skills and they maintained these skills after the intervention was withdrawn.

Plavnick et al. (2015) investigated the effectiveness of video modelling interventions in sharing toy sessions and joining play sessions to improve social initiation skills, and Buggey (2012) investigated the effectiveness of the VSM in facilitating social initiation for three young children with ASD. Neither study found that video modelling or video-self modelling interventions were effective for teaching social skills to students with autism.

Many studies combined or embedded video modelling intervention and other types of interventions. For instance, Cihak et al. (2012) used a picture exchange communication system (PECS) with video modelling for improving social initiation skills. The results of the study showed that the participants improved their social initiation skills. Additionally, their performance was better in PECS plus video modelling sessions than PECS-only sessions. Similarly, the authors of the study (Simpson, Langone, & Ayres, 2004) a computer-based intervention with embedded video modelling for improving unprompted social initiations. The authors used a computer program embedded with video clips of peers for improving three target skills: sharing, following teacher directions and social greetings. All participants exhibited rapid improvement in their target social skills. The authors also found that the computer program-embedded video modelling intervention improved the unprompted social skills. The video modelling strategy embedded another intervention for acquisition of the target behaviours. For example, Apple and colleagues (2005) study showed that video modelling used with self-management interventions was effective for facilitating the acquisition behaviours that the participants did not have in their repertoire before. The interpretation of the studies' results showed that interventions are used with video-based intervention can be more effective than the interventions used alone.

Generalization

Authors of only one study (Jones et al., 2014) used video-based intervention for generalization of the target skills. Jones and colleagues (2014) evaluated the generalization of the social response skills with adults and peers. The authors used adults when teaching social responses skills. They used both adults and peers for generalization of the skills. The authors

used video modelling for the generalization of the social response skills. The result of the study showed that video modelling could be promoted to help children with autism to engage with peers.

Discussions

Video modelling (VM) intervention is an evidence-based and, cost- and time-efficient intervention that has been effective for children with autism spectrum disorder (ASD) (Wilson, 2013). In the current review was analyzed the effectiveness of VM intervention on improving social and/or communication skills for children with ASD, based on the studies' findings. In this content analysis, the eleven articles met the inclusion criteria. There are multiple variations of VM interventions, such as traditional video modelling (VM), video-self modelling (VSM), or point-of-view video modelling (POVVM) (Wilson, 2013). These eleven articles used the form of traditional VM form and VSM form. There was used no POVVM form.

As a result of this content analysis, the author reached five main themes. These are as follows: social communication, in vivo vs. video modelling, spontaneous requesting, social initiation and generalization. The authors of eight studies (Apple et al., 2004; Bellini et al., 2007; Buggey et al., 2012; Cihak et al., 2012; Jones et al., 2014; Plavnick et al., 2015; Simpson et al., 2004; Wert & Neisworth, 2003) result showed that VM intervention was effective on teaching or improving social communication skills, social initiation skills, vocal verbal skills, spontaneous requesting or generalization skills. Plavnick and Vitale (2016) study showed that video model was more effective than live model for children with ASD. Conversely, Wilson (2013) study found that in vivo modelling was more effective than video modelling for children with ASD. Additionally, Buggey (2012) found that video-self modelling (VSM) was not effective strategy on facilitating social initiation for children with ASD.

As a result of this review showed that VM intervention was effective to teach new social communication skills for children with ASD (Cihak et al., 2012). Also, VM intervention help to improve children with ASDs' social communication skills. For example, Buggey et al. (2011) study's result showed that VSM intervention was effective intervention to improve social initiation skills for children with ASD.

Social initiation, in other words, verbal social communication behaviour, is one of the complex social behaviours for children with ASD (Nikopoulos & Nikopoulo-Symyri, 2008). For this reason, the participants' independent performance of the social initiation skills might be lower than the other target skills such as greetings or listening to the conversation partners' responses. VM is an effective evidence-based intervention to teach complex social behaviours for children with ASD. For example, Bellini et al. (2007) indicated that VSM was effective intervention on social engagement behaviours for children with ASD.

Moreover, VM was not only effective intervention to teach or improve social communication skills but also VM was effective intervention on rapid changing of behaviour. Apple et al. (2005) study pointed out that VM was an effective procedure possibly contributing to the rapid behaviour change exhibited by participants, who had not been exhibited behaviour before. Similarly, Cihak et al. (2012) study indicated that all participants increased independent communication initiation and reached criteria more quickly via VM intervention as a priming technic conjunction with PECS.

According to Alzyoudi, Sartawi and Almuhiri (2015), watching a video was an enjoyable activity, and increased learner's motivation and their attention. In the current review,

the authors of the studies (Plavnick et al., 2015; Wert & Neisworth, 2003) pointed out that VM intervention was highly motivated intervention for children with ASD to attend the intervention. Wert and Neisworth (2003) indicated that the participants of the study liked watching the video and agreed to participate making video clips. VSM intervention was highly motivated for the participants of the study.

Video modelling intervention provides to study in individuals' natural environment such as classrooms, playground, schools' cafeterias, or individuals' homes. The natural environment was the key to the success of the demonstration, maintenance, and generalizability of the skills (Cihak et al., 2012). Therefore, implementing the intervention for children, in the natural environment is vital for the efficacy of the intervention. Also, many social skills interventions' failure is that these interventions were implemented in an isolated environment (Bellini et al., 2007). Similarly, when a target behaviour did not relate the reinforcers in the natural environment, the motivation of continuing engaging the response might be degreased (Plavnick et al., 2015) Additionally, when the intervention implemented in the participants' natural environment, target social skills showed rapid improvement (Simpson et al., 2004)

VM intervention was also potential effective strategy for prompt fading and minimizing prompt dependency (Bellini et al., 2007). Sometimes, researchers used VM intervention with different types of intervention for teaching new skills. For instance, Cihak and colleagues (2012) study used VM with PECS for increasing independent communicative initiation skills. This intervention was more effective intervention than using PECS alone

Limitations

Although video modelling (VM) intervention was effective to improve social and communication skills for individuals with autism spectrum disorder (ASD) (Apple et al., 2005; Cihak et al., 2012; Plavnick et al., 2015; Plavnick & Vitale, 2016) there were some limitations of the VM interventions. The one of the limitations was time restriction. As with the most school-based interventions were conducted under the time constraints of a typical school day and calendar (Cihak et al., 2012). For instance, the authors of study (Plavnick et al., 2015) were conducted at the end of the school year, so there was limited time to complete the full reversal. Similarly, Bellini et al. (2007) study had a short maintenance procedure for evaluating long-term effects of VSM intervention because of time restriction.

The authors of studies (Cihak et al., 2012; Buggey, 2012; Buggey et al., 2011) pointed out that small sample size was a limitation of the study because the studies' results could not be generalized different aged group or different special needs group. However, in single case design (SCD) may include only one participant. However, the typical SCD may include more than one participant (e.g. 3, 5, or 8) in a single study (Horner et al., 2005). This is not a limitation for single-case design research but rather is sometimes viewed as a limitation by researchers not familiar with the single-case design.

Radley et al. (2014) indicated that many numbers of social skills studies did not result in increased the ability to social competence, which meant to utilize fundamental and specific social skills in the appropriate context so, social skills intervention was the failure to promote generalized effect. The authors added that if the social skills training promoted the social competence, the social skills training would explicit methodological programming for generalization to occur within social skills training (Radley et al., 2014). In this literature review, only one of the eleven studies (Jones et al., 2014) addressed to generalize the social response behaviours for children with autism. As a result of this study, the video viewing was an efficient way to promote the generalization of the skills. On the other hand, the rest of ten studies did not have any generalization procedures. Plavnick and Vitale (2016) and Wilson

(2013) studies also indicated that lack of assessing the generalization of the target skills were one of the limitations for both studies.

In VM intervention, researchers make their own video clips as appropriate of the target behaviours. The researchers record videos and edit them. The process may take time. This taking time situation about making video clips sometimes is a limitation of the VM studies. For example, Apple and colleagues' study (2005) stated that the production of each video clip was considerable amount of time.

Conclusions

Although there were limited research studies focus on improving social communication skills using with video modelling (VM) intervention for preschool-aged children with ASD, the finding of the studies showed that VM was an effective intervention for teaching or improving social and communication skills. Despite some implication limitations of VM intervention, the knowledge base that findings of study, more research should be conducted in VM intervention for preschool-aged children with ASD. Also, there was no point-of-view video modelling (POVVM) intervention study met the inclusion criteria of the review of the articles. Future research should be conducted in POVVM intervention for improving social and communication skills for preschool aged children with ASD.

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