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Scoping Review

Problem behaviors in nonverbal autistic individuals: the role of alternative augmentative communication

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ABSTRACT

Objective: This Scoping Review aims to analyze the correlation between problem behaviors and communication deficits in non-verbal individuals with autism spectrum disorder (ASD), evaluating the role of Functional Communication Training (FCT) and Augmentative and Alternative Communication (AAC) as evidence-based tools for reducing dysfunctional behaviors and enhancing communicative autonomy.

Materials and Methods: A systematic search was conducted following the PRISMA-ScR guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews), including articles published in English between 2015 and 2025. The databases consulted were PubMed and Google Scholar, using the following keywords: "Autism", "Problem behaviours", "Augmentative and Alternative Communication", "Non-verbal", with predefined inclusion criteria.

Results: From the initial search, 742 articles were identified, but only 8 met the inclusion criteria and were included in the final scoping review. The data confirm that the absence of functional communication channels is a primary risk factor for the emergence of dysfunctional behaviors. The implementation of FCT, even via telehealth, and the use of AAC tools (PECS, digital devices, gestures, images) have been shown to significantly reduce the frequency and intensity of problem behaviors, improving communication quality and reducing family stress. However, the literature remains limited and fragmented, with little focus on the systematic and formal integration of FCT and AAC.

Conclusions: The review highlights the need to develop early, multimodal, individualized intervention models that formally integrate AAC into FCT protocols, not only as an expressive support but also as a diagnostic and therapeutic tool for the functional analysis of behavior.

Keywords

Autism, Problem behaviors, Alternative augmentative communication, Nonverbal.

ABSTRACT in ITALIANO

Obiettivi: Questa Scoping Review si propone di analizzare la correlazione tra comportamenti problema e deficit comunicativi negli individui non verbali con disturbo dello spettro autistico (ASD), valutando il ruolo del Functional Communication Training (FCT) e della Comunicazione Aumentativa e Alternativa (CAA) come strumenti evidence-based per la riduzione dei comportamenti disfunzionali e il potenziamento dell'autonomia comunicativa.

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Materiali e Metodi: È stata condotta una ricerca sistematica secondo le linee guida PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews), includendo articoli pubblicati in lingua inglese tra il 2015 e il 2025. Le banche dati consultate sono state PubMed e Google Scholar, utilizzando le seguenti parole chiave: A*utism, Problem behaviours, Augmentative and Alternative Communication, Non-verbal*, con criteri di inclusione predefiniti.

Risultati: Dalla ricerca iniziale sono stati identificati 742 articoli, ma solo 8 hanno soddisfatto i criteri di inclusione e sono stati inseriti nella revisione finale. I dati confermano che l'assenza di canali comunicativi funzionali rappresenta un fattore di rischio primario per l'insorgenza di comportamenti disfunzionali. L'implementazione del FCT, anche tramite telehealth, e l'utilizzo di strumenti CAA (PECS, dispositivi digitali, gesti, immagini) hanno dimostrato di ridurre significativamente la frequenza e l'intensità dei comportamenti problema, migliorando la qualità della comunicazione e riducendo lo stress familiare. Tuttavia, la letteratura rimane limitata e frammentaria, con scarsa attenzione all'integrazione sistematica e formale tra FCT e CAA.

Conclusioni: La revisione evidenzia la necessità di sviluppare modelli di intervento precoci, multimodali e individualizzati, che integrino formalmente la CAA all'interno dei protocolli di FCT, non solo come supporto espressivo ma anche come strumento diagnostico e terapeutico per l'analisi funzionale del comportamento.

Parole chiave

Autismo, comportamenti problema, comunicazione aumentativa alternativa, non verbale.

INTRODUCTION

In the clinical and scientific context of autism, non-verbal individuals are among the most vulnerable and the least represented in research and therapeutic practice [1]. The absence of verbal and vocal language is one of the most significant limitations, profoundly affecting the quality of life of both autistic people and their caregivers [2]. This communication barrier not only hinders the expression of needs, emotions, and intentions, but can also contribute to the emergence of dysfunctional behaviors [3].

The impairment of the verbal channel is a crucial variable in the development of problem behaviors, such as aggression, self-harm, avoidance, escape, and opposition [3]. These behavioral manifestations, often misinterpreted as mere oppositional conduct [3], are in fact adaptive strategies through which the individual attempts to interact with their surroundings.

In the absence of alternative means of communication, behavioral repertoire can become the only means of expression available, taking on a primary communicative function [4].

Although problem behaviors have significant clinical importance and impact in the clinical and non-clinical lives of autistic individuals, they do not receive the same attention and relevance in treatment protocols and even in scientific literature.

Such problem behaviors are not seen for their true nature and meaning, but rather as elements to be curbed and contained. These actions lead the autistic individual to become entrenched in and to consolidate the problem behaviors they identify as natural communicative practices. This approach is directly associated with therapeutic ineffectiveness, an increase in problem behaviors, and deterioration in caregivers' quality of life.

A fundamental element that provides support and objective, replicable results is the use of Augmentative and Alternative Communication (AAC) [5]. AAC is a resource that is still not adequately integrated and undervalued. This communication tool consists of a set of strategies, technologies, and symbolic systems that aim to support or replace verbal language, offering individuals concrete tools to express themselves, interact, and actively participate in social life.

AAC systems [e.g., PECS (Picture Exchange Communication System), personalized visual interfaces, digital voice devices] have allowed scientific researchers to demonstrate in various studies that their use significantly reduces the intensity and incidence of problem behaviors [6] improving the quality of communication and life for autistic individuals and their caregivers.

The purpose of this article, and the decision to focus on key points relating to non-verbal autistic individuals and their relationship with AAC, stems from the difficulties we continually encounter in clinical practice with regard to the rehabilitation of autistic individuals. This study stems from the need to raise awareness among the scientific community and caregivers about the importance of observing the autistic individual as a whole. This is the key to future rehabilitation success, represented by the

relationship between communication and behavior skills.

This scientific contribution aims to offer a dynamic, up-to-date, and multidisciplinary perspective on the transformative potential of AAC in addressing unexpressed communication needs that can lead to problem behaviors.

MATERIALS AND METHODS

To identify all articles related to our study, a systematic search was conducted using a Scoping Review of ethical and evidence-based interventions that value communication as a fundamental right and as the key to understanding and reducing problem behaviors.

The decision to conduct a Scoping Review arose from the desire to demonstrate that there is very little literature on this topic and from the desire to raise awareness among two types of categories: the scientific community (doctors, therapists and researchers) and the group of people who revolve around the routine of autistic individuals (caregivers, teachers, educators, communication assistants).

Scoping reviews are an excellent tool for identifying the existence of a sample of literature on a given topic and providing a detailed overview of its focus; they are useful for examining emerging evidence when it is not yet clear what other, more specific questions can be asked and addressed by a systematic review [7].

Table 1. Keywords.

Autism
Problem behaviours
Augmentative and alternative communication
Non-verbal

To conduct this review and ensure a transparent, systematic, and reproducible methodology in the identification and selection of scientific literature, the authors followed PRISMA guidelines, in the extension specifically developed for Scoping Reviews, the PRiSMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) [8].

To answer the research question of this scoping review, articles were included that focused on nonverbal autistic patients exhibiting problem behaviors for whom functional communication training was necessary. Specifically, studies published in English over the last ten years were selected. The review of scientific articles was carried out using two electronic databases: Google Scholar and PubMed, using keywords such as: autism, problem behaviors, augmentative and alternative communication, non-verbal (Table 1).

Initially, 742 articles were identified, of which 661 were found in PubMed and 81 in Google Scholar. Following the inclusion criteria (Table 2), based on titles and abstracts, a total of 732 articles were excluded. In addition, after reading the full text, two more articles were

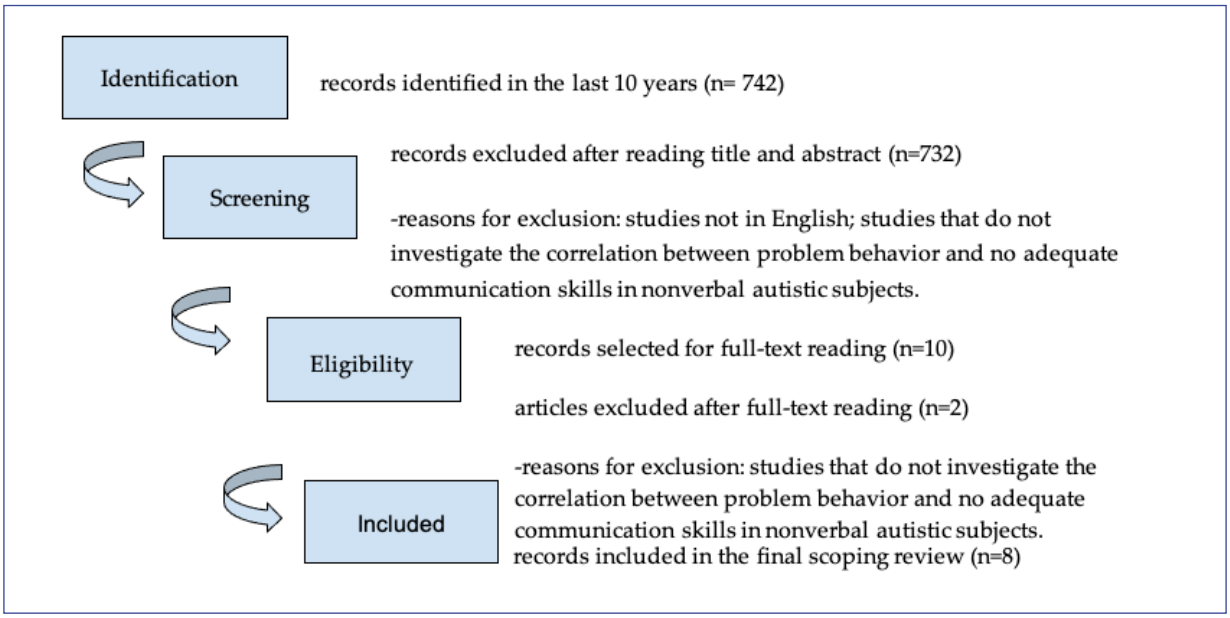

Figure 1. Flow chart of the articles' selection process.

Table 2. **Eligibility criteria.**

CRITERION	INCLUSION	EXCLUSION
Year of publication	2015-2025	Studies prior to 2015
Language	English	Other languages
Focus of the study	The correlation between problem behaviour and lack of adequate communication skills in non-verbal autistic individuals	Verbal subjects; adequate communication skills; absence of problem behaviours; absence of autism spectrum disorder.
Study sample	Non-verbal autistic individuals with problem behaviours	All other categories of patients and disorders
Type of article	Scientific articles	All others

excluded. The remaining eight articles were included in the Scoping Review, as they met the inclusion criteria (Figure 1).

RESULTS

The characteristics of the selected studies have been summarized in Table 3, which provides information on the author, title, year of publication, purpose, data collection method and tools used, sample size, and study design.

The articles selected are the result of a careful, systematic, and rigorous selection process based on specific criteria (paragraph 3).

The literature recognizes the ABA approach [9] and Functional Communication Training (FCT) (even when conducted via telehealth) as evidence-based treatments for reducing problematic behaviors and improving the communication skills of children with ASD. It is based on three fundamental points:

1) Functional analysis of dysfunctional behavior: the function of the problem behavior is identified;
2) Choice of an alternative communicative response: the child acquires an alternative and functional way to satisfy his needs;
3) Reinforcement of functional communication: when the child uses functional communication, he immediately achieves what he requests.

Strategies such as using daily materials in realistic, naturalistic environments and involving parents increase the likelihood of success and the transferability of techniques to environments beyond the treatment setting, promoting the generalization of new communication skills.

Furthermore, younger children seem to benefit more from early intervention, as their development and brain plasticity favor learning in natural environments without the need for targeted generalization programs. At the same time, reducing parental stress can contribute to a more positive family environment that is conducive to children's learning and growth [10-14].

The need to adopt systematic and individualized assessment methods is also emphasized in order to improve the effectiveness and durability of Functional Communication Training (FCT) interventions: the assessment and identification of preferences and, above all, the choice of command type play an extremely crucial role. The results show that preference for a response can vary individually, and choosing a preferred option can increase motivation and the effectiveness of communicative learning. For example, individuals with good vocal imitation skills respond better to verbal instruction, while others may benefit from responses using visual symbols or manual signals.

The choice of delivery methods depends on several variables, such as:

- individual factors: physical abilities, existing communication skills, ease of prompting, and compatibility with the subject's current abilities;
- environmental factors: the social recognizability of responses in different environments or social contexts, and the costs for caregivers or ease of access.
- response characteristics: preferences because of compatibility with problem behaviors, continuous accessibility, and ease of control by the clinician.

Research shows that teaching different types of commands reduces problem behaviors because it increases flexibility and communicative independence, allowing for more precise responses and facilitating changes in preferences over time. Techniques such as delayed reinforcement are shown to be effective methods for increasing tolerance for waiting, promoting the acquisition of more complex responses, and reducing the risk of problem behaviors. In addition, the transition between different response topographies can be strategic in promoting the generalization of responses in different environments. To facilitate more functional communication, it is important to plan a gradual transition from generalized responses to more specific ones, while carefully assessing the patient's cognitive, visual, and motor skills.

The most effective and commonly used responses in nonverbal individuals include:

- gestures or signs (e.g., simplified sign language);
- pictograms or images (e.g., PECS – Picture Exchange Communication System);
- electronic devices (tablets with communication apps, voice buttons);
- physical indication (pointing, touching, handing over an object) [3].

Similarly, actively involving the patient in determining which type of reinforcement program is most acceptable or preferable, can improve the intervention's effectiveness and social validity and reduce problem behaviors [16].

DISCUSSION

In this perspective, it is essential to identify the problem behaviors exhibited by patients with ASD, the cause from which they arise (antecedent), and the function they perform in the absence of verbal language. This is made possible by functional behavior analysis, an observation methodology used to understand the function of a behavior by identifying the relationships between antecedents, the behavior itself, and consequences, using the ABC model:

- Antecedents (A): events, situations, people, or activities that occur immediately before the behavior and may trigger it.
- Behavior (B): the observable response or specific action that the person performs in response to the antecedents.
- Consequences (C): what happens immediately after the behavior and which can reinforce it, maintaining it over time, or, conversely, weaken it.

This tool enables planning targeted interventions to replace problem behaviors with more adaptive ones.

Adaptive behaviors are the set of conceptual, social, and practical skills that a person learns to function in daily life, respond to environmental demands, and meet social and cultural expectations.

Communication is one of the key components of adaptive behavior, including the ability to understand and produce verbal and nonverbal language, which is essential for interacting effectively with others and adapting to social contexts. In this sense, according to scientific literature, the treatment of choice involves early, individualized Functional Communication Training, carried out in naturalistic and real environments, with the involvement of the parents and/or caregivers of patients with ASD. In fact, several studies show that when parents are adequately trained to implement Functional Communication Training, significant benefits are observed in both the behavior and emotional well-being of the family as a whole. Furthermore, the use of FCT *via* telehealth has shown promising results in terms of accessibility and effectiveness, representing a valuable resource for local areas with limited availability of specialist services.

Another recurring theme is the personalization of the *mand*, that is, the choice of the type of communicative response to teach. Some sources show that taking individual preferences into account when selecting the topography of the communicative response (for example, vocalizations, gestures, picture exchange, use of devices) can increase the subject's motivation, improve learning, and make the results of the intervention more lasting.

However, it emerged that explicit attention to the integration of Augmentative and Alternative Communication (AAC) tools, such as PECS, digital voice devices, and other symbolic aids, was scarce. This highlights a gap in the literature, where FCT is frequently treated as a stand-alone method, without systematic reflection on its integration with AAC technologies and symbolic systems.

Finally, the review confirmed that early intervention is particularly effective in younger children, thanks to greater neuroplastici-

Table 3. Overview of selected records

	Author	Title	Year	Purpose	Data collection method/ tools	Sample size	Study design
1	Kodak T, Bergmann S [9]	Autism Spectrum Disorder: Characteristics, Associated Behaviors, and Early Intervention	2020	Provide an overview of ASD characteristics, associated behaviors, and early intervention strategies based on applied behavioral analysis (ABA)	Review	-	-
2	O'Brien MJ, Pelzel KE, Hendrix NM, Schieltz KM, Miller K, Call NA, Tsami L, Lerman DC, Berg WK, Kopelman TG, Wacker DP, Lindgren SD. [10]	Parent Ratings of Generalized and Indirect Effects of Functional Communication Training for Children with Autism Spectrum Disorder	2022 (Epub 2021)	Evaluate the effects of Functional Communication Training on target and non-target behaviors outside the training context, as well as parental stress	Intervention via telehealth, indirect measures (parental assessment scales), and direct observations of problem behaviors	30 children with ASD and their parents (aged 29-83 months)	Pre-/post-treatment study
3	Ruppel KW, Hanley GP, Landa RK, Rajaraman A [11]	An Evaluation of "Balance": a Home-Based, Parent-Implemented Program Addressing Emerging Problem Behavior	2021	Evaluate the effectiveness of a home-based program, implemented by parents, to prevent emerging problem behaviors in young children with ASD	Biweekly coaching for parents by a BCBA; direct measures of behavior and use of the Aberrant Behavior Checklist (ABC)	4 children with ASD and their parents (aged 3-4 years)	Pre-/post-treatment study
4	Lindgren S, Wacker D, Schieltz K, Suess A, Pelzel K, Kopelman T, Lee J, Romani P, O'Brien M [12]	A Randomized Controlled Trial of Functional Communication Training via Telehealth for Young Children with Autism Spectrum Disorder	2020	Verify the effectiveness of Functional Communication Training (FCT) provided via telehealth, compared to "usual treatment"	FCT implemented by parents with real-time coaching via telehealth; direct observation of problem behaviors	38 children with ASD (aged 21-84 months)	Randomized controlled trial
5	Kunnavatana SS, Wolfe K, Aguilar AN [13]	Assessing Mand Topography Preference When Developing a Functional Communication Training Intervention	2018	Reducing arbitrary selection of mand topography during functional communication training by assessing individual preference for mand topography to improve long-term effectiveness of intervention	Preference assessment, functional communication training, and enhancement of the chosen topography	2 adults with ASD	Experimental study
6	Gerow S, Hagan-Burke S, Rispoli M, Gregori E, Mason R, Ninci J [14]	A Systematic Review of Parent-Implemented Functional Communication Training for Children With ASD	2018	Evaluate the empirical literature on Functional Communication Training (FCT) implemented by parents for children with ASD	Descriptive and social validity analysis in different studies	26 studies	Systematic review
7	Houck EJ, Dracobly JD, Baak SA [15]	A Practitioner's Guide for Selecting Functional Communication Responses	2022	Provide practical guidance to help professionals choose functional and effective communication responses during Functional Communication Training (FCT) interventions, with the aim of reducing problem behaviors	Review	-	Applicative theorical research
8	Briggs AM, Akers JS, Greer BD, Fisher WW, Retzlaff BJ. [16]	Systematic Changes in Preference for Schedule-Thinning Arrangements as a Function of Relative Reinforcement Density	2018	Examine which type of reinforcement schedule is most acceptable or preferable for the patient, as reinforcement conditions vary	Experimental study with reinforcement schedule	1 patient with ASD	Case report

ty and the possibility of preventive interventions compared to the consolidation of dysfunctional behaviors.

CONCLUSIONS

This Scoping Review has highlighted the central role of Functional Communication Training (FCT) in managing challenging behaviors in non-verbal autistic individuals. The collected data confirm that the absence of functional communication channels represents a primary risk factor for the emergence of dysfunctional behaviors, and that the introduction of alternative communication tools can significantly reduce the frequency and intensity of such behaviors.

However, the scientific literature available on this topic remains limited and fragmented. Studies published over the past decade are scarce and do not clearly systematize the integration between FCT and Augmentative and Alternative Communication (AAC). This misalignment among theoretical evidence, clinical practice, and the communication needs of nonverbal individuals underscores the urgent need to develop intervention models that formally incorporate AAC into FCT protocols—not only as an expressive support but also as a diagnostic and therapeutic tool for functional behavior analysis.

Both the literature review and clinical experience converge in showing that early, multimodal, and individualized approaches are the most effective in reducing dysfunctional behaviors and fostering communicative autonomy. The scarcity of available studies should not be interpreted as a limitation but rather as an opportunity: the scientific community must invest in more comprehensive and systematic research capable of filling this gap and translating what is already observed in daily clinical practice into operational protocols. It is desirable that the scientific and clinical community recognize the urgency of early, structured, communication-based interventions that are capable not only of reducing dysfunctional behaviors but also of valuing individuals' alternative expressive modalities, thereby promoting rehabilitation pathways that are genuinely inclusive and respectful of communicative diversity.

Conflict of Interest

The authors have no conflict of interest to declare.

REFERENCES

1. Tager-Flusberg, H., & Kasari, C. (2013). Minimally verbal school-aged children with autism spectrum disorder: The neglected end of the spectrum. *Autism Research, 6*(6), 468–478.
2. de Marchena, A., Cuneo, N., Gurbuz, E., Brown, M., Trujillo, J., & Bergstrom, J. (2025). Communication in autistic adults: An action-focused review. *Current Psychiatry Reports*, 1–11.
3. Hanley, G. P., Iwata, B. A., & McCord, B. E. (2003). Functional analysis of problem behavior: A review. *Journal of Applied Behavior Analysis, 36*(2), 147–185.
4. Iacono, T., Trembath, D., & Erickson, S. (2016). The role of augmentative and alternative communication for children with autism: Current status and future trends. *Neuropsychiatric Disease and Treatment*, 2349–2361.
5. Wendt, O. (2024). Current trends in augmentative and alternative communication intervention for minimally verbal autistic children. *Psicologia: Teoria e Prática, 26*(1).
6. May, R. J., Salman, H., O'Neill, S. J., Denne, L., Grindle, C., Cross, R., ... & Games, C. (2025). Exploring the use of the picture exchange communication system (PECS) in special education settings. *Journal of Autism and Developmental Disorders, 55*(2), 652–666.
7. Munn, Z., Peters, M. D., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology, 18*(1), 143.
8. Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., ... & Hempel, S. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine, 169*(7), 467–473.
9. Kodak, T., & Bergmann, S. (2020). Autism spectrum disorder: Characteristics, associated behaviors, and early intervention. *Pediatric Clinics of North America, 67*(3), 425–438.
10. O'Brien, M. J., Pelzel, K. E., Hendrix, N. M., Schieltz, K. M., Miller, K., Call, N. A., ... & Lindgren, S. D. (2022). Parent ratings of generalized and indirect effects of functional communication training for children with autism spectrum disorder. *Behavior Modification, 46*(5), 971–1001.
11. Ruppel, K. W., Hanley, G. P., Landa, R. K., & Rajaraman, A. (2021). An evaluation of "Balance": A home-based, parent-implemented program addressing emerging problem behavior. *Behavior Analysis in Practice, 14*(2), 324–341.
12. Lindgren, S., Wacker, D., Schieltz, K., Suess, A., Pelzel, K., Kopelman, T., ... & O'Brien, M. (2020). A randomized controlled trial of functional communication training via telehealth for young children with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 50*(12), 4449–4462.

13. Kunnavatana, S. S., Wolfe, K., & Aguilar, A. N. (2018). Assessing mand topography preference when developing a functional communication training intervention. *Behavior Modification, 42*(3), 364–381.
14. Gerow, S., Hagan-Burke, S., Rispoli, M., Gregori, E., Mason, R., & Ninci, J. (2018). A systematic review of parent-implemented functional communication training for children with ASD. *Behavior Modification, 42*(3), 335–363.
15. Houck, E. J., Dracobly, J. D., & Baak, S. A. (2023). A practitioner's guide for selecting functional communication responses. *Behavior Analysis in Practice, 16*(1), 65–75.
16. Briggs, A. M., Akers, J. S., Greer, B. D., Fisher, W. W., & Retzlaff, B. J. (2018). Systematic changes in preference for schedule-thinning arrangements as a function of relative reinforcement density. *Behavior Modification, 42*(4), 472–497.