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Listener responses can influence the presentation of restricted interest topics to individuals with ASD

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LISTENER RESPONSES CAN INFLUENCE THE PRESENTATION OF RESTRICTED
INTEREST TOPICS TO INDIVIDUALS DIAGNOSED WITH ASD

By

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DEDICATION

This thesis is dedicated to my parents, Masood and Parastoo, for teaching me the value of hard work and the importance of education. To my older brother, Romtean, thank you for your support and for always making me laugh.

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LISTENER RESPONSES CAN INFLUENCE THE PRESENTATION OF RESTRICTED INTEREST TOPICS TO INDIVIDUALS DIAGNOSED WITH ASD

Abstract

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2020

The behavior of individuals diagnosed with autism spectrum disorder (ASD) can influence caregiver responses that lead to countertherapeutic outcomes. However, there are few experimental evaluations of variables that can cause potentially undesirable interactions between those with ASD and their caregivers. Specifically, little is known about the effects of listener interest on the restricted topics presented by caregivers. We evaluated the influence of listener responses exhibited by a confederate acting as a person with ASD on the topics presented by three undergraduate students who were interested in working with individuals diagnosed with ASD. Each session consisted of a 5-min conversation, during which the participant was instructed to talk about three topics. We compared the duration of topic presentation across phases in which the confederate behaved as an interested listener for one topic or for all three topics. Results showed that topic presentation was controlled by the confederate's behavior as an interested or uninterested listener. All participants reported that the simulation was believable, acceptable, and useful. These findings have implications for understanding interactions between caregivers and individuals with ASD that might foster restricted interests and for developing corresponding interventions and caregiver-training programs.

Keywords: restricted interests, child effects, manipulation by proxy, listener responses

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CHAPTER 1: INTRODUCTION

Listener Responses Can Influence the Presentation of Restricted Interest Topics to Individuals Diagnosed with ASD

Individuals diagnosed with autism spectrum disorder (ASD) and their family members have reported that their restricted interests can negatively impact social relationships (Mercier et al., 2000). One specific concern is a tendency to dominate conversations by talking about a narrow range of topics (e.g., Fisher et al., 2013; Mercier et al., 2000; Peters & Thompson, 2015; Stewart et al., 2007). Because children who are not responsive to topics raised by conversation partners have been rated as less likeable (Black & Hazen, 1990), talking about a narrow range of topics may result in having fewer friends. In comparison to their typically developing peers, individuals with ASD are more likely to respond to topics presented by a conversation partner with off-topic comments or questions (Capps et al., 1998; Turkstra et al., 2003). If individuals with ASD talk about a narrow range of topics and appear uninterested in other topics, they may not sustain the interest of conversation partners (Rodriguez & Thompson, 2015). Moreover, they may have fewer social interactions and relationships, which could be related to why those with ASD are more likely to report feeling lonely (Bauminger & Kasari, 1999). Although researchers have identified environmental variables and interventions that influence speech about restricted interests (e.g., Fisher et al., 2013; Kuntz et al., 2019; Rehfeldt & Chambers, 2003), little is known about the variables that influence caregiver presentation of restricted interests to individuals diagnosed with ASD.

Child or client behavior is one variable that can influence caregiver behavior (Stocco & Thompson, 2015) and has been shown to be related to caregiver nonadherence to interventions

(Allen & Warzak, 2000; Sloman et al., 2005). Findings from Stocco et al. (2011) indicated that the behavior of individuals diagnosed with ASD may influence caregiver presentation of restricted interests. Researchers asked teachers to present play items to students who reportedly exhibited restricted or distributed interests. For example, caregivers reported that one student, Wayne, engaged with pictures of roller coasters (restricted) and exhibited problem behavior when this item was removed or others were presented. In contrast, caregivers reported that another student, Nick, engaged with a variety of leisure items (distributed) and did not engage in problem behavior when play items were removed. Before the start of sessions, researchers used a single-stimulus assessment (Pace et al., 1985) to identify play items that evoked student responses that could function as reinforcement (e.g., roller coaster book) or punishment (e.g., animal figurines) for teacher presentation of items. Results of the single-stimulus assessment confirmed the validity of teacher reported restricted or distributed interests exhibited by students. Students with restricted interests consistently engaged in problem behavior when teachers removed restricted interest items or presented other play items. Based on these results, researchers provided teachers with four items that they could present to each student during sessions. For students who exhibited restricted interests, researchers provided two items associated with high levels of positive responses (e.g., laughing, smiling, requests for item) and low levels of negative responses (e.g., aggression, crying, screaming) and two items associated with high levels of negative responses and low levels of positive responses. For students who exhibited distributed interests, researchers provided teachers with four items associated with relatively equal levels of positive responses and no negative responses. Results showed that teacher presentation of items corresponded with the positive and negative responses exhibited by the student, and participants with restricted interests experienced a narrower array of items in

comparison to the participants with distributed interests. However, because researchers did not systematically manipulate approach responses, laughing, smiling, requests for items, and problem behavior, it is difficult to draw firm conclusions about the influence of student responses on caregiver presentation of play items to individuals who exhibit restricted interests.

Studying relations between caregiver behavior and child or client behavior has implications for understanding how certain reactions influence caregiver adherence. For example, previous research has shown associations between the cessation of problem behavior and potentially countertherapeutic responses such as delivering high rates of reprimands (Sloman et al., 2005) or avoiding the presentation of academic demands (Carr et al., 1991). Addison and Lerman (2009) extended these findings by showing relations between problem behavior and nonadherence to recommendations provided during a 5-day training that included a focus on managing problem behavior. Researchers taught three special education teachers to withhold attention and tangible items and to follow-through with demands using prompts when participating children engaged in problem behavior. Results showed that all three teachers engaged in countertherapeutic responses that were targeted for reduction during training and that such responses were commonly preceded by higher frequencies of problem behavior and followed by decreases in, or the cessation of, problem behavior. Taken together, these studies suggest that child problem behavior might establish its removal as reinforcing and evoke potentially countertherapeutic responses that have characteristically produced that outcome in the past (Carr et al., 1991; Sloman et al., 2005), even after caregivers experienced training to do otherwise (Addison & Lerman, 2009). However, similar to Stocco et al. (2011), the use of nonexperimental research designs limits the conclusions that can be drawn from these studies.

One barrier to conducting experimental analyses is systematically manipulating the behavior of individuals diagnosed with ASD to evaluate the effects on caregiver responses. For example, Keller and Bell (1979) reported that variations in children's eye contact, smiling, and answering questions (i.e., responsiveness) influenced the ways college students encouraged child confederates to engage in altruistic behaviors for other children (e.g., rebuilding a tower after knocking it down). To manipulate eye contact, smiling, and answering questions promptly, experimenters trained three 9-year-old child confederates to engage in high (e.g., attending to adult, answering promptly, smiling at adult) or low (e.g., looking away, delayed answers) levels of responsiveness to adult participants. Keller and Bell reported that when children engaged in high levels of responsiveness, adults were more likely to discuss consequences. In contrast, when children engaged in low levels of responsiveness, adults were more likely to bargain materialistic rewards when encouraging child confederates to engage in altruistic responses. However, because there were unsystematic variations in answering questions and opportunities to smile across conditions, it is difficult to draw firm conclusions about the influence of children's responsiveness on caregiver responses.

One solution is manipulation by proxy, which can include using adult confederates to evaluate the effects of behavior on caregiver responses. For example, building on the research that reported a link between problem behavior and caregiver responses (Addison & Lerman, 2009; Carr et al., 1991; Sloman et al., 2005), Miller et al. (2010) conducted an experimental evaluation by manipulating problem behavior and measuring the effects on the reprimands delivered by caregivers. Experimenters recruited college students from a special education class and asked them to teach academic skills to a confederate who acted as an individual diagnosed with developmental disabilities. Confederate behavior was manipulated across conditions in

which the confederate (a) did not engage in problem behavior, (b) immediately stopped engaging in problem behavior contingent on adult verbal reprimands, or (c) did not stop engaging in problem behavior, even if the participant engaged in verbal reprimands. The percentage of trials with reprimands were compared across the conditions. Researchers observed the highest levels of reprimands when the cessation of problem behavior was contingent on reprimands. These results suggest that child problem behavior could serve as a punisher for caregivers engaging in therapeutic responses, which could result in treatment nonadherence. Using an adult confederate is a feasible approach because it does not require recruitment of outside resources, unlike using a child confederate. Adult confederates may also need less training than a child confederate to implement procedures with fidelity. Moreover, using adult confederates could be a viable solution to the extraneous variables that might be introduced by child confederates. By training experimenters to act as conversation partners who either act uninterested or interested and hold other extraneous variables constant (e.g., rate of speech), researchers can minimize threats to internal validity.

Studies have reported interventions for restricted topics of conversation. However, there are no studies that have evaluated the influence of listener interest on caregiver presentation of restricted topics and adherence to therapeutic recommendations. For example, uninterested and interested responses may influence the presentation of restricted topics. Therefore, the purpose of this study was to evaluate the influence of listener responses exhibited by a confederate acting as a person with ASD on the topics presented by three undergraduate students who were interested in working with individuals diagnosed with ASD. We also asked participants to complete a social validity questionnaire that asked about the believability of the simulation and acceptability of participating in this type of simulation.

CHAPTER 2: METHOD

Participants, Setting, and Experimenters

We recruited three female undergraduate students through fliers posted on course websites and a research participation website within the psychology department. All participants reported no experience working with individuals diagnosed with ASD but expressed interest in doing so in their future careers. Students received extra credit in one of their current courses for participating. Sessions were conducted in a university laboratory equipped with a one-way observation window and included items typically found in this space (e.g., chairs, a table).

Three experimenters were involved in recruiting participants or conducting sessions. Experimenter 1 recruited participants and delivered instructions to the participants at the beginning of the study and after prolonged breaks, Experimenter 2 collected data from behind the one-way observation window, and Experimenter 3 (confederate) acted as an individual diagnosed with ASD. The confederate (author) was a female graduate student who was enrolled in a master's program in behavior analysis. All fliers, emails, and consent forms included the name of Experimenter 1 and were void of the confederate's name. This was done to reduce the possibility that participants recognized the confederate's name or searched the confederate's name on social media prior to sessions were conducted. We obtained approval from the institutional review board (IRB) at University of the Pacific.

Preassessment

We used a questionnaire to identify topics of conversation that were used during sessions (Appendix A). The participant was asked to sort predetermined conversation topics into the following categories: topics that they enjoy talking about or talk about on a daily basis (high

preference), topics that they avoid talking about or do not talk about on a daily basis (low preference), and topics that they are okay with talking about or do not talk about on a daily basis (moderate preference). To minimize the potential influence of participant preference on topic presentation, we used three topics identified by the participant as high preference topics during sessions. We did not use moderate preference topics because each participant identified at least three high preference topics and because we thought that talking about high preference topics would increase the likelihood of voluntary participation. Out of the three high preference topics, one topic was selected as the restricted topic. We did not use low preference topics because doing so may have reduced the possibility of voluntary participation.

Measurement

Similar to Hughes et al., (1995), *presentations by topics* was defined as statements or questions related to the topics that were assigned to each session (e.g., “What did you do at school today?”). Nonexamples included statements or questions unrelated to the assigned topics and vocalizations such as “mmhm” or “yeah.” To inform decisions about switching phases, we measured the duration of presentations by topic from behind the one-way mirror during sessions using a data collection program (Instant Data PC). However, because conversations often involve dynamic shifts between topics, we reported data collected from video recordings of sessions. We collected data from recordings so observers could pause, fast-forward, and rewind videos if the content of speech was initially unclear. Observers recorded the onset and offset of presentations by topic. Statements or questions related to a topic marked the onset of a topic (e.g., “I like listening to music in the car. Where do you like to listen to music?”); the offset of a topic included switching topics, presenting topics that were not assigned to the session, or discontinuing speech for 3 s. Presentation of the restricted and nonrestricted topics were not

mutually exclusive and were scored simultaneously when the participant presented two or more topics at the same time. For example, if the restricted topic was music and the nonrestricted topic was family, a statement like, “My family likes to listen to the radio,” counted toward the duration of presentation for music and family.

Interobserver Agreement and Training

Interobserver Agreement (IOA) was collected for 66% of sessions. We calculated mean duration-per-interval IOA for duration of presentations by topic using the following formula (± 3 s short duration \div long duration \times 100). An agreement was scored when the primary and secondary observer recorded the occurrence and same duration of the topic that was presented within a ± 3 -s window. Table 1 shows the IOA coefficients for each dependent measure.

The primary investigator provided secondary data collectors with written instructions and operational definitions that included examples of the dependent variable. Before scoring sessions, the secondary data collectors were trained on data collection using practice videos that were created by the experimenters that showed role-plays of sessions between Experimenter 1 and the confederate until they obtained an agreement coefficient of 80% or higher with the primary investigator.

Procedural Integrity

Experimenters collected data on procedural integrity for 33% of sessions using momentary time sampling with 5-s intervals. The experimenter observed the confederate during the entirety of the session, but only recorded data at every 5-s mark. Integrity was scored when the confederate provided the appropriate consequence for the participant’s presentation of topics for each condition. For example, integrity was scored if the confederate oriented her body towards the participant and engaged in at least one other interested response (e.g., nodded head)

after the participant presented the restricted topic during the restricted interest condition. An error was scored when the confederate did not provide the appropriate consequence during each condition. For example, an error was scored if the confederate oriented her body towards the participant, but sighed and leaned her head on her hand after the participant presented the restricted topic during the restricted interest condition. If the participant did not present a topic or presented topics that were not assigned to the session, then integrity was scored when the confederate turned her body away from the participant and engaged in at least one other uninterested response (e.g., sighed). The percentage of total intervals with integrity was calculated by dividing the number of intervals with integrity by the total number of intervals. Mean percentage of intervals with integrity was 99% for sessions with Elena, 99.5% for sessions with Emily, and 100% for sessions with Katie.

Procedure

Sessions were completed during an average of 2-hour blocks of sessions across 1 day, and each session consisted of a 5-min conversation. On the first day, Experimenter 1 obtained informed consent from the participant. In order to conceal the true purpose of the study, the experimenter deceived the participant by telling them that the purpose of the study was to engage in conversations with an individual diagnosed with ASD who recently completed a social skills program that specifically aimed at increasing the range of topics she talked about. We deceived participants to arrange a context that most closely approximated engaging in conversations with someone who has ASD in everyday life. Participants were told that they can discontinue their participation at any time and would still receive some course credit. Before the first session, Experimenter 1 provided the participant with the following set of instructions:

You will be talking to an adult diagnosed with ASD who recently completed a social skills program administered by our team. Her family members reported that she tends to talk excessively about (insert restricted topic), and they asked us to address this issue in our program. So, we have been working on increasing the range of topics she talks about during conversation. We are asking you to talk with her to see how she does with other people who were not a part of our social skills program. You will be given a list of 3 topics, one of which is (insert restricted topic). Please try to present all of the topics, but do whatever comes naturally to you. Please do not present topics that are not on the list. We will notify you when the session begins and ends.

The participant was able to present the topics in any order during the session and each session was assigned the same 3 topics. The experimenter provided the participant with an index card that listed the topics of conversation.

During each session, the confederate acted interested or uninterested. Similar to Peters and Thompson (2015), the confederate acted interested by orienting her body and head towards the participant, provided eye contact, smiled, made statements or asked questions that were in response to the participant's topic, and provided brief vocal feedback (e.g., "Nice" or "I like that too"). The confederate acted uninterested by orienting her body and head away from the participant, removing eye contact, leaning her head on her hand, sighing, and making brief statements (e.g., "I don't know" or "nothing"). The following conditions were evaluated using a BAB reversal design.

Restricted interest. The confederate began the session by acting uninterested, and she continued acting uninterested if the participant presented the nonrestricted topics (e.g. family). The confederate acted interested contingent on the participant's presentation of the restricted topic (e.g., music). The confederate gradually stopped acting interested (e.g., removing eye contact, slowly orienting body away from the participant) when the participant stopped presenting topics for 3 s and started acting uninterested until the participant presented the restricted topic again.

Distributed interests. This was similar to the restricted interest condition except that the confederate acted interested contingent on the participant's presentation of any of the three topics.

Debriefing and Social Validity

The experimenter debriefed the participant on the purpose of the study, informed the participant that the confederate does not have a diagnosis of ASD, and showed the participant their data. For example, the experimenter used a script like the one below:

The purpose of this study was to experimentally evaluate the influence of the interested or uninterested responses of an individual diagnosed with ASD on the topics presented by a conversation partner. The broader goal of our research is to understand factors that may influence the restricted interests of individuals diagnosed with ASD. In this study, you were asked to engage in several conversations with an individual diagnosed with ASD. However, this individual does not actually have a diagnosis of ASD. We withheld this information from you in order to observe your responses and reactions under the context of being told that you were talking to an individual diagnosed with ASD. We also want to show you a graph of the data we collected from your sessions. In the restricted-interests condition, the confederate was instructed to act interested if you presented her restricted topic. If you presented a nonrestricted topic, then the confederate was instructed to act uninterested. In the distributed-interests condition, the confederate acted interested when you presented any of the topics. During these conversations, we looked at the topics you presented and how long you talked about each of them with the experimenter who acted as an individual diagnosed with ASD. We found that you presented the restricted topic for longer durations than the nonrestricted topic during the restricted-interests condition. During the distributed-interests condition, you presented all 3 topics for similar durations. When we repeated the restricted-interests condition, your responses were similar to the first time that we implemented this condition. This suggests that your behavior of presenting topics was sensitive to the experimenter's programmed reactions. Therefore, you presented topics that resulted in the confederate acting interested for longer durations than topics that resulted in the confederate acting uninterested.

Participants were asked to fill out a social validity questionnaire after their final session (Appendix C). The questionnaire used a 7-point Likert-type scale to assess the acceptability of participating in this type of simulation, the likelihood that the participant would participate in a

similar simulation in the future, the acceptability of developing intervention goals that focus on decreasing restricted interests, and the believability of the simulation.

CHAPTER 3: RESULTS

Figure 1 illustrates the results for all participants. During both restricted interest phases, all participants presented the restricted topic for longer durations than the nonrestricted topics, and during some sessions, we observed the exclusive presentation of the restricted topic. Exclusive presentation of the restricted topic occurred during 3 sessions for Emily and Katie during the restricted interest phases. The opposite effect was found in the distributed interests phase in which all participants presented at least one of the nonrestricted topics for longer durations than the restricted topic, and during some sessions, we observed the exclusive presentation of one of the nonrestricted topics. Exclusive presentation of a nonrestricted topic occurred during 3 sessions for Elena and Katie and 2 sessions for Emily. This effect was a bit delayed for Katie and Emily as they continued to present the restricted topic for longer durations during the first three sessions of the distributed interests phase.

The grey bars depict the participant's total duration of speech per session. Mean duration of speech during the first restricted interest phase was 231 s (range, 222–242 s) for Elena, 254 s (range, 239–274 s) for Emily, and 234 s (range, 225–242 s) for Katie. During the distributed interest phase, mean duration of speech was 227 s (range, 200–248 s) for Elena, 235 s (range, 184–270 s) for Emily, and 246 s (range, 197–266 s) for Katie. Mean duration of speech during the second restricted interest phase was 267 s (range, 229–296 s) for Elena, 247 s (range, 233–257 s) for Emily, and 238 s (range, 227–251 s) for Katie.

Figure 2–4 are event diagrams that illustrate within-session data for each participant during the restricted interest condition (top panel) and during the distributed interests condition (bottom panel). These graphs depict the participant's presentation and removal of each topic.

All participants consistently presented the restricted topic for longer durations as depicted by the blip in the corresponding data path. For example, Emily presented music (restricted) at the beginning of Session 1 and the confederate responded as interested. Emily then presented animals (nonrestricted), in which the confederate responded as uninterested. After, Emily went back to presenting the restricted topic for the rest of Session 1. Additionally, all participants skipped presenting certain topics as depicted by the flat data paths in the restricted and/or distributed interest phases.

Social Validity Assessment

Results from the social validity questionnaire are depicted in Table 3. On a 7-point Likert scale (1 = *not acceptable, not likely, not believable* and 7 = *highly acceptable, very likely, highly believable*), the average rating for the acceptability of engaging in conversations with an adult confederate was 5.67 (range, 5 to 6), the average rating for the likelihood that participants would participate in this type of simulation again was 6, the average rating for the acceptability of interventions that focus on decreasing restricted interests was 5.67 (range, 5 to 7), and the average rating for the believability of the simulation was 6.67 (range, 6 to 7).

CHAPTER 4: DISCUSSION

We evaluated the influence of the listener interest of an experimenter acting as an individual diagnosed with ASD on the presentation of restricted and nonrestricted topics during conversations. Results showed that the confederate's interested and uninterested responses influenced the presentation of topics for all participants. Despite receiving instructions to present each topic during the session, all participants presented the restricted topic for longer durations than the nonrestricted topic when the confederate behaved as an interested listener for only the restricted. When the contingency was reversed and the confederate behaved as an interested listener for all three topics (i.e., distributed interests), the participant presented one (Elena, Emily) or both (Katie) of the nonrestricted topics for longer durations. Overall, these findings have implications for understanding interactions between caregivers and individuals with ASD that might foster restricted interests and for developing corresponding interventions and caregiver-training programs.

Our results add to the literature on restricted interests (Fisher et al., 2013; Kuntz et al., 2019; Rehfeldt & Chambers, 2003) and variables that influence caregiver behavior (Miller et al., 2010; Stocco et al., 2011; Thompson et al., 2011). Whereas Stocco et al. (2011) reported the potential influence of child responses on the presentation of leisure items to individuals diagnosed with ASD, these data show that listener responses can influence the presentation of conversation topics to individuals reported to have restricted interests. However, little is known about how these findings correspond with the typical interactions between caregivers and individuals diagnosed with ASD. Baer (1973) argued that understanding behavioral phenomena should rely on evidence from both observational and experimental studies. For example,

Addison and Lerman (2009) and Sloman et al. (2005) added descriptive observations that suggested a negative reinforcement contingency for child problem behavior surrounding caregiver reprimands and Miller et al. (2010) demonstrated these functional relations in a subsequent experiment. Future research could include similar observational studies that describe naturally occurring interactions between individuals diagnosed with ASD who talk about a narrow range of topics and their caregivers.

These results have implications for research on variables and behavioral processes that influence parental nonadherence to interventions (Allen & Warzak, 2000; Stocco & Thompson, 2015). Despite receiving instructions to present all three topics, participants presented the restricted topic for longer durations, and during some sessions, we observed exclusive presentation of the restricted topic. Similar to Addison and Lerman (2009), these findings add to the literature on responses exhibited by individuals diagnosed with ASD as a potential barrier for caregiver adherence to therapeutic recommendations. Unlike Addison and Lerman (2009), we did not provide explicit training sessions focused on a particular intervention. In contrast, we provided general instructions for participants to present all topics during each session, but to also do what comes naturally. Future research could evaluate adherence after training for caregivers on a specific intervention, such as requiring some degree of quality conversation about nonrestricted topics before presenting restricted topics.

There are, however, multiple interpretations of the behavioral processes that might be responsible for the patterns of presentation we observed. One interpretation is that the confederate's interested and uninterested responses resulted in the reinforcement or punishment of topic presentation. Interested responses may have reinforced topic presentation, and uninterested responses may have punished topic presentation or established their removal as

reinforcing. During the restricted interest phases, participants presented the topics that produced high rates of interested responses for longer durations. Topics that produced uninterested responses were presented for shorter durations and sometimes avoided. Similar patterns of responding have been reported in previous research on social interactions and the matching law. Conger and Killeen (1974) found that college students talked more to conversation partners who provided higher rates of agreement with participants' opinions during a conversation. Participants talked with three confederates about their opinions on drug abuse. Two of the confederates provided statements of agreement (e.g., "that's a good point") on different variable-interval schedules. The first confederate provided statements of agreement for 70% of total cues given and the second confederate provided statements of agreement for 30% of total cues given. The third confederate asked questions to elicit conversation. Halfway through the conversation, experimenters switched the schedules on which confederates provided statements of agreement. Overall, results showed that the proportion of time spent talking to a confederate closely matched the proportion of agreement statements from that confederate. Similar to the findings in Conger and Killeen, our outcomes could be interpreted as an example of the matching law, in which the relative durations of topic presentation were roughly equal to the relative rates of listener responses.

However, it is notable that Elena continued to present topics that produced uninterested listener responses during restricted interest phases. This is important to note because the expected outcome for concurrent ratio schedules in matching studies would be exclusive responding toward the option that produces the highest rate of reinforcement (Grace & Hucks, 2013). Therefore, interpreting our outcomes as an example of matching produced by concurrent schedules of listener responses appears insufficient. It is possible that topic presentation was

influenced by instructions provided by the experimenter at the start of sessions or rules derived by participants during sessions (e.g., Baron & Galizio, 1983). For example, the instruction to present all three topics could have impacted Elena's performance across the restricted interest phases.

Alternatively, despite demonstrating the influence of listener responses, topic presentation may have also been influenced by participants hearing themselves talk about certain topics (Palmer, 1998; Schlinger, 2008). Previous research has shown that certain topics of conversation can function as reinforcement (Roscoe et al., 2010). Although we attempted to include topics that were equally preferred, it is possible that our preassessment did not capture important differences in the topics that participants self-reported as highly preferred. For example, Elena consistently presented family (Nonrestricted Topic 1) for longer durations than food (Nonrestricted Topic 2) as topics of conversation across all phases. Moreover, all participants did not present topics equally when any topic produced interested listener responses during distributed interests phases. For instance, when performance stabilized in the last three sessions of the distributed interests phase, Emily and Katie engaged in near exclusive presentation of animals or food (Nonrestricted Topic 1), respectively. This indicates that talking about some topics may have been more reinforcing than others. Future research could evaluate the separate and interactive effects of listener responses and topic on speech using procedures similar to Conger and Killeen (1974).

Equally important are understanding the behavioral processes that contribute to adherence and how they can be leveraged to design effective interventions that promote adherence. It is important to note that Elena presented nonrestricted topics for longer durations than other participants when the confederate behaved as an uninterested listener for those topics.

However, she largely avoided uninterested responses from the confederate by either (a) pairing the presentation of the restricted topic with one of the nonrestricted topics or (b) sequencing the presentation of topics by presenting the restricted topic after a nonrestricted topic. For example, as can be seen in the top panel of Figure 4, Elena sometimes presented the topic of animals (restricted topic) in conjunction with the topic of family (nonrestricted topic) by stating something like, “My dogs are a part of my family because they have lived with us for a long time.” In contrast, Emily and Katie commonly presented topics in isolation (Figures 2 and 3). It is important to note that pairing or sequencing topics aligns with suggestions to embed restricted topics into interventions (Gunn & Delafield-Butt, 2016).

In light of these results, it is possible that incorporating restricted interests into interventions could impact caregiver adherence. To date, all published functional analyses of excessive speech about restricted topics have shown sensitivity to attention from a conversation partner and interventions have included differential reinforcement (Rehfeldt & Chambers, 2003; Roantree & Kennedy, 2012) or time-based delivery of attention (Noel & Rubow, 2018). A notable feature of these interventions is programming extinction for speech about restricted topics. Because intervention would entail withholding conversation about restricted topics, caregivers may experience lower rates of interested responses and higher rates of uninterested responses from individuals diagnosed with ASD. In contrast, Fisher et al. (2013) provided signaled access to restricted topics contingent on talking about nonperseverative topics or a therapist-selected topic. If individuals diagnosed with ASD exhibit higher rates of interested responses when talking about restricted topics, caregivers may be more likely to implement interventions that use restricted topics as reinforcement.

Future research could compare caregiver adherence across interventions with (Fisher et al., 2013) and without (Noel & Rubow, 2018; Rehfeldt & Chambers, 2003; Roantree & Kennedy, 2012) using restricted topics as reinforcement.

These findings also support the viability of manipulation by proxy when evaluating the influence of the behavior of individuals diagnosed with ASD on caregiver behavior. By having an experimenter act as an individual with ASD, we were able to evaluate the influence of the confederate's listener responses on caregiver presentation of topics while minimizing the likelihood of unsystematic variations in manipulated responses. Moreover, participants rated the simulation as highly believable, which speaks to the ecological validity of these findings. Future research could further evaluate the viability of using confederates to investigate the influence of listener interest on caregiver presentation of restricted topics. Results from previous studies have raised various concerns about the validity of procedures or conclusions derived from arrangements that involve experimental manipulations using confederates. For example, Miller et al. (2010) reported participant attrition and concerns of social acceptability, specifically in a context where the participants' verbal reprimands did not produce escape from the confederate's problem behavior. None of our participants withdrew from the study, and ratings on the social validity questionnaire indicated that they found the experience acceptable and recommendable. However, there are two notable differences between our procedures and those in Miller et al. (2010) that might account for differences in individuals completing participation. First, we did not program conditions in which aversive simulation was inescapable. Had we programmed inescapable aversive simulation, such as the confederate engaging in uninterested responses regardless of the participant's behavior, then we may have observed some degree of participants withdrawing from the study. Second, the topographies of behavior in those studies were more

severe in comparison to the uninterested responses that the confederate engaged in during this study. Severe topographies of behavior such as self-injury and property destruction may have more aversive properties that function as establishing operations over other behaviors. This was evident when participants in Miller et al. (2010) engaged in emotional responses such as crying during the study. Therefore, it is possible that even if we programmed inescapable uninterested responses, we may not have observed higher levels of participants withdrawing from the study. Future research could use objective preference assessments, such as concurrent chains arrangements, to evaluate the kind of simulated arrangements in which individuals would be more willing to participate.

Another important area for future research involves evaluating reactivity as a potential confound when using experimental arrangements that include adult confederates. Reactivity refers to the impact of experimental procedures (e.g., stating a rule) or awareness of observation on the behavior of interest (Kazdin, 1979). For example, Verplanck (1955) reported that college students stated more opinions when adult confederates acted as an interested listener (e.g., provided statements of agreement, nodded head, smiled) and stated less opinions when adult confederates acted as an uninterested listener (e.g., provided statements of disagreement). During 30-min conversations, the confederate either (a) did not provide any programmed consequences, (b) provided statements of agreement, or (c) provided statements of disagreement, or (d) did not respond to the participants opinions. Results supported the use of conducting sessions with confederates in nonexperimental settings in order to evaluate the influence of agreement and disagreement statements on the number of opinions stated by participants. However, subsequent replications reported in Azrin et al. (1973) found that outcomes were likely due to procedural errors, fabricated data, and the participant's awareness of the experiment.

Researchers conducted three experiments. In the first experiment, researchers replicated the procedures from Verplanck in a college classroom with one modification. Instead of conversing with undergraduate students, participants talked with graduate students who implemented the experimental manipulations and were aware of the procedures and results reported in Verplanck. Results were similar to those found in Verplanck; however, Azrin et al. reported that the experimental procedures were compromised (e.g., experimenter errors with timing), data were fabricated, and participants were aware of the experiment. Using similar procedures, the second experiment reported that statements of agreement provided by the experimenter increased the number of opinions stated by the participant in comparison to statements of disagreement. In contrast, results from the third experiment found that statements of disagreement increased the number of opinions stated by the participant in comparison to statements of agreement. The differences in number of opinions stated between the second and the third experiments were likely due to a rule that was stated prior to the conversations. Experimenters gave a rule that a state of “catharsis” is produced by providing statements of agreement, which would decrease the number of opinions stated. Whereas, “catharsis” would be prevented by providing statements of disagreement, which would increase the number of opinions stated. Therefore, it is possible that the different rules produced inverse outcomes between the experiments conducted in these two classes. This suggests that outcomes were due to participants reactivity to the rule. In this study, we attempted to minimize reactivity by deceiving participants about the purpose of the study. Responses on the social validity questionnaire further indicate that reactivity was minimized. Researchers could continue to use social validity questionnaires to assess the believability of an experimental arrangement and deception to reduce the likelihood of reactivity.

There are other limitations to the current study that could be considered in future research. First, because the confederate engaged in various interested and uninterested responses, it is unclear if specific listener responses influenced caregiver presentation of topics. It is also possible that all responses had an additive or compound influence on caregiver presentation of topics (Michael et al., 2011). A component analysis would reveal the listener responses that influence presentation of restricted topics, and future caregiver training programs could focus on developing interventions that allow caregivers to access the specific responses that influence their presentation of topics. Second, our measurement system did not capture some important dimensions of topic presentation. For example, participants sometimes presented open-ended or close-ended questions, and there were also times when they provided models of appropriate answers when the confederate acted uninterested. These could be important features of topic presentation that could guide caregiver training programs on how to increase the interested responses of individuals diagnosed with ASD to nonrestricted topics. Future studies could measure other important dimensions of topic presentation.

Results of this study showed that caregiver presentation of restricted and nonrestricted topics was controlled by the listener responses of an experimenter acting as an individual diagnosed with ASD. Our social validity findings suggest that caregivers found our procedures acceptable, believable, and useful, which provides basis for further research on manipulation by proxy to evaluate other child behaviors that potentially influence caregiver behavior. Future research is necessary to evaluate variables that impact caregiver presentation of restricted topics in applied settings, in attempts to increase adherence to recommended interventions and caregiver training programs.

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APPENDIX A: PARTICIPANT CHARACTERISTICS

Table 1
Participant Characteristics and Conversation Topics

Participant	Age (years)	Sex	Major	Conversation Topics
Emily	19	Female	Biology	Music*, animals, family
Katie	19	Female	Psychology	Music*, food, family
Elena	19	Female	Psychology	Animals*, family, food

Note. *Restricted topic.

Table 2
Interobserver Agreement for Presentation by Topic M (session range)

Participant	Restricted Topic	Nonrestricted Topic 1	Nonrestricted Topic 2
Emily	96% (84–100%)	100%	99% (94–100%)
Katie	95% (87–100%)	97% (91–100%)	98% (94–100%)
Elena	96% (90–100%)	96% (90–100%)	88% (80–97%)

Table 3
Participant Social Validity Ratings

Questionnaire Items	Emily	Katie	Elena	Mean
Rate the acceptability of engaging in conversations with an adult confederate.	6	6	5	5.67
How likely would you participate in this type of simulation in the future?	6	6	6	6
Rate the acceptability of developing intervention goals that focus on decreasing restricted interests.	7	5	5	5.67
Rate the believability of the simulation.	6	7	7	6.67

Note. 1 = not acceptable, not likely, not believable and 7 = highly acceptable, very likely, highly believable

APPENDIX B: FIGURES

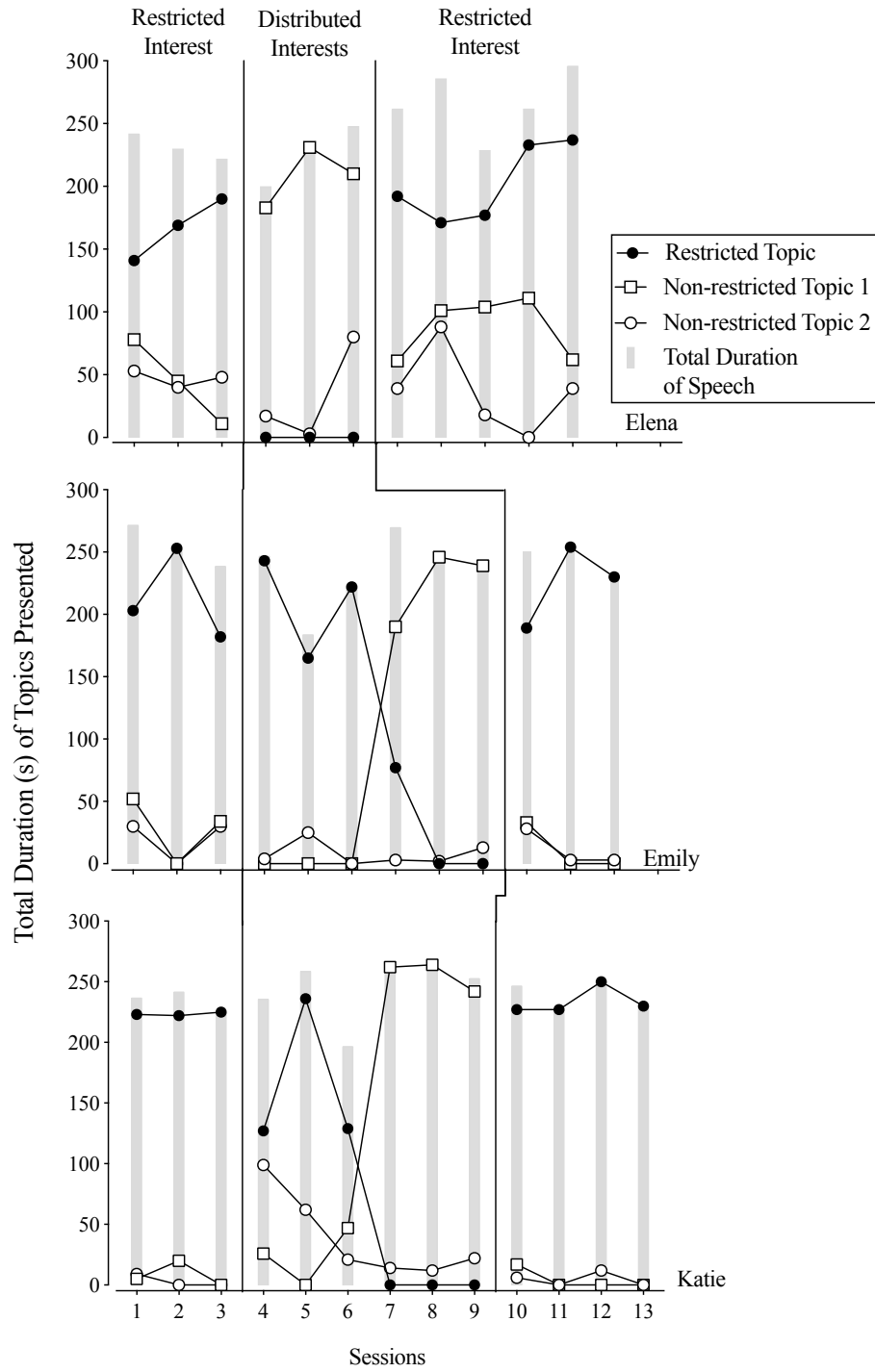


Figure 1. This graph depicts the total duration of topics presented for three participants.

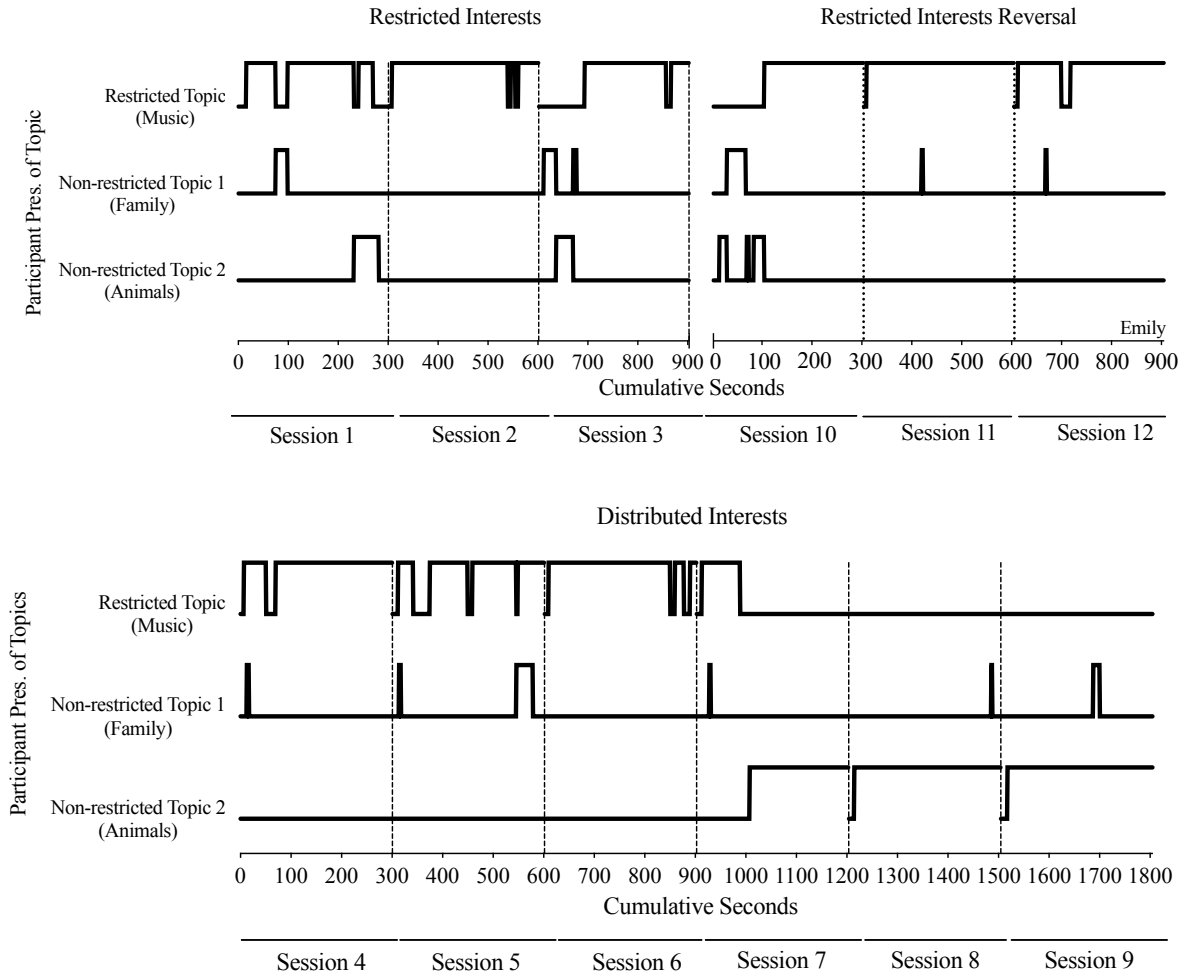


Figure 2. Within-session data depicting Emily's presentations by topic. Presentation of a topic is noted by blips in the corresponding data paths.

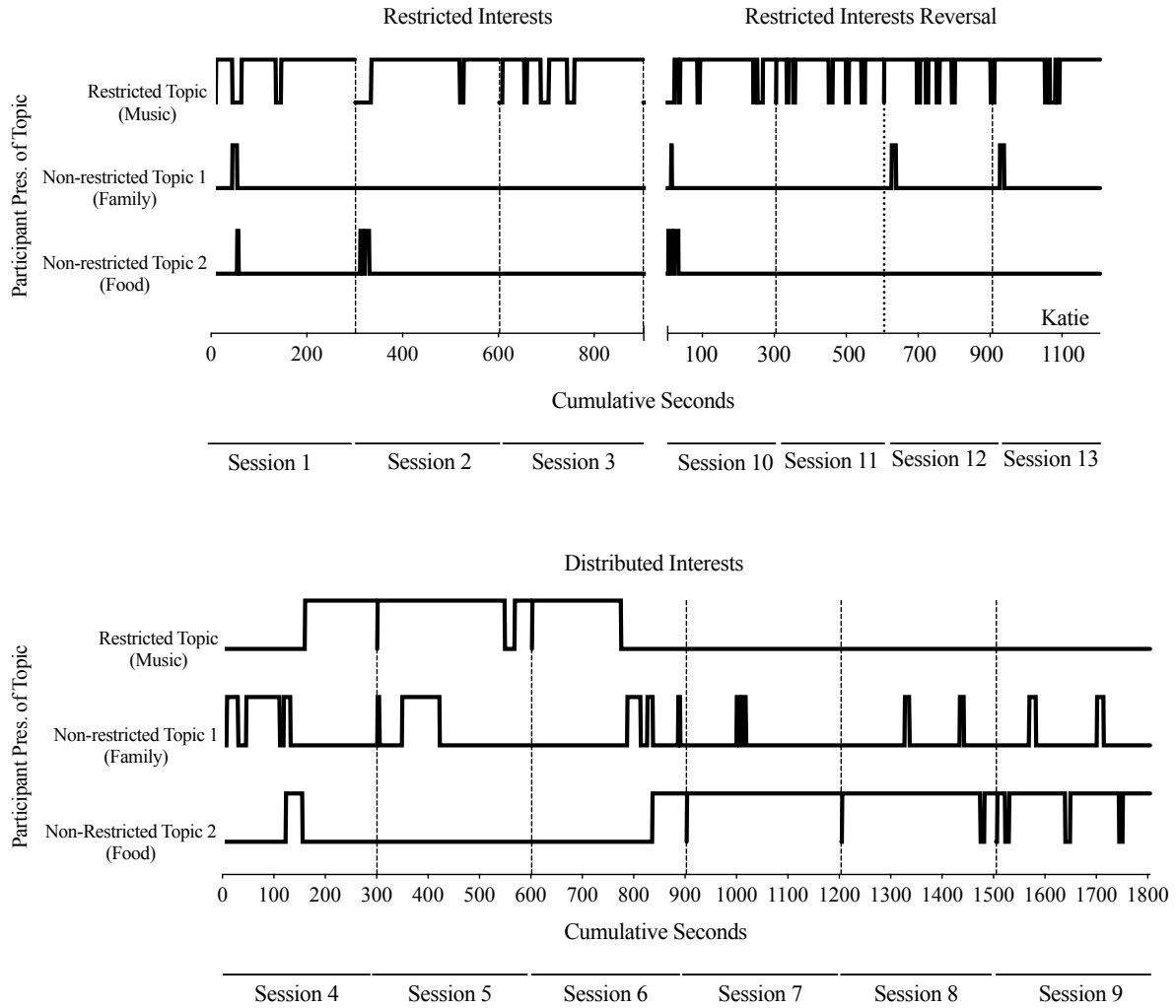


Figure 3. Within-session data depicting Katie's presentations by topic. Presentation of a topic is noted by blips in the corresponding data paths.

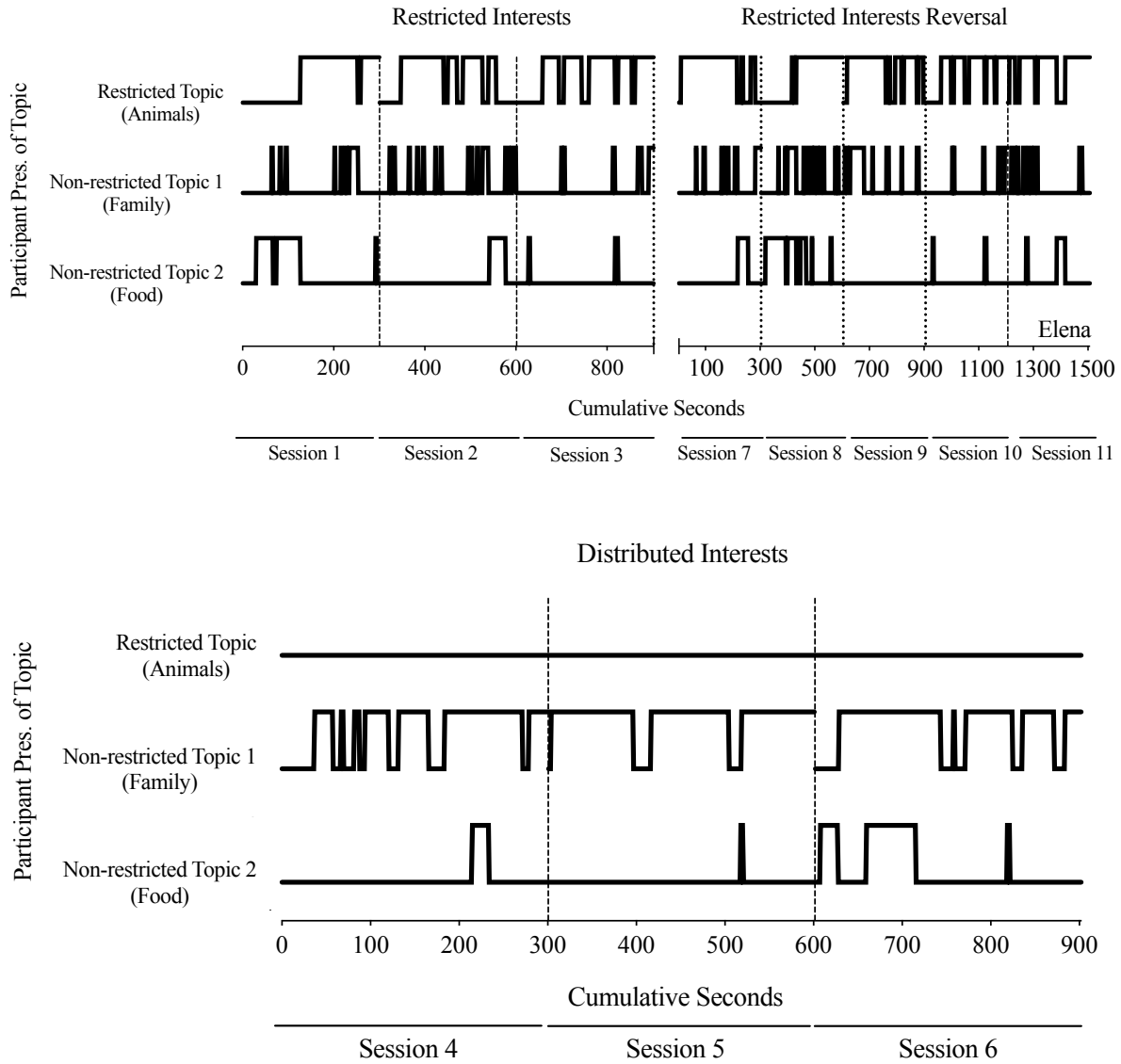


Figure 4. Within-session data depicting Elena's presentations by topic. Presentation of a topic is noted by blips in the corresponding data paths.

APPENDIX D: SOCIAL VALIDITY QUESTIONNAIRE

Participant's Name _____

Date: _____

1. Rate the acceptability of engaging in conversations with an adult confederate.

1 2 3 4 5 6 7

Not Acceptable

Highly Acceptable

2. How likely would you be to participate in this type of simulation in the future?

1 2 3 4 5 6 7

Not Likely

Very Likely

3. Rate the acceptability of developing intervention goals that focus on decreasing restricted interests.

1 2 3 4 5 6 7

Not Acceptable

Highly Acceptable

4. Rate the believability of the simulation.

1 2 3 4 5 6 7

Not Believable

Highly Believable