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Original Article

Video Modeling to Enhance Language Production in Identical Twins with Selective Mutism

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ABSTRACT

Background: Selective mutism (SM) is an anxiety-based communication disorder that significantly interferes with social, academic, and functional participation. Early intervention is critical to reduce long-term psychosocial risk. Objective: This case series examined the effects of a video modeling (VM) and video self-modeling (VSM) intervention on verbal output and lexical diversity in identical twins diagnosed with SM. Materials and Methods: A pre–post case series design was implemented in a university-based speech and hearing clinic. Outcome measures included Mean Length of Utterance (MLU), Type–Token Ratio (TTR), and Number of Spontaneous Utterances (NSU) derived from standardized conversational language samples. Results: Following intervention, NSU increased for both participants. However, MLU decreased for both, and TTR showed divergent patterns, increasing for Twin 2 but decreasing for Twin 1. Conclusion: VM may be effective in increasing verbal initiation and frequency in children with SM, though gains in linguistic complexity may require longer intervention durations.

Keywords:
Selective mutism; video modeling; video self-modeling; language production; case series

INTRODUCTION

Selective mutism (SM) is an anxiety disorder characterized by a consistent failure to speak in specific social situations despite the ability to speak in other contexts. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR), the disturbance must interfere with educational or occupational achievement or social communication, persist for at least one month (excluding the first month of school), and not be attributable to lack of language knowledge or another communication disorder (1). SM is not better explained by autism spectrum disorder, psychotic disorders, or other neurodevelopmental conditions (1).

SM is widely conceptualized as an anxiety-maintained behavior in which silence functions as an avoidance strategy that temporarily reduces social-evaluative distress (2–4). This negative reinforcement cycle often results in persistent mutism across academic and community settings. Onset typically occurs before five years of age, with prevalence estimates indicating higher rates among females (5). Without

intervention, SM is associated with long-term outcomes including social withdrawal, academic underachievement, and increased risk for broader anxiety disorders (6).

Speech-language pathologists (SLPs) are essential members of interprofessional teams treating SM, as they target communicative participation, reduce anxiety-related communication avoidance, and support generalization of verbal behaviors across contexts (7,8). Evidence-based interventions include behavioral and cognitive-behavioral approaches, often supplemented by pharmacological management in severe or treatment-resistant cases (9–11). Parent-Child Interaction Therapy for Selective Mutism (PCIT-SM) and graded exposure-based behavioral interventions have demonstrated efficacy in increasing verbal engagement by systematically reducing communicative demands while reinforcing verbal attempts (12,13).

Video modeling (VM) is a behavioral intervention grounded in Bandura's social cognitive theory, which posits that learning occurs through observation, imitation, and reinforcement (18,19). VM reduces social pressure by allowing individuals to observe successful communicative behaviors in a controlled, low-anxiety format. Video self-modeling (VSM), in which individuals observe edited recordings of their own successful performances, has been shown to enhance self-efficacy and facilitate generalization of skills (20,21). Prior research supports VM as an effective strategy for increasing verbal initiation and pragmatic behaviors in socially anxious populations, including children with SM (22,23).

The study of monozygotic twins with SM offers a unique opportunity to examine both genetic vulnerability and environmental maintenance factors. SM has been reported at higher rates among twins than in the general population, suggesting a heritable component of social anxiety (14–17). Twin-specific interaction patterns, such as reliance on a sibling as a communication intermediary, may further reduce the functional need for speech and reinforce mutism (14,17). Examining intervention outcomes within twin dyads therefore provides clinically relevant insight into both shared and individual response patterns.

Despite the established conceptual and empirical link between selective mutism and social anxiety, much of the foundational research informing diagnosis and intervention has been conducted with predominantly White, middle-class samples (2,5,6). Limited racial and ethnic diversity in clinical research has broader implications for health equity, as diagnostic frameworks and behavioral interventions may not fully account for culturally mediated communication styles, caregiver expectations, or differential access to services (26,27). African American children, in particular, have been shown to experience diagnostic bias, delayed identification of anxiety-related conditions, and reduced access to culturally responsive mental health and speech-language services (28,29). Within this context, documenting intervention outcomes in African American children with selective mutism contributes to the emerging need for more inclusive clinical evidence and supports efforts to reduce disparities in pediatric mental health and communication disorder services.

MATERIALS AND METHODS

This study employed a pre–post case series design. All procedures were conducted at a communication sciences and disorders clinic at a southeastern high-research activity university. Specifically, the academic department included a university-based outpatient clinical training facility. All study procedures were approved by the university's Institutional Review Board (IRB No. Pro00009864).

PARTICIPANTS

Participants were 11-year-old African American monozygotic twin girls (Twin 1 and Twin 2) with a formal diagnosis of selective mutism based on DSM-5-TR criteria. Both twins were born at 35 weeks gestation and had received speech-language and behavioral intervention services since early childhood. While verbal at home, both relied primarily on gestures or nonverbal responses in unfamiliar settings. Twin 1 demonstrated greater baseline verbal willingness than Twin 2.

DEMOGRAPHIC CHARACTERISTICS

The participants were identical, female African American twins (Twin 1 and Twin 2). The twins were born at 35 weeks' gestation via vaginal delivery. The pregnancy was complicated by maternal gestational diabetes and hypertension. At birth, Twin 1 weighed four pounds, 13 ounces, and Twin 2 weighed four pounds, three ounces; neither required an extended neonatal hospital stay. Per caregiver report, both children achieved early gross motor developmental milestones within expected timeframes.

At approximately three years of age, both twins were diagnosed with asthma and experienced frequent upper respiratory infections. Both children were also diagnosed with astigmatism and wore corrective lenses. At age three, the twins received diagnoses of selective mutism. Following the diagnosis of selective mutism, both children were enrolled in mental health counseling services within one year and began private speech-language therapy at age three. At age five, they initiated services at the university-affiliated clinic that served as the data collection site for this study. They continued to receive speech-language services within the public-school setting to address communication delays. Subsequent psychoeducational assessment and academic performance supported their enrollment in special education services under the classification of learning disability. At the time of data collection, the twins had received long-term, multidisciplinary intervention involving speech-language pathologists, educators, psychologists, and developmental specialists.

INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria required a confirmed diagnosis of selective mutism and English as the primary language of exposure. Both participants were required to have English as their primary language to ensure linguistic measures (MLU/TTR) were valid. Hearing status was confirmed through bilateral pure-tone audiometric screening at 20 dB HL for 1000, 2000, and 4000 Hz. Review of educational records and clinical observation ruled out autism spectrum disorder and intellectual disability. No history of psychological or physical trauma was reported by caregivers or identified in medical records. Based on caregiver report and review of existing medical and educational records, both participants demonstrated developmentally appropriate cognitive and social-emotional development outside of mute episodes.

OUTCOME MEASURES AND DEFINITIONS

To assess language production, a 5-minute language sample was elicited at the start of every session. The setting was kept consistent in a quiet therapy room with the same graduate clinician using a standardized set of open-ended conversational prompts regarding the participants' week.

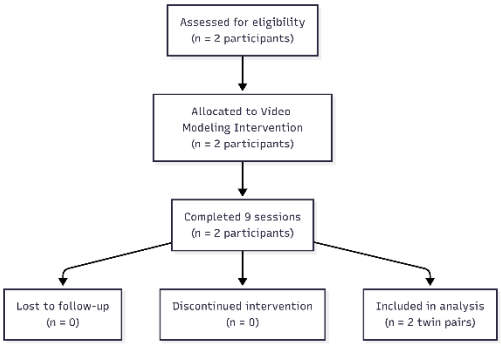
Mean Length of Utterance (MLU): Defined as the average number of morphemes per utterance, calculated by dividing the total number of morphemes by the total number of utterances in the 5-minute sample.

Type-Token Ratio (TTR): A measure of lexical diversity calculated by dividing the number of unique words (types) by the total number of words (tokens) produced. Number of Spontaneous Utterances (NSU): Defined as any verbalization initiated by the participant without a direct prompt or question from the clinician. Pre- and Post-Assessment Tools Baseline and post-intervention measures included caregiver-completed Selective Mutism Questionnaires (SMQ) and standardized language sample analysis for MLU, TTR, and NSU. Intervention Procedures following IRB approval, participants received nine weekly sessions lasting 45–60 minutes. Each session included a 30-minute video modeling block followed by guided discussion and role-play activities. Nature of Videos: The intervention utilized a "Video Modeling" (VM) and "Video Self-Modeling" (VSM) hybrid. The VM clips featured adult models (the investigator and a familiar adult) performing scripted social interactions (e.g., ordering at a restaurant, answering a telephone). These clips were approximately 3–5 minutes in length. Content Outline (30-minute VM block): This segment involved repeated viewings of the scripted clips followed by a guided "Pragmatic Discussion." The clinician used a checklist to highlight eye contact, verbal greetings, and response latency within the video.

Role-Play and "Stranger" Interactions: Role-play prompts were standardized to mirror the weekly video theme. For the "stranger" interaction, participants were required to approach a "predetermined unfamiliar adult" (a clinic staff member unknown to the twins) within the clinic to perform a specific communicative task, such as asking for a specific item or offering a greeting. Video modeling clips

featured adult models engaged in scripted social interactions such as greeting unfamiliar adults, ordering items, or requesting assistance. Clips were approximately 3–5 minutes in length and viewed repeatedly within sessions. Pragmatic discussion focused on eye contact, verbal greetings, response latency, and initiation strategies. Role-play prompts were standardized to mirror video content. To promote generalization, participants completed a structured interaction with a predetermined unfamiliar adult within the clinic. These interactions were recorded and edited to produce video self-modeling clips highlighting successful communicative behaviors.

Figure 1. CONSORT flow diagram illustrating participant enrollment, allocation, follow-up, and inclusion in analysis for the video modeling intervention case series.



RESULTS

Across the 9-week intervention period, both participants demonstrated increases in verbal participation and initiation, with more variable changes observed in linguistic complexity and lexical diversity.

Number of Spontaneous Utterances Twin 1 increased from a baseline mean of 22.5 spontaneous utterances per session to 63.0 post-intervention. Twin 2 increased from 22.0 to 48.5 spontaneous utterances per session. Both participants demonstrated greater consistency in verbal participation, with fewer prolonged periods of silence. In summary, NSU increased for both participants. However, MLU decreased for both , and TTR showed divergent patterns, increasing for Twin 2 but decreasing for Twin 1. Mean Length of Utterance MLU decreased for both participants. Twin 1 declined from 4.1 to 3.0 morphemes per utterance, and Twin 2 declined from 5.4 to 2.6 morphemes per utterance. Post-intervention speech consisted primarily of shorter, functional utterances. Type–Token Ratio Twin 2 demonstrated an increase in TTR from 59.0% to 66.5%, whereas Twin 1's TTR decreased from 63.5% to 55.0%, reflecting increased repetition of core lexical forms.

Table 1 Pre- and Post-intervention Communication Features of Twin 1

Feature	Pre-Intervention	Post-Intervention
Mean Length of Utterance	4.1	3.0
Type-Token Ratio (% Lexical Diversity)	63.5	55.0
Number of Spontaneous Utterances	22.5	63.0

Table 2 Pre- and Post-intervention Communication Features of Twin 2

Feature	Pre-Intervention	Post-Intervention
Mean Length of Utterance	5.4	2.6
Type-Token Ratio	59	66.5
Number of Spontaneous Utterances	22	48.5

DISCUSSION

This case series examined patterns of change in verbal output and selected language measures following a short-term video modeling intervention in identical twins with selective mutism. Interpretation of findings is exploratory and does not support causal or efficacy claims. The most consistent outcome was increased spontaneous verbalization, consistent with prior findings that modeling-based interventions reduce communicative avoidance in children with SM (23,25). Increased speech frequency may represent an early recovery phase in which anxiety reduction precedes linguistic refinement. Decreases in MLU should not be interpreted as linguistic regression. Rather, shorter utterances likely reflect a functional shift toward efficient, low-effort verbal responses that support participation while minimizing cognitive and emotional load, consistent with stage-based models of SM recovery (24). Differences in TTR underscore individual variability in treatment response despite shared genetic and environmental factors, a pattern reported previously in twin and SM literature (14,17). Improvements in eye contact and greeting behaviors suggest increased socio-communicative engagement; however, absence of standardized pragmatic measures limits conclusions regarding pragmatic development.

While this case series cannot determine differential treatment effects across racial or cultural groups, the inclusion of African American participants responds to the documented underrepresentation of minoritized populations in selective mutism research and underscores the importance of reporting intervention outcomes in diverse clinical contexts. Several limitations should be considered. First, the small sample size limits generalizability. Second, reliance on language-sample measures without standardized expressive or pragmatic assessments constrains interpretation relative to age-based norms. Third, pragmatic outcomes were documented through clinical observation rather than formal quantitative instruments. Fourth, the intervention duration may have been insufficient to capture later-emerging gains in linguistic complexity. It should be noted that twin-specific interaction dynamics may limit generalization to non-twin populations with selective mutism. Additionally, although both participants identified as African American, the small sample size and case series design preclude conclusions regarding culturally specific mechanisms or differential responsiveness to intervention, highlighting the need for larger, systematically diverse samples in future research.

CONCLUSION

This case series provides preliminary evidence that video modeling and video self-modeling interventions may reduce anxiety-related barriers to speech and increase verbal initiation in children with selective mutism. Although immediate gains in linguistic complexity were not observed, increased communicative participation suggests VM may serve as an effective early-phase intervention.

ETHICAL CONSIDERATIONS

All procedures were conducted in accordance with institutional ethical standards. Written informed consent was obtained from caregivers prior to participation.

REFERENCES

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed, text rev. Washington (DC): American Psychiatric Association; 2022.
2. Viana AG, Beidel DC, Rabian B. Selective mutism: a review and integration of the last 15 years. Clin Psychol Rev. 2009;29(1):57–67.
3. Garcia AM, Freeman JB, Francis G, Miller LM, Leonard HL. Selective mutism. In: Ollendick TH, March JS, editors. Phobic and anxiety disorders in children and adolescents. Oxford: Oxford University Press; 2004. p. 433–55.
4. Muris P, Ollendick TH. Children who are anxious in silence. Clin Child Fam Psychol Rev. 2015;18(2):151–69.
5. Bergman RL, Piacentini J, McCracken JT. Prevalence of selective mutism. J Am Acad Child Adolesc Psychiatry. 2002;41(8):938–46.
6. Black B, Uhde TW. Selective mutism as social phobia. J Am Acad Child Adolesc Psychiatry. 1995;34(10):1399–406.

7. American Speech-Language-Hearing Association. Selective mutism [Internet]. Rockville (MD): ASHA; 2024 [cited 2026 Feb 10]. Available from: https://www.asha.org/practice-portal/clinical-topics/selective-mutism/
8. Klein ER, Armstrong SL, Shipon-Blum E. Assessing spoken language abilities in selective mutism. Contemp Issues Commun Sci Disord. 2013;40:37–50.
9. Cohan SL, Chavira D, Stein MB. Treatment of selective mutism. J Am Acad Child Adolesc Psychiatry. 2006;45(9):1051–63.
10. Oerbeck B, Stein MB, Wentzel-Larsen T, Kristensen H. A home- and school-based intervention. Child Adolesc Ment Health. 2014;19(3):192–8.
11. Manassis K. Selective mutism and social anxiety disorder. J Am Acad Child Adolesc Psychiatry. 2007;46(11):1461–7.
12. Cotter AC, Pullia SR, Niec LN. Parent-child interaction therapy for selective mutism. In: Niec LN, editor. Parent-child interaction therapy. New York (NY): Springer; 2018. p. 203–24.
13. Lang R, Regester A, Mulloy A, Rispoli M, Botout A. Behavioral intervention for selective mutism. J Appl Behav Anal. 2011;44(3):623–8.
14. Gray RM, Jordan CM, Ziegler RS, Livingston RB. Twins with selective mutism. Child Neuropsychol. 2002;8(3):204–11.
15. Sireli O, Ince MT, Tufan AE. Selective mutism in twins. Cumhuriyet Med J. 2024;46(2):152–5.
16. Muchnik C, Ari-Even Roth D, Linder N, Postan D, Hildesheimer M. Genetic component of selective mutism. J Commun Disord. 2013;46(1):27–35.
17. Segal NL. Monozygotic twins with selective mutism. Clin Child Psychol Psychiatry. 2003;8(4):473–88.
18. Bandura A. Social learning theory. Englewood Cliffs (NJ): Prentice Hall; 1977.
19. Bandura A. Social foundations of thought and action. Englewood Cliffs (NJ): Prentice-Hall; 1986.
20. Dowrick PW. A review of self-modeling. Behav Modif. 1999;23(1):23–39.
21. Buggey T. Video self-modeling. Focus Autism Other Dev Disabl. 2005;20(1):52–63.
22. AFIRM Team. Video modeling. Chapel Hill (NC): National Professional Development Center on Autism Spectrum Disorder; 2018.
23. Kehle TJ, Madaus JW, Baratta VS, Bray MA. Augmented self-modeling for selective mutism. J Sch Psychol. 1998;36(3):247–60.
24. Shipon-Blum E. Transitional stage of communication. Jenkintown (PA): Selective Mutism Anxiety Research and Treatment Center; 2010.
25. Oerbeck B, Stein MB, Pripp AH, Kristensen H. Follow-up study after treatment. Eur Child Adolesc Psychiatry. 2015;24(7):757–66.
26. Alegría M, Vallas M, Pumariega AJ. Racial and ethnic disparities in pediatric mental health. Child Adolesc Psychiatr Clin N Am. 2010;19(4):759–74.
27. Flores G; Committee on Pediatric Research. Technical report racial and ethnic disparities in the health and health care of children. Pediatrics. 2010;125(4):e979–1020.
28. Coker TR, Elliott MN, Kataoka S, Schwebel DC, Mrug S, Grunbaum JA, et al. Racial/ethnic disparities in the identification of emotional and behavioral problems in children. Pediatrics. 2009;124(3):e347–54.
29. Lindsey MA, Brandt NE, Becker KD, Lee BR, Barth RP, Daleiden EL, et al. Identifying the common elements of treatment engagement interventions in children's mental health services. Clin Child Fam Psychol Rev. 2014;17(3):283–98.