A Meta-Analysis of Video Modeling Interventions for Children and Adolescents with Emotional/Behavioral Disorders

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Video modeling is a non-punitive, evidence-based intervention that has been proven effective for teaching functional life skills and social skills to individuals with autism and developmental disabilities. Compared to the literature base on using video modeling for students with autism and developmental disabilities, fewer studies have examined the effectiveness of using video modeling based interventions for students with high-incidence disabilities (e.g., specific learning disabilities, emotional/behavioral disorders). This meta-analysis evaluated the utility of using video modeling to decrease disruptive behaviors and increase positive pro-social behaviors of students with emotional/behavioral disorders. Additionally, this paper compiled a list of research gaps related to video modeling and students with emotional/behavioral disorders. Implications for future research directions are discussed.

Introduction

Students with emotional/behavioral disorders (EBD) are individuals with a disability that impairs academic, emotional, and/or social functioning due to frequently intensive internalized behaviors (e.g., anxiety, depression) and/or externalized behaviors (e.g., physical aggression, verbal aggression). Though controversy on the definition exists, EBD is a hypernym that generally refers to students with frequent aggression, anxiety disorders, depression, conduct disorder, bipolar disorder, oppositional defiant disorder, and/or childhood schizophrenia (Cook et al., 2008).

Currently there is a growing international awareness of the concept of full inclusion, and many countries have moved towards an inclusive model of special education

(Dessemontet, Bless, & Morin, 2012). Full inclusion is supported by an educational construct which posits that students with disabilities benefit both socially and academically when they receive instruction in general education classrooms with typically developing peers (McLeskey, Henry, & Hodges, 1998). The debate regarding whether or not full inclusion is appropriate/ethical for all students with disabilities is not the focus of this paper; however, the growing trend of implementing fully inclusive classrooms is a reality that many educators must face. If placed in a full inclusion setting, students with EBD are often required to adhere to behavioral expectations commensurate with their typical peers (Cumming, 2010; Hitchcock, Dowrick, & Prater, 2003). Consequently, students with EBD and their teachers experience many challenges in inclusive settings (Cumming, 2010; Lane, Pierson, & Givner, 2004). To exemplify the previous point, the American Association for Employment in Education (2000) reported that attrition rates for teachers of students with EBD were the highest in the field of special education. Students with EBD commonly exhibit disruptive classroom behaviors that not only impair academic development, but also impede their ability to create meaningful social relationships with their peers (Baker, Lang, & O'Reilly, 2009: Hitchcock et al., 2003). The social and academic difficulties of students with EBD often persist into adulthood, and most of these students will experience life-long difficulties such as depression, adjudication, incarceration, suicidal tendencies, and/or substance abuse (Kauffman, 1997). In light of these findings, it is imperative that researchers continue to investigate interventions that facilitate significant improvement in the social behaviors of students with EBD.

Overview of Video Modeling

One promising intervention for improving the pro-social skills repertoires of students with EBD is video modeling (VM). Video modeling is an instructional method that utilizes video footage of a model engaging in a target behavior in order to teach a new behavior or promote the occurrence of a known behavior. Video modeling applies Bandura's concepts of social learning theory in which individuals are believed to learn skills through observation and vicarious reinforcement (Bandura, 1997). Researchers have discussed numerous advantages of VBI such as: targeted skills are modeled in relevant environments (e.g., classrooms, cafeteria, playground), the ability to implement multiple stimulus and response exemplars, salience of stimuli, the flexible nature of video formatting leads to increased individualization, the probability of in-creasing learners' independence (i.e., the learner does not rely on adults or peers to provide support), and the presentation of the skill being taught is consistently accurate (Baker, Lang, & O'Reilly, 2009; Wilson, 2013).

Variations of Video Modeling

Video modeling can refer to video modeling other (VMO) interventions or video self-modeling (VSM) interventions. Video modeling other interventions provide instruction to a learner by using footage of an adult or peer (i.e., not the learner his/herself) engaging in a target behavior in order to increase future occurrences of that target behavior. Video self-modeling interventions use footage of the learner his/herself engaging in a target behavior in order to promote future occurrences of that target behavior. Both variations of VM have been found to be successful where other interventions have failed (Cumming, 2010; Hawkins & Heflin, 2011; Hitchcock et al., 2003; Huff, 2002).

Both variations of VM can be effective instructional approaches for students with EBD for a variety of reasons. First, some students may find the social interactions necessary for in vivo instruction aversive, resulting in aberrant behavior maintained by negative reinforcement (i.e., the student engages in behavior that removes him/her from the non-preferred task). Video modeling can provide those aforementioned students with a method of instruction that minimizes aversive social conditions in order to increase learning opportunities. Researchers have proposed that VM interventions are well suited to working with reluctant/resistant learners because viewing video footage is associated with recreation (Goodwyn et al., 2013). Thus, pairing a preferred activity (e.g., viewing a video) with a non-preferred activity (e.g., social skills instruction) may reduce levels of noncompliance. Further, students are unlikely to find the task of viewing video footage aversive, where-as traditional methods of instruction may be associated with failure or frustration; therefore, learners who frequently engage in noncompliance based on negative learning experiences in the past may be more willing to engage in VM instruction.

Purpose of the Study

The purpose of this review was to examine empirical literature that has targeted the potential utility and significance of using VM interventions to improve the social behaviors of students with EBD. Baker et al. (2009) conducted a similar review of studies targeting VM interventions for students with EBD. It has been seven years since the publication of the aforementioned meta-analysis by Baker et al. (2009); therefore, this paper provides a contemporary update regarding existing literature on VM interventions for children and adolescents with EBD. Several studies have shown that VM is an effective intervention for

students with autism and other developmental disabilities; however, there is a relative dearth of research targeting VM interventions for students with high-incidence disabilities such as EBD (Baker et al., 2009; Cumming, 2010).

Methods

Studies were located using a computer search of peer-reviewed literature from the online databases ERIC, EBSCOhost, and PsycInfo. The terms used in the search included: emotional behavior disorders, emotional disturbance, video modeling, video self-modeling, disruptive behavior, video-based instruction. Studies for the review were chosen based on the following criteria: the study involved a quantitative measurement of the effects of VM on increasing targeted behaviors or decreasing disruptive behaviors, the participants were school-age students identified with EBD or significant levels of problematic behaviors, and the publication was from a peer-reviewed journal or retrieved from an online academic archive database (i.e., dissertations were included). An ancestral search was then conducted by examining the references of each identified article for relevant studies. Finally, a forward ancestral search was completed using the "cited by" option in Google Scholar. Application of the specified search methods and inclusionary criteria yielded 19 relevant studies. In order to create an organized representation of examined data, each publication was analyzed and indexed in two primary categories: VMO or VSM intervention. Further analysis was implemented and the publications were classified based on (a) the paired components of the intervention (e.g., token economy, teacher feedback, self-monitoring), (b) age of participants, (c) gender of participants, and (d) dependent measures.

Data Analysis

The percentage of non-overlapping data (PND) was used to evaluate the magnitude of treatment effect for the identified studies. Percentage of non-overlapping data is a non-parametric outcome metric used to aggregate data across single-subject experimental design studies in a parsimonious manner (Scruggs & Mastropieri 1998). Some researchers have suggested that PND be used in lieu of traditional effect sizes when evaluating treatment effectiveness for single-subject research for two reasons: (a) single-subject studies often involve a small sample of data points that yield inflated effect sizes which are difficult to decipher, and (b) effect size calculations are rooted in the primary assumptions of inferential statistics, including independence of data; therefore, effect sizes are problematic for single-subject research as the date are non-independent (Bellini & Akullian, 2007; Scruggs & Mastropieri, 2001). Scruggs and Mastropieri (1998) outlined specific criteria for interpreting PND scores: PND ranges from 0-100%, PND of less than 50% indicates an unreliable treatment effect, PND of 50% - 70% indicates a questionable treatment effect, PND of 70% - 90% indicates a moderate treatment effect, and PND of greater than 90% indicates a strong treatment effect.

For the purpose of this review, PND was calculated for studies that targeted decreasing problem behaviors by identifying the lowest data point in the baseline phase of the study, counting the intervention phase data points that were below the lowest baseline (i.e., non-overlapping), dividing the number of non-overlapping data points by the total number of intervention data points, and then multiplying the quotient by 100 to convert to a percentage. For the studies that targeted increasing appropriate behaviors, PND was calculated by identifying the highest baseline point, counting the intervention data points that were above the highest baseline point (i.e., non-overlapping), dividing the number of non-overlapping data points by the number of intervention

data points, and then multiplying the quotient by 100 to yield a percentage. When studies contained more than one baseline phase, PND was calculated using only the first baseline/treatment phase. When a study involved multiple participants, PND was calculated by obtaining a mean score across participants for each dependent variable. The percentage of non-overlapping data could not be calculated for studies that employed group research designs; however, those studies were included because this study was intended to be comprehensive in scope. Statistical measures conducted by the authors were reported for all studies that involved group research designs.

Inter-rater Agreement

The author and a university student research assistant conducted independent searches of the literature for studies to be included using the databases, search terms, and inclusionary criteria discussed above. Inter-rater agreement (IRR) for included studies was determined by comparing the lists generated by the author and the student research assistant. The author identified 19 studies and the student researcher identified 18 studies. Inter-rater agreement was calculated by dividing the number of agreements (i.e., identical studies identified by both researchers) by the total number of identified studies (i.e., all studies identified by the author and the student researcher), then multiplying the quotient by 100 to yield a percentage. Thus, IRR for the inclusion of studies was 94%. The paper that was missing from the student researcher's list was examined, and after discussion was added to the pool of studies included for review. The author and a student research assistant conducted measures of IRR for data analysis and extraction. The two researchers independently recorded participant information, treatment, dependent measures, and PND for 9 randomly selected studies (47%).

Table 1.
Summary of studies using video modeling for students with emotional/behavioral disorders

Reference	Treat-ment	Paired Component	*N*	Age in Years	Gender	Dependent Measures	Percent of Non-Overlapping Data
Axelrod, Bellini, and Markoff (2014)	VSM	none	3	7 – 8	M = 3	decrease disruptive behaviors	91%
Baker (2010)	VSM	none	4	15 – 18	F = 2 M = 2	increase compliance decrease, aggression	compliance = 100% aggression = 100%
Blood et al. (2011)	VMO	self-monitoring, social skills instruction	1	10	M = 1	increase on-task behavior, decrease disruptive behavior	on-task behavior = 100% disruptive behavior = 91%
Booth and Fairbank (1983)	VSM	self-monitoring, teacher feedback	1	9	M = 1	increase on-task behavior	100%
Clees and Greene (2014)	VMO	role-playing, social skills instruction, teacher feedback	2	16 – 17	F = 1 M = 1	increase on-task behavior, decrease talk outs	82%

Cumming et al. (2008)	VMO	social skills instruction, teacher modeling, role-play, teacher feedback	25	11-14	F = 2 M = 23	increase social skills knowledge	N/A - t-tests for increasing social skills Pretest: 3.80 Posttest: 12.88
Clare, Jenson, Kehle, and Bray (2000)	VSM	none	3	9-11	M = 3	increase on-task behavior	100%
Davis (1979)	VSM	role-playing	1	11	M = 1	increase pro-social behaviors	65%
Esveldt, Dawson, and Forness (1974)	VSM	teacher feedback	2	10	M = 2	increase positive classroom behaviors	14%
Falk, Dunlap, and Kern (1996)	VSM	self-evaluation, teacher feedback	10	11 - 14	F = 3 M = 7	increase pro-social behaviors, decrease inappropriate behaviors	pro-social behaviors = 68% inappropriate behaviors = 56%
Hartley, Bray, and Kehle (1998)	VSM	none	3	8	F = 1 M = 2	increase hand raising responses	67%

Kehle Clarke, Jenson, and Wampold (1986)	VSM	teacher feedback, reinforcement	4	10 - 13	M = 4	decrease inappropriate behavior	92%
Kern-Dunlap et al. (1992)	VSM	self-evaluation, teacher feedback, reinforcement, social skills instruction	5	11-13	M = 5	increase positive interactions, decrease negative interactions	positive interactions = 39% negative interactions = 53%
Kern et al. (1995)	VSM	self-evaluation, reinforcement, teacher feedback	3	10 - 12	M = 3	increase appropriate interactions, decrease inappropriate interactions	appropriate interactions = 57% inappropriate interactions = 73%
O'Reilly et al. (2005)	VSM	self-evaluation, self-management, teacher feedback	2	10	M = 2	increase pro-social behavior, decrease aggression	pro-social behavior = 15% aggression = 47%

Pigott and Gonzalez (1987)	VSM	reinforcement (social praise and token economy), social skills instruction, self-monitoring	1	9	M = 1	increase participatory behavior: answer questions, volunteer to speak	answer questions = 100% volunteer to speak = 63%
Possell, Kehle, Mcloughlin, and Bray (1999)	VSM	reinforcement (token economy)	4	5 - 8	M = 4	decrease disruptive behaviors	74%
Schwan and Holzworth (2003)	VSM	reinforcement, teacher feedback, role-playing	13	K – 5th	NS	decrease inappropriate behaviors	N/A - Inappropriate behavior decreased from pre to post tests
Walther and Beare (1991)	VSM	self-monitoring, teacher feedback	1	10	M = 1	increase time on-task	N/A - median on-task: 28% in baseline, 58% in intervention

Note. **F = Female, M = Male, N/A = Not Applicable, NS = Not Specified, VMO = Video Modeling Other, VSM = Video Self-Modeling**

This resulted in a total of 36 items on which agreement or disagreement of data analysis and extraction could be compared. Afterwards, the author and student researcher compared the extracted data and determined that agreement was obtained on 34 items (94%). The 2 items that resulted in disagreements were examined, and appropriate changes were made after a discussion that led to agreement.

Results

Of the 19 studies evaluated, 3 utilized VMO as the intervention (Blood et al., 2011; Clees & Greene, 2014; Cumming et al., 2008) and 16 employed VSM. The total number of participants across the studies was 88. The VMO studies included a combined total of 28 participants ranging in age from 10 to 17 years, and the VSM studies included a total of 60 participants ranging in age from 5 to 18 years. Paired components incorporated in the studies included: self-monitoring/recording/evaluation, in vivo social skills instruction, teacher feedback, role-playing, and reinforcement. A summary of participant information, paired components, and percentage of non-overlapping data for each study can be found in Table 1.

Each study was analyzed and the significance of intervention outcomes was measured using PND. If PND could not be calculated, studies were analyzed using statistical measures reported by the examined paper's authors. Studies utilizing VMO interventions demonstrated PND ranging from 82% to 100%. PND could not be calculated for 1 VMO study (Cumming et al., 2008), but paired T-tests reported by the study's authors indicated an obvious increase in social skills acquisition from baseline to the VMO intervention phase. Studies utilizing VSM interventions demonstrated a PND range from 14% to 100%. Percentage of non-overlapping data could not be calculated for 2 VSM studies (Schwan & Holzworth, 2003; Walther & Beare, 1991);

however, statistical measures reported by the authors indicated therapeutic changes in the dependent measure(s) of both studies.

Results of the PND analysis indicated variability regarding treatment effect across studies. Overall, data analysis indicated that studies incorporating VMO interventions yielded higher PND, yet this is potentially skewed as only 15% of the studies in this review used VMO. Of the 16 reviewed studies for which PND could be calculated, 6 yielded a strong treatment effect, 3 yielded a moderate treatment effect, 4 yielded a questionable treatment effect, and 3 yielded an unreliable treatment effect. In sum, 56% of the studies indicated a strong or moderate treatment effect, and 43% of examined studies indicated a questionable or unreliable treatment effect

Discussion and Future Directions

A goal of this meta-analysis was to provide a list of research gaps associated with VM interventions for students with EBD. Baker et al. (2009) conducted a similar meta-analysis and identified several research gaps including: (a) isolation of various paired components to determine which has the greatest effect on behavior change, (b) social validity of VM (i.e., are the interventions effective enough that the time and technology required are warranted), and (c) study participants should accurately reflect the actual population of students identified with EBD (e.g., disproportionate representation of elementary students and boys in past studies).

Findings of the current review correspond with those of Baker et al. (2009) in regards to a need for future research to measure the effect of video models with a single paired component. Of the studies in this review, 68% implemented a package intervention that consisted of VMO or VSM and at least two paired components. This was problematic for the

purpose of this review as it was not possible to calculate the differential effects of the individual paired components when combined with VM. Future research should attempt to measure the effects of single, isolated components in conjunction with video models.

This review also identified inconsistent measures of social validity across studies. Baker et al. (2009) indicated that the social validity issue associated with VM is the feasibility of the cost and time required for implementation. Essentially, the question is: are video models worth the time and effort based on resulting levels of behavioral change? Many studies in this review indicated that the majority of time required to institute VM interventions was associated with editing video footage. For example, Pigott and Gonzales (1987) reported an editing session that lasted over two hours. While the aforementioned concerns were valid in 1987, technological advancements have reduced the time needed to record and edit video models. Using devices such as iPods©, digital cameras, or electronic tablets (e.g., iPads©, Microsoft Surface©, Kindle Fire©), and computer-based video editing software (e.g., iMovie©, Adobe Premier©, Avid Media Composer©), practitioners can record and edit video models in a fraction of the time required for editing videotape technology.

Past research studies have not included participants that accurately represent the current population of students with EBD (Baker et al., 2009). The findings of this study confirm the need to address the aforementioned gap in the empirical research. For example, of the studies examined that reported gender information, only 14% of the participants were female. This discrepancy is substantial because females constitute approximately 24% of the population of students with EBD, and research has indicated the complex, individualized needs of females with EBD (Baker et al., 2009;

Lloyd, 2005; Rice, Merves, & Srsic, 2008; Yell, Meadows, Drasgow, & Shriner, 2009).

Another limitation of this study was the metric used to calculate effect sizes. As indicated by Mason et al. (2013), using PND to calculate effects sizes does provide useful information regarding intervention effectiveness, yet a more meaningful comparison of studies should be conducted through the use of other statistical methods such as calculated p-values, confidence intervals, and regression models.

Conclusion

In summary, data analysis indicated more than half of the studies in this review yielded a strong to moderate treatment effect when using VM interventions for children and adolescents with persistent aberrant behavior. These results provide evidence of the potential effectiveness of VM interventions for advantageously modifying the behavior of students with EBD. While much is known about VM interventions, many variables and components are not clearly understood. In light of existing literature gaps, future research is warranted to increase learning opportunities for students with disabilities in inclusive classrooms, and to ultimately improve the quality of life for students with EBD.

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