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Developing a Taxonomy of Coaching Behavior

Andrew S. Massey
St. Cloud State University, maan1101@stcloudstate.edu

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by

Andrew S. Massey

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Benjamin Witts, Chairperson
Kimberly Schulze
Michele Traub

Abstract

In the field of applied behavior analysis, there is currently a lack of technicality pertaining to the term *behavioral coaching*. Previous research has investigated the use of behavioral principles applied to training coaches to shape behaviors. However, there is currently no behavioral literature available that has investigated how coaches allocate their behavior throughout practice. The purpose of the current study was to develop a taxonomy of coaching behavior that may aid behavior analysts to better analyze coaching behaviors by investigating what behaviors coaches engage in. A descriptive assessment identified 16 coaching behaviors that will be used throughout the study. A descriptive field assessment illustrated the type of behavior, when the behavior occurs, and how often coaches engage in these behaviors throughout multiple basketball practices.

Keywords: behavioral coaching, athletics, descriptive field assessment, Behavioral Coaching Inventory

Acknowledgments

Mom and Dad, this is for you. Mom, you have taught me that pursuing my dreams can become a reality. Your sense of humor and love for everything you do inspires me in all aspects of life; thank you. Dad, your work ethic, humility, and love are unwavering. Thank you for all the sacrifices you have made, they have not gone unnoticed.

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Chapter 1: Introduction

Rushall and Siedentop (1972) advocated for the use of operant procedures to improve coaching and physical education behaviors. As a prominent example of answering Rushall and Siedentop's call, Allison and Ayllon (1980) compared a five-step behavioral coaching procedure to a standard coaching model across three sports: football, gymnastics, and tennis. *Standard coaching* consisted of specific coaching responses to three different situations. One, prior to a drill, coaches provided instructions. Two, when the athlete's behavior in the drill was executed correctly, coaches intermittently provided brief praise. Three, if a player did not successfully perform the drill, the coach intermittently provided one or more of the following: a) corrective feedback, b) modeling, c) overcorrection procedures, and d) putatively aversive statements, often in the form of yelling, consisting of statements of the player's poor performance or lack of knowledge or skill.

In comparison to standard coaching, *behavioral coaching* involved a five-step process, again set against three possible situations (Allison & Ayllon, 1980). Prior to having the athlete perform the behavior, the coach provided the players with instructions on the skill, which also included a description of consequences for correct and incorrect responding. If the player performed the behavior correctly, the coach would provide feedback regarding the accuracy of their response. When the behavior was performed incorrectly, the coach would a) interrupt the drill, b) describe to the athlete how the behavior was performed incorrectly, c) model the correct behavior, and d) the athlete correctly imitated the coach's model. Across all three sports behavioral coaching was found to be superior to standard coaching in terms of increasing skill performance.

While Allison and Ayllon (1980) brought recognition to the term *behavioral coaching*, Martin and Hrycaiko (1983) provided insight as to what behaviors should be considered when addressing behavioral coaching. Martin and Hrycaiko (1983) described six characteristics that comprise effective behavioral coaching: a measurement of athletic performance, being able to discriminate developing and maintaining athletic performance, establishing a motivating factor to continue to improve athletic performance, advocating for the use of behavioral procedures and data to analyze athletic performance, applying the principles of behavior to coach behavior, and finally, selecting target behavior(s) socially important to all those involved.

However, despite the direction provided by Allison and Ayllon (1980) and Martin and Hrycaiko (1983), behavior analytic investigations into coaching behavior have generally lacked the comprehensive nature seen in these early works, opting instead to focus on particular athlete's skills. For example, Osborne, Rudrud, and Zezoney (1990) improved the efficiency of hitting a curveball in collegiate baseball players by gradually fading the size of within stimulus prompts on a baseball. Fogel, Weil, and Buris (2010) used TAGteach (teaching with acoustical guidance) to teach a novel golfer a golf swing. In football, Stokes, Luiselli, Reed, and Fleming (2010) improved the rate of offensive line pass blocking in high school athletes using a multiple baseline design and behavioral coaching treatment package consisting of descriptive feedback, descriptive feedback plus video feedback, and TAGteach.

Behavior analysts have also begun to investigate how the use of principles of behavior can be applied to athletics without focusing on behavior change. Beginning with Vollmer and Bourret (2000), there have been a number of articles published that investigated the application of the matching law to both collegiate and professional sports. The matching law (Hernstein,

1961), demonstrates that if one behavior is reinforced at a specific rate and then an additional behavior is also reinforced at an additional rate, then the behavior that produces the most reinforcement with the least level of effort will be emitted most frequently. Vollmer and Bourret (2000) first investigated the universality of the matching to athletics by evaluating two and three-point shot locations in collegiate basketball players; Seniuk, Williams, Reed, and Wright (2015) applied the matching law to professional hockey investigating shots on goal; finally, Cox, Sosine, and Dallery (2017) applied the law to professional baseball by investigating the type of pitch pitchers threw.

The application of behavioral principles applied to a multitude of athletic sports as well as training coaches is an excellent example of how applied behavior analysis is continuing to evolve and disseminate into other fields of study. Notwithstanding the progress that has been made in athletics, there is still more that can be investigated. Luiselli, May, and Reed (2011) advocated for the continuation of applying the matching law to athletics as well as how behavioral momentum can assist coaches and management. While these studies may provide insight as to how behavioral principles can and are being applied to athletics, these types of data analyses are being done by statisticians. Before further progress is made in the dissemination of behavior analysis to athletics we must ask one another the direction we wish to go and what behaviors and interventions are socially acceptable? One possibility is to critique and improve behavioral coaching. As Seniuk, Witts, Williams, and Ghezi (2013) pointed out, there is still an inconsistency with the definition and the behaviors that behavioral coaching includes. A question that has yet to be answered in the field of ABA is what is the criteria to be a *good* coach? While

Martin and Hrycaiko (1983) outlined characteristics of what behavioral coaching should look like, we have no data on what behaviors coaches typically produce.

Several studies outside of the field of applied behavior analysis have already begun to investigate these behaviors. Tharp and Gallimore (1976) observed eight practices for 2 hours as a pilot study, investigating predominate and targeted coaching behaviors of John Wooden. During these practices, 10 targeted coaching behaviors were identified: *Instructions*: explanation of a behavior and how it should be performed; *Hustles*: intense statements intended to intensify the practice atmosphere; *Modeling-Positive*: a correct model of a behavior; *Modeling-Negative*: a model of an incorrect behavior; *Praises*: reinforcement statements; *Scolds* (Reproofs): abolishing or aversive statements; *Nonverbal Reward*: facial signs and physical contact of approval; *Nonverbal Punishment*: facial signs of disproval, player removed from drill; *Wooden* (scold/reinstruction): behavioral package of scold, positive model, negative model, and positive model; *Other*: any behavior that is not listed; *Un-codable*: behavior that is not audible or cannot be seen (Gallimore & Tharp, 2004; Tharp & Gallimore 1976).

By recording the occurrences of each behavior, the results of the study (Tharp & Gallimore, 1976) indicated that *Instructions* accounted for slightly over 50% of all behaviors, followed by *Hustles* (12.7%), and then *Positive Model* (2.8%). In addition to the most frequent coaching behaviors, the lowest emitted behaviors were: *Nonverbal Rewards* (1.2%), *Model-Negative* (1.6%), and *Other behaviors* (2.4%) (Tharp & Gallimore, 1976).

Lacy and Darst (1984) expanded on the observation instrument that Tharp and Gallimore (1976) used by creating the Arizona State University Observation Instrument (ASUOI). The observation form includes 14 coaching behaviors—many of which were included in the study

conducted by Tharp and Gallimore. Targeted behaviors included *Pre-Instruction*: instructions given prior to the drill or onset of behaviors; *Concurrent Instruction*: prompts or instructions provided during the drill or occurrence of the behavior; *Post-Instruction*: feedback or instruction provided after the drill or behavior had been performed; *Questioning*: questions that are directed at the players; *Manual Manipulation*: the physical manipulation of assisting the player through the correct body movements for a desired behavior; *Positive Modeling*: the correct behavior or skills being modeled; *Negative Modeling*: the incorrect behaviors or skills being modeled; *Use of First Name*: the use of a first name/nickname when speaking to a specific player(s); *Hustle*: statements that are intended to increase the intensity of practice and improve practice behavior; *Praise*: verbal statements or nonverbal actions that intend to show approval—physical contact that showed approval was also included; *Scold*: verbal or nonverbal statements or actions intended to show disproval and displeasure of specific behavior(s); *Management*: statements pertaining to the organization or structure of drills or practice—this could be for players or other coaches; *Silence*: when recording behaviors using an interval recording method, duration of time when the coach is not engaging in one of the above behaviors; *Other*: any behavior that cannot be classified as one of the above behaviors (Lacy & Darst, 1984).

Similar to Tharp and Gallimore (1976), no dependent measures were investigated in the article by Lacy and Darst (1984). Rather the article outlined various recording methods that investigators can use with the ASUOI such as interval recording, validity measures, and interobserver agreement.

Bloom, Crumpton, and Anderson (1999) also directly observed coaching behaviors of one of the winningest coaches in NCAA Division I Men's Basketball history (NCAA.org), Jerry

Tarkanian. In an extension of Tharp and Gallimore (1976), Bloom and colleagues (1999) used a similar recording form; the Revised Coaching Behavior Recording Form (RCBRF). The RCBFR consists of 12 coaching behaviors: *Technical Instruction*: specific player behavior and correcting inappropriate player behavior; *Tactile Instruction*: offensive and defensive plays and strategies; *General Instruction*: instruction-type behaviors that did not meet the criteria for technical or tactile instruction; *Hustles*: verbal statements that were intended to increase player performance; *Praise/Encouragement*: verbal statements that were intended to increase future player behaviors; *Scolds*: verbal statements of disproval; *Nonverbal Punishment*: facial behaviors of disproval; *Criticism/Reinstruction*: verbal statements of displeasure towards a player'(s') behavior and then instruction of how to properly execute target behavior; *Modeling*: model of how to correctly perform a target behavior; *Nonverbal Rewards*: socially appropriate facial gestures or physical contact; *Humor*: verbal statements that were intended to make the player(s) laugh or smile; *Uncodable*: any behavior that were not audible or visible. In addition to recording coaching behaviors, a *comments* section was provided on the recording sheet to note any unusual occurrences or ideas.

Bloom et al. (1999) observed three 2-hour practices as a pretest to ensure behaviors and definitions were accurate. Similar to the results of Tharp and Gallimore (1976), the results indicated that instructions (50.3%) and hustles (12.7%) were the two most frequent behaviors that the coach engaged in. However, the RCBRF included separate instruction categories: *Tactile* (29%) and *Technical* (13.9%), resulting in a total of 42.9% of instruction behaviors.

Researchers using taxonomical recordings provide one means of coding behavior. An alternative method is to directly observe and record behavior in a continuous fashion. Bijou,

Peterson, and Ault (1968) advocated for the use of descriptive observation methods as a starting point for systematic investigations and behavior change efforts. This method of recording provides a continuous log of not only the occurrence of behaviors, but can also provide a pattern of certain behaviors occurring before or after other behaviors. As Bijou et al. pointed out, descriptive recording methods as well as experimental studies yield continuous, reciprocal, and synonymous results. By observing and recording only observable and measurable behaviors (see also Baer, Wolf, & Risley, 1968), data is portrayed in a manner of validity and reliability (Wolf, 1978) that can therefore be measured via experimental studies.

As previously stated, the field of behavior analysis has demonstrated numerous accounts of behavioral principles effectively applied to athletic behaviors and describing athletic events in behavioral laws. However, as a field, ABA has yet to operationalize coaching behaviors or identified response classes of coaching behavior across different sports. Once a taxonomy of coaching behaviors is identified, behavior analysts can work to determine which behaviors are functionally related to different athletic outcomes. Following a functional analysis, we can work with coaches to increase deficit behaviors and decrease excess behaviors. In doing so, the technicality of *behavioral coaching* is addressed.

To better develop a valid taxonomy of coaching behavior, the author conducted a pilot investigation. This pilot experiment was conducted to determine what coaching behaviors might be important, when the behaviors occurred, and the duration and frequency of these behavior. Behavioral definitions were then constructed from these observations. To aid in field study research, a 5-s and 10-s partial- interval recording method was used to determine what interval would most accurately illustrate the occurrence and non-occurrences of coaching behavior.

Chapter 2: Pilot Experiment

Methods

Participants. No participants were used in the pre-experiment. Coaching behaviors were obtained through YouTube.com and searching for "full length basketball practice." Video clips were from varying collegiate basketball programs of NCAA Division I and one Division III program. Videos were selected by name recognition of the head coach, his previous history of regular and post-season success, and the duration of the videos.

Setting and Materials

A personal computer was used to watch practice videos on YouTube.com. All practices took place in a collegiate gymnasium that included several basketball hoops and a collegiate regulation size court with regulation lines. Practice equipment, number of coaches, number of managers, and number of players varied per video. The Revised Coaching Behavior Recording Form (RCBRF; Bloom et al., 1999; Appendix A) and the Arizona State University Observation Recording Form (Lacy & Darst, 1984; Appendix B) were used as a reference to observe coaching behaviors. The behavior guidelines were used to determine if one recording form was more accurate than the other, if the definitions of the behaviors needed to be modified, if any behaviors were irrelevant for behavior analytic investigations, and if any behaviors should be added.

Interobserver Agreement

All data collection and observations were done by the experimenter. The purpose of the pre-experiment was to create an exhaustive list of coaching behavior deemed to be important. Identifying and defining behaviors in observable and measurable terms allows future research the

ability to extend and refine a taxonomy of coaching behaviors. As a result, there was no need for a second observer.

Procedure

YouTube.com was used to search for collegiate basketball practices that were already uploaded to the website. The search term “full length basketball practice” was used that identified a practice clip that was just over sixty minutes in length. Related videos were found in a *Suggested for You* category on that site.

Videos were watched by the experimenter and behaviors were recorded using a 5 s and 10 s partial interval recording, and also a descriptive recording method. For the 5 s and 10 s partial interval recording method, behaviors were scored as an occurrence if the behavior occurred at all during the interval. Each occurrence of a behavior during an interval resulted in the experimenter writing the coded number in the respective interval (refer to Appendix A and B for respective coding numbers). When more than one behavior occurred during an interval, behaviors were recorded in the order of occurrence. If more than one behavior occurred simultaneously, an asterisk was placed on in the top right of the coded behavior number. During the descriptive assessment method, the behaviors were recorded in the same manner as described by Bijou and colleagues (1968). The coach’s behavior served as the anchor or *behavior* during anecdotal recording and players’ behavior was either an antecedent or consequence.

Results and Discussion

Results from the pre-experiment that investigated behaviors from the RCBRF (Bloom et al., 1999) and the ASUOI (Lacy & Darst, 1984) indicated that neither recording form yielded consistent or informative results for the coaching taxonomy. The lack of observable and

measurable definitions for both recording forms (RCBRF and ASUOI) resulted in inconsistent coding for both recording forms and across intervals (see Appendix A and B for example).

Due to the ambiguous results from the RCBRF and ASUOI recording forms, a descriptive assessment was conducted. A running narrative of coaching behavior (refer to Appendix C for example) illustrated the types of behaviors a coach engages in as well as when the behaviors are likely to occur. Behaviors observed from the descriptive assessment identified 16 possible behaviors (Appendix D; Table 1). The identified behaviors became part of a coaching behavior taxonomy called the Behavior Coaching Inventory (BCI) (Table 1). These behaviors were then classified as either a proactive (antecedent) response or a reactive (consequent) response. Due to the types of the behaviors (instruction or feedback), several behaviors that were categorized under instruction were also categorized under feedback. Anecdotally, this may have contributed to the inconsistent recording of the RCBRF and ASUOI recording forms. For example, a coach modeled what he wanted his players to do during a drill and also performed the same model after the drill was completed. This model would only be classified as a model with previous coaching taxonomies. If a coach were to engage in the same behaviors using the BCI, the behaviors were coded differently. The first behavior was an antecedent for future player behavior, it was a model, and it was duplicative. The same can be said for the model that occurred following a drill; the behavior was reactive, it was a model, and it was duplicative. Categorizing behaviors into antecedent or responsive levels may allow for a more accurate and informative coaching taxonomy.

Chapter 3: Experiment

Methods

Participant. The participant was the head men's basketball coach at an NCAA Division II midwestern university who had 20 years of coaching experience.

Setting

Observations occurred at the university gymnasium and all sessions were recorded from the mezzanine. The gymnasium court conformed with NCAA size, width, and markings, and consisted of 6 regulation basketball hoops, and can seat over 1500 attendees on either bleachers or the mezzanine. Practice format varied across days of the week, but were consistent across weeks, with more intense demands being placed on Tuesdays and Wednesdays compared to Mondays, and Thursdays. Only practices that occurred on the university main court were observed; film study, weight training, and any other mandatory team activity that did not occur in the gymnasium were not observed.

Materials

The Behavioral Coaching Inventory (BCI), consisting of 16 behaviors, identified by the results from the pilot study was used to code coaching behaviors. The BCI consisted of coaching behaviors that were identified by the experimenter after conducting a descriptive assessment on coaching behaviors from college basketball practices available on YouTube. BCI behaviors were defined in observable and measurable terms and categorized into three levels: Level 1: proactive or reactive; Level II: the class of behavior; and Level III: whether the behavior was behavior-specific, generic, or a sub-class of a Level II behavior. A Sony 8.9 megapixel video camera, Bogen tripod, Olympus digital voice recorder, and Audio-Technica microphone were used

during all practice sessions to record coaching behavior. Data were coded on an Excel spreadsheet see (Appendix E) for example.

Procedure

Data were coded using a 5-s partial interval descriptive field study analysis. Results from the pilot study indicated that a 5-s (Appendix F) partial interval would provide a more accurate representation of the occurrence of behaviors compared to a 10-s partial interval (Appendix G). Similar to how the data were coded during the pilot experiment, target behaviors were coded upon the order of occurrence within each interval. Behaviors were coded by distinguishing if the behavior was an antecedent ($_A$) or a response ($_R$), the class of behavior (e.g., model; M), and the sub-class of the behavior (e.g., oppositional; $_O$). For example, if the coach engaged in a duplicative model prior to when the athlete's behavior occurred, it would be coded as $_AM_D$ (i.e., antecedent Model duplicative), or if the coach said, "nice shot" following a shot, the behavior would be coded as rPv-g (i.e., reactive Praise vocal generic as a response to player behavior). Not only does this recording method illustrate what type of behavior the coach engaged in, it also provides a description of when it occurred in relation to another behavior and its potential effect on future behavior. Additionally, this method eliminated the possibility of recording the wrong order of behavior. Using previous recording methods (RCBRF or ASUOI), if a coach were to provide an instruction and model the incorrect behavior of where players should be, while also pointing to the position on the court, rather than having to code three separate behaviors in order of occurrence, it would now be scored as two (e.g., aMo, aPg*).

Video footage was downloaded from the video camera to an external, password protected hard drive by the experimenter and saved as *year_month_date_sessionnumber* that only the

experimenter and select members of the University Technology Services Department had access to. Members of the IT department assisted in synchronizing the audio files to the video files.

Prior to the study, the experimenter emailed the director of athletics at the university for permission to conduct the study. Once the director of athletics permitted the study, the coach was recruited by the experimenter to participate in the study. The experimenter contacted the potential participant via email requesting to meet and discuss possible participation in the study. During the meeting, the experimenter explained the purpose of the study and informed him that no information could or will be used against him, and that all behaviors would be coded as to eliminate any possibility of identifying information or comments. With permission from the faculty advisor, the experimenter provided an example of two possible coach:player exchanges and how each comment would be coded (see Appendix H).

Prior to the first practice session, the experimenter provided the participant with the voice recorder and instructed the participant how to start and end the recorder as well as where to place the microphone. At the beginning of every home practice, the experimenter set up the video camera on the mezzanine of the university gymnasium. Data collection began after warm-up stretches for every session except the first session, which was started prior to team stretches when the participant signaled to the experimenter that his microphone and voice recorder were on. A total of 13 practices were observed, but due to technological malfunctions, 4 practices were omitted from data analysis; resulting in 9 sessions of possible data analysis.

Chapter 4: Results

Data were reported as percent of overall occurrence, similar to Tharp and Gallimore (1976) and Bloom et al. (1999), across sessions (Figures 1-16), as well as the conditional probability of occurrence across behaviors (see McCommas et al., 2009). Percentage of occurrence ranged from over 30.5% (aIv) to 0% (aPp); aIv occurred 30.600%, followed by aPg (17.450%), aGEOv-v 11.578%, rCFc-s (11.467%), rPv-g (9.097%), rPg (8.601%), aPv-v (7.867%), rCFc-g (1.917%), rPv-s (<1%), rMd (<1%), rMo (<1%), aMd (<1%), rPn-v/pc (<1%), rGEOv-v (<1%), aMo (<1%), and aPp (0%) (see Table 2).

Conditional probabilities were investigated for all 16 behaviors and are reported if the conditional probability of occurrence was ≥ .05. aIv was the most frequently occurring behavior and was conditionally followed by aPg (.550) and aGEOv-v (.124) (Table 3). Given the occurrence of aPg, aGEOv-v occurred .125 of the time (Table 4). If aGEOv-v occurred, aPv-v also occurred .089 (Table 5). Given the occurrence of rCFc-s, behavior that met the conditional probability inclusion criteria were: rPg.(696), aIv (.088), aPg (.057), and aGEOv-v (.050) (Table 6). If rPv-g occurred, aIv also occurred (.133) and aPv-v (.080) (Table 7). rPg was conditionally followed by aIv (.078) (Table 8). If aPv-v occurred, it was conditionally followed by aGEOv-v (.166), rPv-g (.09), and aIv (.052) (Table 9). Given the occurrence of rCFc-g, rPg occurred .217 of the time, followed by aIv (.179), aGEOv-v (.132), and aPg (.057) (Table 9). When rPv-s occurred, it was conditionally followed by aIv (.238), rPg (.195), and rCFC-s (.095) (Table 10). Conditional probabilities for rMd that met inclusionary criteria were: rPg (.211), aIv (.152), aPg (.152), and rMo (.052) (Table 11). rMo occurred a total of times throughout the 9 seasons and was conditionally succeeded by: rPg (.417), rCFCc-s (.167), aIv (.083), aPg (.083), and rMd

(.083) (Table 12). Given the occurrence of aMd, aPv-v (.4) was the lone behavior that met the inclusion criteria of ≥ .05 (Table 13). If rPn-v/pc occurred, it was conditionally succeeded by aPv-v (.250) (Table 14). Although rarely occurring, rGEOv-v occurred 5 times, and was conditionally succeeded by rPv-s (.400) and rPn-v/pc (.200) (Table 15). Given aMo, aMd conditionally occurred .667 of all opportunity (Table 16). Finally, aPp was not observed throughout the course of the study and therefore, does not have any conditional responses.

Chapter 5: Discussion

Similar to the findings of Tharp and Gallimore (1976) and Bloom and colleagues (1999), instruction (aIv) was the most frequent occurring behavior across sessions. Additionally, antecedent generalized establishing operation (aGEOv-v), which are similar to Hustles (Bloom et al., 1999; Tharp & Gallimore, 1976) was also a frequently occurring coaching behavior (14.450%). However, the present study extended several important aspects of literature investigating coaching behavior: the present study investigated conditional probabilities of one coach's behavior compared to another behavior, as well as investigated the behavior from an applied analytic perspective.

While percentage of occurrence across sessions (Table 3-18) provides the consumer important qualitative information, the investigation of conditional probabilities may provide the consumer with even more information. For example, aIv occurred almost 1700 times throughout the study, but was succeeded by, or occurred concurrently with aPg 55% of the time, as well as aGEOv-v over 12% of the time. Although this does not depict when all three behaviors occurred concurrently, or aIv occurred and was followed by aPg and not aGEOv-v, or vice versa, it does open up avenues for future research. Does an instruction (aIv) that occurs concurrently with a gestural prompt (aPg) as well as a generalized establishing operation (aGEOv-v) have a greater impact on player behavior than an instruction occurring independently or with only one successive behavior? Additionally, aPg was the second most frequently occurring behavior (967; 17.450%) and was succeeded by or occurred concurrently with aGEOv-v 12.400% of the time, only 1% less than it did with aIv.

Research has illustrated that behavior-specific feedback is more effective at identifying a target or replacement behavior compared to generic feedback (Martin & Hrycaiko, 1983). Compared to generic feedback (rCFc-g), specific feedback (rCFc-s), rCFc-s occurred more frequently than rCFc-g, in terms of corrective feedback, but generic praise statements (rPv-g), such as “nice shot” occurred far more frequently than behavior-specific praise statements (rPv-s). Consequently, this leads to another question: what is more effective at identifying the target behavior? Conversely, because behavior-specific praise occurred less frequently compared to generic praise, is the occurrence of a behavior-specific praise statement more reinforcing because it occurs less frequently?

The purpose of this study was to extend the literature on behavioral coaching and to identify what behaviors athletic coaches engage in, how frequently they engage in target behaviors. The application of conditional probabilities also provides an illustration of what behaviors occur independently, concurrently with other target behaviors, and/or are succeeded by other behaviors. While this study extends the literature on behavioral coaching, it is not without limitations. First, no interobserver agreement was conducted. While important to determine the reliability and replication of target behaviors, future research should investigate the application of chance agreement (Hopkins & Hermann, 1977) compared to overall agreement. This method of reliability will demonstrate the advantages as well as limitations of the BCI. A second limitation of the study is that the BCI did not contain several important coaching behaviors. One behavior that was noticeably absent was a probe. On several occasions throughout the study, the coach would probe the players on specifics of a certain play or an instruction that he had just given. This is something that future research should investigate. Although, anecdotally,

hypothetical probes did not occur as frequently as instructions or other prompts, the addition would be advantageous to the coaching literature. An additional behavior that was absent from the BCI was humor. While included in Tharp and Gallimore (1976) and Bloom et al. (1999), it may provide insight as to when a coach engages in this behavior and its impact on player behavior.

Finally, it was not the intent of this study to determine what behaviors *good* coaches engage in, how frequently they are emitted, or what behaviors they occur with. The purpose of this study was to determine what behaviors coaches engage in and to extend the literature on behavioral coaching in the field of applied behavior analysis. With the results of the present study, future research should continue to investigate coaching behaviors, but also determine player behaviors, just as was done during the descriptive study of this experiment. Once the first two components of this analysis had been extensively researched, then, we can investigate what behaviors coaches engage in, their effect on player behavior, and the effect that the player behavior has on the future coaching behavior.

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Appendix A: Revised Coaching Behavior Recording Form

Revised Coaching Behavior Recording Form (Bloom et al., 1999)

1	Technical Instruction	The skill-based dimension that encompasses the pedagogical aspects of coaching and often involves correcting individual skills
2	Tactical Instruction	Teaching the cognitive strategies used by coaches to outsmart their opponents (teaching plays and offensive/defensive strategies)
3	General Instruction	Verbal statements outside the guidelines of technical or tactical instruction (e.g. repeating drills, player substitutions, water breaks, injury stoppages, instructions to assistants
4	Hustles	Verbal statements that activate, intensify, or energize the athletes. These statements do not necessarily contain positive or negative aspects
5	Praise/Encouragement	Verbal statements that are positive and encouraging. (statements about players' effort and performance)
6	Scolds	Verbal statements of displeasure and anger
7	Nonverbal Punishment	Nonverbal acts that include scowls and gestures of despair
8	Criticism/Reinstruction	Verbal statements that relay players' inappropriate acts or behaviors. Statements that explain the correct act or behavior sought by the coach immediately follow
9	Modeling	A demonstration of how or how to not perform
10	Nonverbal Rewards	Nonverbal compliments or encouragement (smiles, nods, pats)
11	Humor	Verbal statements that include jokes or contain content designed to rela the players and make them smile or laugh
12	Uncodable	Behaviors that could not be clearly heard or seen

Appendix B: Arizona State University Observation Inventory

Arizona State University Observation Inventory (Lacy & Darst, 1984)

1	Pre-Instruction	Initial information given to player(s) preceding the desired action to be executed. It explains how to execute a skill, play, strategy, etc., associated with the sport.
2	Concurrent Instruction	Cues or reminders given during the actual execution of the skill or play.
3	Questioning	Correction, re-explanation or instructional feedback given after the actual execution of the skill or play.
4	Manual Manipulation	Physically moving the player's body to the proper position or through the correct range of motion of a skill (e.g., guiding the player's arm through the movement of a tennis serve or aligning a golfer's stance for a correct swing.
5	Positive Modeling	A demonstration of correct performance of a skill or playing technique
6	Negative Modeling	A demonstration of incorrect performance of a skill or playing technique
7	Use of First Name	Using the first name or nickname when speaking directly to a player (e.g., "Nice pass, Bill!" or "Tank, that was a poor tackle").
8	Hustle	Verbal statements intended to intensify the efforts of the player(s) (e.g., "Be quick, be quick" or "Push yourself, push yourself").
9	Praise	Verbal or nonverbal compliments, statements, or signs of acceptance (e.g., "Nice going, gang" or smiles or pats on the back).
10	Scold	Verbal or nonverbal behaviors of displeasure (e.g., "That was a terrible effort," or scowling or kicking the ground).
11	Management	Verbal statements related to organizational details of practice sessions not referring to strategies or fundamentals of the sport (e.g., "Make three lines facing me on the goal line." or "Coach, is your group ready to scrimmage?").
12	Silence	(Used only with interval recording.) Periods of time when the subject is talking, players are running sprints, player is talking, etc.
13	Other	Any behavior that cannot be seen or heard, or does not fit into the above categories (e.g., checking injuries, joking with players, talking with bystanders).

Appendix C: Descriptive Assessment Results for Pilot Experiment

Time	Antecedent	Behavior	Consequence
:05	Players dribbling up the court during a drill	"Here ya go, you're looking at it."	Players dribble up the court to the drill
:08		"Get to that spot"	Players get to spot
:09		"Alright, here we go. Let's do it again."	
:12	Players get to the opposite side of the floor	"Alright, stop."	Players stop
		Coach pulls the point guard back and tells the forward to go get the ball	Forward gets the ball
		Coach pushes point to start going to spot on floor where he is suppose to be.	
		Begins explaining why it is important for players to be in correct position for this.	Player passes the ball to the court.
:30	Another group runs the drill	"Watch, Watch, Watch"	Players finish play and the whistle is blown.
	Whistle blown	"That sucked, that was embarrassing…do it again	
		"Watch what happens when Jarius cuts"	

	Doing the play again	"Watch, watch, watch"	
		Begins describing the chain of events of the play while standing in the paint	
	Player begins to move but doesn't perform it correctly	Coach told him to "stop"	
		Begins describing the process and the possibility of scoring chances by doing a certain behavior or going to a different spot on the court	
	Another group begins running the drill	"Go to that post"	
		"Now, Terrance, when he begins to fade away, you need to.."	
		Tells the group to run the drill again	Group runs it
		"Good!"	
1:24		"Now 5's the trailer"	
		Provides instruction	

1:26		"Stop!"	Group stops
		"C'mon, Josh. What the *expletive* are you doing? You goof around and don't pay attention. That's the reason you do the *expletive* that you do."	
1:39	Players stop drill and listen to coach criticize player	Coach describes where players are suppose to be while players begin to run drill	Players go to correct locations on the court
1:45	Same as Consequence above	"There it is, that's it. Good. Now, going the other way."	
1:45	Players run drill coming down	"We're not trying to shortcut it, guys."	
2:00	Group executes drill	"Alright, coming back."	
2:07	Players begin running drill the other way	"Alright, slow down"	
		Coach comes out on the floor and begins explaining the situation.	
2:12		Coach explaining situation on the court	Players run play

2:20	During same drill, player dribbles	"Too tight, you gotta get your spacing."	
2:23		"Now outside the line. Go"	Players begin drill
2:23		"That's it, that's right. There ya go, theeeere ya go."	
2:32		"Alright, next group."	Next group begins drill
		To players on the sidelines: "Everybody's watching the next group."	
2:42		"Watch the next group!"	
2:47	Players coming back the other way	"Again, passing, shooting."	
2:49	Player dribbles	"Shoot, shoot it!"	
2:54		"Next group. This is the easy stuff, this is the easy stuff."	

2:58		"Passing and shooting."	
3:01		"Stop. Do it again. That's a negative pick. I want a positive pick. You got it behind you. I want it in front of you."	Player perform it correctly
		"There you go, good. There ya go. Comin' back."	
3:26	Player executes drill	"Good."	
3:36	Something happened at the end of the drill	Whistle blown	
		"Do that again, that one sucked!"	
3:48		"Alright, here we go."	
	Player shoots the ball	"Good shot"	
4:02	Player bringing the ball up.	"Alright, here we go, push it, hurry up."	
4:15		"Alright, going through, going through."	

	Players begin drill	Coach calls out directions of where players are supposed to be.	
4:24		"Get in that lane."	
		"Okay stop." Gives instructions on where they are supposed to be.	
4:34		"Alright, go. Get the reversal right here."	
		"Hold up."	
4:39		Instruction on why he should be in a certain spot.	
4:49		"Stop!"	
		"Now if he's the guy, what are you suppose to do?"	
5:06	Players running drill.	"That's fine, that's fine."	Player shoots it.

	Same as Consequence above	"Good! See how when you can move, you get those types of shots."	
5:13		"Stop. You have to reverse the ball.	
5:42	Same group running drill	Players name "get on the other side of the floor."	
5:47		"Stop laughing. You know what side of the floor you're suppose to be on. Stop messing up!"	
5:59		"Spacing, passing, good! Alright, fellas, that's how it's suppose to be done. Good! Let's do a three. Go, go, go!"	
6:13		Giving directions during play and asking questions to players.	
6:27	New drill begins	Coach is asking players questions about the drill to the players on the baseline.	

6:44		Different scenario in the drill: "Alright he catches it, what options do we have"	
		Tells the different players their responsibilities and where they are suppose to be on the floor.	
6:53		"Alright, he's got it in the corner…When do we trap?"	
	Player begins to go trap.	"No, watch."	
7:03		During same drill, coach begins dribbling as a player would and asks questions	Player defends wrong
	Same as Consequence above	"We don't touch, we don't touch. By doing it this way, we can do 'A,' 'B,' 'C…"	
7:12	Player begins dribbling the ball and the defense reacts.	"Go with him, C'mon, go! Good."	

7:42	Player dribbles and defender goes with him.	"AAAAAGGGHHH!! We just went over this, you need to do 'X'!"	
7:52		"These 3 are in a zone now."	
	Player begins to dribble	"Josh, when you're starting to see it, what do you do?"	Player begins telling the other players what to do.
7:56		"A little wider, a little wider."	
		"Terrance, that's good, but I want it quicker."	
		"Do it again."	
8:15		"You're doing this (coach shows him), I want you to do this (shows him and tells him)."	
9:00		"Swing it, swing it, swing it. Good. Now, Terrance, go."	Player moves

	Same as Consequence above	"That's too tight, spacing!"	
9:03		"You got a good post move, but if you're too close, you won't be able to use it."	
9:07		"Stop, stop. Right now you are too close." Begins motioning with his hand for the player to move.	
	Player moves	"That's what this is suppose to look like."	
10:15		"Alright, go."	
	Players begin drill	"Stop, stop, stop."	
		Begins to point and instructing players while motioning where to be.	
		"Alright, now what I want…." (Describes)	
11:20		"Throw it back to him."	

	Player gives ball back	"Good."	
11:30		"Stop, stop. Do it over."	
11:34		Coach talking to a player. Resting his arm on him, pointing, and instructing."	
12:21		"Stop." Coach grabs the ball from the point guard and begins dribbling the ball, acting as the point guard.	
12:32		"Spin the ball, spin that ball! Good! Move! That's it!"	
		"Alright now…" (Begins instructing)	
12:56		"Alright, a hard swivel and cut back. Cut back!"	
13:01		Begins instructing while pointing to spots on the court.	
13:36		"You can't be going sideways because" (explains and is using his hands to move a player from side to side).	

14:26		"There. I'm showin' you guys how just simple passes open things up. Good."	

Appendix D: Table 1

Table 1

Behavioral Coaching Inventory

Proactive Instruction			
	Instruction		
		Vocal	Vocally instructing a player(s) about specific behaviors he wants to see or what drill is prior to conducting the drill.
	Model		
		Duplicative	Coach models the targeted behavior that he wants the player(s) to engage in prior to the drill.
		Oppositional	Coach models the incorrect behavior that he does not want the player(s) to engage in prior to the drill.
	Prompting		
		Gestural	Coach gestures to assist a player(s). An example would be pointing to a spot on the court where he wants the players to be

			prior to or during a drill.
		Physical	Coach physically guides part of the player's body prior to the drill. An example would be moving the player to where they are supposed to be on the court prior to the drill.
		Vocal-Verbal	Vocally instructing a player(s) after an instruction has already been provided. An example would be, telling a group of players to stay "in their stance" while a drill has already started.
	Establishing Operation		
		General Establishing Operation	A vocal statement that is intended to increase the intensity of a drill or behavior. An example would be saying, "Come on, let's go!"

Feedback			
Reactive			
	Modeling		
		Duplicative	Coach models the targeted behavior that he wants the player(s) to engage in after the drill.
		Oppositional	Coach models the incorrect behavior that the player(s) engaged in.
	Prompting		
		Gestural	While providing feedback, the coach gestures to assist the player(s).
	Praise		
		Non-Vocal-Verbal: non-vocal/physical contact	Coach non-violently provides physical contact to a player (e.g., high-five, fist bump).
		Vocal Generic	Coach vocally provides non-behavior specific praise after a behavior is emitted. An example would be saying, “good,” “keep it up,” “nice shot.”
		Vocal Specific	Coach vocally provides behavior-specific praise after a behavior

		is emitted. An example would be saying, “way to get that pass to him quickly” or “that’s the type of leadership we need out of you.”
Establishing Operation		
	General Establishing Operation	A vocal statement that is intended to increase the intensity of a drill or behavior following the occurrence of a behavior. An example would be saying, “You think this is going to get it done?”
Corrective Feedback		
	Corrective Generic	Coach vocally makes a non-behavior specific comment of disapproval after a behavior was emitted. An example would be, “Come on, DeMar! You’re killing me!”
	Corrective Specific	Coach vocally makes a behavior-specific comment of

	disapproval after a behavior was emitted. An example would be, “Come on, JJ. You’re not going to be seeing the court if you keep making passes like that.”

Appendix E: BCI Recording Sheet

Time	Interval (5s)	Coded Behaviors
00:00–00:04.59	1	
00:05–00:09.59	2	
00:10–00:14.59	3	
00:15–00:19.59	4	
00:20–00:24.59	5	
00:25–00:29.59	6	
00:30–00:34.59	7	
00:35–00:39.59	8	
00:40–00:44.59	9	
00:45–00:49.59	10	
00:50–00:54.59	11	
00:55–00:59.59	12	
01:00–01:04.59	13	
01:05–01:09.59	14	
01:10–01:14.59	15	
01:15–01:19.59	16	
01:20–01:24.59	17	
01:25–01:29.59	18	
01:30–01:34.59	19	
01:35–01:39.59	20	

Note. Example of data recording sheet used.

Appendix F: Results from 5 s Partial Interval during Pilot Study

	Interval (5s)	Behaviors
:00-:05	1	$_{A}P_{V\text{-}V}$
:05-:10	2	$_{R}F_{V}$
:10-:15	3	$_{A}I_{V}$, $_{A}P_{G}$, $_{A}P_{P}$
:15–:20	4	$_{A}I_{V}$, $_{A}P_{V\text{-}V/G}$,
:20–:25	5	$_{A}I_{V}$, $_{A}P_{V\text{-}V/G}$
:25–:30	6	$_{A}I_{V}$, $_{A}P_{V/G}$
:30–:35	7	$_{A}P_{V\text{-}V}$
:35–:40	8	$_{R}C_{C\text{-}G}$
:40–:45	9	$_{A}I_{V}$
:45–:50	10	$_{A}I_{V}$
:50–:55	11	$_{A}I_{V}$
:55–1:00	12	$_{A}P_{V/G}$, $_{A}I_{V}$
1:00–1:05	13	$_{A}I_{V}$
1:05–1:10	14	$_{R}F_{C\text{-}S}$
1:10–1:15	15	—
1:15–1:20	16	$_{R}P_{V\text{-}G}$
1:20–1:25	17	$_{A}I_{V}$
1:25–1:30	18	$_{R}I_{V}$, $_{R}F_{C\text{-}S}$
1:30–1:35	19	$_{R}F_{C\text{-}S}$
1:35–1:40	20	$_{R}F_{C\text{-}S}$, $_{A}I_{C}$
1:40–1:45	21	$_{A}P_{V\text{-}V}$, $_{R}P_{V\text{-}G}$
1:45–1:50	22	$_{R}F_{v\text{-}S}$
1:50–1:55	23	$_{R}P_{V\text{-}S}$
1:55–2:00	24	—
2:00–2:05	25	$_{A}I_{V}$
2:05–2:10	26	$_{R}F_{V}$
2:10–2:15	27	$_{A}I_{V}$
2:15–2:20	28	$_{R}F_{V}$, $_{R}C_{C\text{-}S}$
2:20–2:25	29	$_{A}I_{V}$
2:25–2:30	30	$_{R}P_{V\text{-}G}$
2:30–2:35	31	$_{R}F_{V}$
2:35–2:40	32	—
2:40–2:45	33	$_{R}C_{C\text{-}S}$, $_{A}I_{V}$
2:45–2:50	34	$_{A}I_{V}$
2:50–2:55	35	$_{A}I_{V}$

2:55–3:00	36	$_{A}I_{V}$, $_{R}F_{V}$
3:00–3:05	37	$_{A}I_{V}$
3:05–3:10	38	$_{R}C_{C\text{-}S}$, $_{A}P_{V\text{-}V}$
3:10–3:15	39	$_{R}P_{V\text{-}G}$
3:15–3:20	40	$_{A}I_{V}$, $_{A}P_{V\text{-}V}$
3:20–3:25	41	—
3:25–3:30	42	$_{R}P_{V\text{-}G}$
3:30–3:35	43	$_{R}P_{V/G}$
3:35–3:40	44	$_{R}F_{V}$, $_{R}P_{V\text{-}V}$
3:40–3:45	45	—
3:45–3:50	46	$_{A}I_{V}$
3:50–3:55	47	$_{R}P_{V\text{-}S}$
3:55–4:00	48	$_{R}P_{V\text{-}S}$
4:00–4:05	49	$_{R}P_{V\text{-}S}$
4:05–4:10	50	$_{A}I_{V}$
4:10–4:15	51	$_{A}P_{V\text{-}V}$
4:15–4:20	52	$_{A}P_{V\text{-}V}$, $_{A}V_{I}$
4:20–4:25	53	$_{R}F_{V}$
4:25–4:30	54	—
4:30–4:35	55	$_{A}I_{V}$, $_{A}P_{V\text{-}V}$
4:35–4:40	56	$_{A}I_{V}$
4:40–4:45	57	$_{A}I_{V}$, $_{A}P_{P}$
4:45–4:50	58	$_{R}F_{V}$
4:50–4:55	59	$_{R}C_{C\text{-}S}$
4:55–5:00	60	$_{A}P_{V\text{-}V}$, $_{R}P_{V\text{-}G}$
5:00–5:05	61	$_{A}P_{V/G}$
5:05–5:10	62	$_{R}P_{V/G}$, $_{R}P_{V\text{-}S}$
5:10–5:15	63	$_{R}F_{V}$
5:15–5:20	64	$_{A}P_{V\text{-}V}$
5:20–5:25	65	—
5:25–5:30	66	—
5:30–5:35	67	—
5:35–5:40	68	$_{A}P_{V\text{-}V}$, $_{R}P_{V\text{-}G}$, $_{R}F_{C\text{-}S}$
5:40–5:45	69	$_{A}I_{V}$
5:45–5:50	70	$_{A}I_{V}$, $_{R}P_{V\text{-}G}$
5:50–5:55	71	$_{R}P_{V\text{-}G}$, $_{A}I_{V}$
5:55–6:00	72	—
6:00–6:05	73	$_{A}P_{V\text{-}V}$

6:05–6:10	74	$_{A}P_{V\text{-}V}$
6:10–6:15	75	—
6:15–6:20	76	$_{R}P_{V\text{-}G}$
6:20–6:25	77	$_{A}I_{V}$
6:25–6:30	78	$_{R}F_{C\text{-}S}$
6:30–6:35	79	$_{A}I_{V}$
6:35–6:40	80	—
6:40–6:45	81	$_{R}F_{C\text{-}S}$, $_{A}I_{V}$
6:45–6:50	82	$_{A}I_{V}$
6:50–6:55	83	$_{A}I_{V}$
6:55–7:00	84	$_{A}P_{P}$, $_{A}M_{D}$
7:00–7:05	85	$_{R}F_{C\text{-}S}$

Appendix G: Results from 10 s Partial Interval during Pilot Study

	Interval (10s)	Behaviors
:00–:10	1	$_{A}P_{V\text{-}V}$, $_{R}F_{V}$
:10–:20	2	$_{A}I_{V}$, $_{A}P_{G}$, $_{A}P_{P}$, $_{A}P_{V\text{-}V/G}$
:20–:30	3	$_{A}I_{V}$, $_{A}P_{V\text{-}V/G}$,
:30–:40	4	$_{A}P_{V\text{-}V}$, $_{R}C_{C\text{-}G}$
:40–:50	5	$_{A}I_{V}$
:50–1:00	6	$_{A}I_{V}$, $_{A}P_{V/G}$
1:00–1:10	7	$_{A}I_{V}$, $_{R}F_{C\text{-}S}$
1:10–1:20	8	$_{R}P_{V\text{-}G}$
1:20–1:30	9	$_{A}I_{V}$, $_{R}F_{V}$, $_{R}F_{C\text{-}S}$
1:30–1:40	10	$_{R}F_{C\text{-}S}$, $_{A}I_{C}$
1:40–1:50	11	$_{A}P_{V\text{-}V}$, $_{R}P_{V\text{-}G}$, $_{R}F_{V\text{-}S}$
1:50–2:00	12	$_{R}P_{V\text{-}S}$
2:00–2:10	13	$_{A}I_{V}$, $R_{F}V$
2:10–2:20	14	$_{A}I_{V}$, $_{R}F_{V}$, $_{R}C_{C\text{-}S}$
2:20–2:30	15	$_{A}I_{V}$, $_{R}P_{V\text{-}G}$
2:30–2:40	16	$_{R}F_{V}$
2:40–2:50	17	$_{R}C_{C\text{-}S}$, $_{A}I_{V}$
2:50–3:00	18	$_{A}I_{V}$, $_{R}F_{V}$
3:00–3:10	19	$_{A}I_{V}$, $_{R}C_{C\text{-}S}$, $_{A}P_{V\text{-}V}$
3:10–3:20	20	$_{R}P_{V\text{-}G}$, $_{A}I_{V}$, $_{A}P_{V\text{-}V}$
3:20–3:30	21	$_{R}P_{V\text{-}G}$
3:30–3:40	22	$_{R}P_{V/G}$, $_{R}F_{V}$, $_{R}P_{V\text{-}V}$
3:40–3:50	23	$_{A}I_{V}$
3:50–4:00	24	$_{R}P_{V\text{-}S}$
4:00–4:10	25	$_{R}P_{V\text{-}S}$, $_{A}I_{V}$
4:10–4:20	26	$_{A}P_{V\text{-}V}$, $_{A}I_{V}$
4:20–4:30	27	$_{R}F_{V}$
4:30–4:40	28	$_{A}I_{V}$, $_{A}P_{V\text{-}V}$
4:40–4:50	29	$_{A}I_{V}$, $_{A}P_{P}$, $_{R}F_{V}$
4:50–5:00	30	$_{R}C_{C\text{-}S}$, $_{A}P_{V\text{-}V}$, $_{R}P_{V\text{-}G}$

5:00–5:10	31	$_{A}P_{V/G,}\ _{R}P_{V-S}$
5:10–5:20	32	$_{R}F_{V},\ _{A}P_{V-V}$
5:20–5:30	33	
5:30–5:40	34	$_{A}P_{V-V},\ _{R}P_{V-G},\ _{R}F_{C-S}$
5:40–5:50	35	$_{A}I_{V},\ _{R}P_{V-G}$
5:50–6:00	36	$_{R}P_{V-G},\ _{A}I_{V}$
6:00–6:10	37	$_{A}P_{V-V}$
6:10–6:20	38	$_{R}P_{V-G}$
6:20–6:30	39	$_{R}F_{C-S}$
6:30–6:40	40	$_{A}I_{V}$
6:40–6:50	41	$_{R}F_{C-S},\ _{A}I_{V}$
6:50–7:00	42	$_{A}I_{V,}\ _{A}P_{P},\ _{A}M_{D}$
7:00–7:10	43	$_{R}F_{C-S}$

Appendix H: Example of Coaching Exchange to Coach

Player throws ball away and coach then blows whistle to stop play and yell at him.

"What the hell was that?! Get your head out of your ass or you won't be seeing any time!"

$_{R}F_{V\text{-}G}$

Player throws the ball away and the coach blows the whistle to stop the play.

"C'mon! We just went over this!"

$_{R}F_{V\text{-}G}$

Appendix I: Tables 2-18

Table 2

Total Occurrence of BCI Behaviors

Behavior	Count	Overall Occurrence Percent
aIv	1692	30.600
aPg	967	17.450
aGEOv-v	640	11.578
rCFc-s	634	11.467
rPv-g	503	9.097
rPg	476	8.601
aPv-v	435	7.867
rCFc-g	106	1.917
rPv-s	21	<1.00
rMd	19	<1.00
rMo	12	<1.00
aMd	8	<1.00
rPn-v/pc	8	<1.00
rGEOv-v	5	<1.00
aMo	3	<1.00
aPp	0	0

Note. aIv = antecedent Instruction vocal; aPg = antecedent prompt gestural; aGEOv-v = antecedent generic establishing operation verbal vocal; rCFc-s = reactive corrective feedback corrective specific; rPv-g = reactive praise vocal generic; rPg = reactive prompt gestural; aPv-v = antecedent prompt verbal vocal; rCFC-g = reactive corrective feedback corrective generic; rPv-s = reactive praise vocal specific; rMd = reactive model duplicative; rMo = reactive model oppositional; aMd = antecedent model duplicative; rPn-v/pc = reactive praise non-vocal physical contact; rGEOv-v; reactive generic establishing operation verbal vocal; antecedent model oppositional; aPp = antecedent prompt physical.

Table 3

Conditional Probability for antecedent Instruction vocal (aIv)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
aIv	1692	aPg	931	.550
		aGEOv-v	209	.124

Table 4

Conditional Probability for antecedent Prompt gestural (aPg)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
aPg	967	aGEOv-v	119	.123

Table 5

Conditional Probability for antecedent General Establishing Operation vocal-verbal (aGEOv-v)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
aGEOv-v	640	aPv-v	57	.089

Table 6

Conditional Probability for reactive Corrective Feedback corrective-specific (rCFc-s)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
rCFc-s	634	rPg	441	.696
		aIv	56	.088
		aPg	36	.057
		aGEOv-v	32	.05

Table 7

Conditional Probability for reactive Praise vocal-generic (rPv-g)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
rPv-g	503	aIv	67	.133
		aPv-v	40	.08

Table 8

Conditional Probability for reactive Prompt gestural (rPg)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
rPg	476	aIv	37	.078

Table 9

Conditional Probability for antecedent Prompt vocal-verbal (aPv-v)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
aPv-v	435	aGEOv-v	72	.166
		rPv-g	39	.09
		aIv	24	.052

Table 10

Conditional Probability for reactive Corrective Feedback corrective-generic (rCFc-g)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
rCFC-g	106	rPg	23	.217
		aIv	19	.179
		aGEOv-v	14	.132
		aPg	.6	.057

Table 11

Conditional Probability for reactive Praise vocal-specific (rPv-s)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
rPv-s	21	aIv	5	.238
		rPg	4	.195
		rCFc-s	2	.095

Table 12

Conditional Probability for reactive Model duplicative (rMd)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
rMd	19	rPg	4	.211
		aIv	2	.152
		aPg	2	.152
		rMo	1	.052

Table 13

Conditional Probability for reactive Model oppositional (rMo)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
rMo	12	rPg	5	.417
		rCFc-s	2	.167
		aIv	1	.083
		aPg	1	.083
		rMd	1	.083

Table 14

Conditional Probability for antecedent Model duplicative (aMd)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
aMd	8	aPv-v	2	.4

Table 15

Conditional Probability for reactive Praise non-vocal/physical contact (rPn-v/pc)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
rPn-v/pc	8	aPv-v	2	.25

Table 16

Conditional Probability for reactive general establishing operation vocal-verbal (rGEOv-v)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
rGEOv-v	5	rPv-s	2	.4
		rPn-v/pc	1	.2

Table 17

Conditional Probability for antecedent Model oppositional (aMo)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
aMo	3	aMd	2	.667

Table 18

Conditional Probability for antecedent Prompt physical (aPp)

Behavior	Occurrence	Conditional Behavior	Conditional Behavior Occurrence	Conditional Probability
aPp	0			

Appendix J: Figures

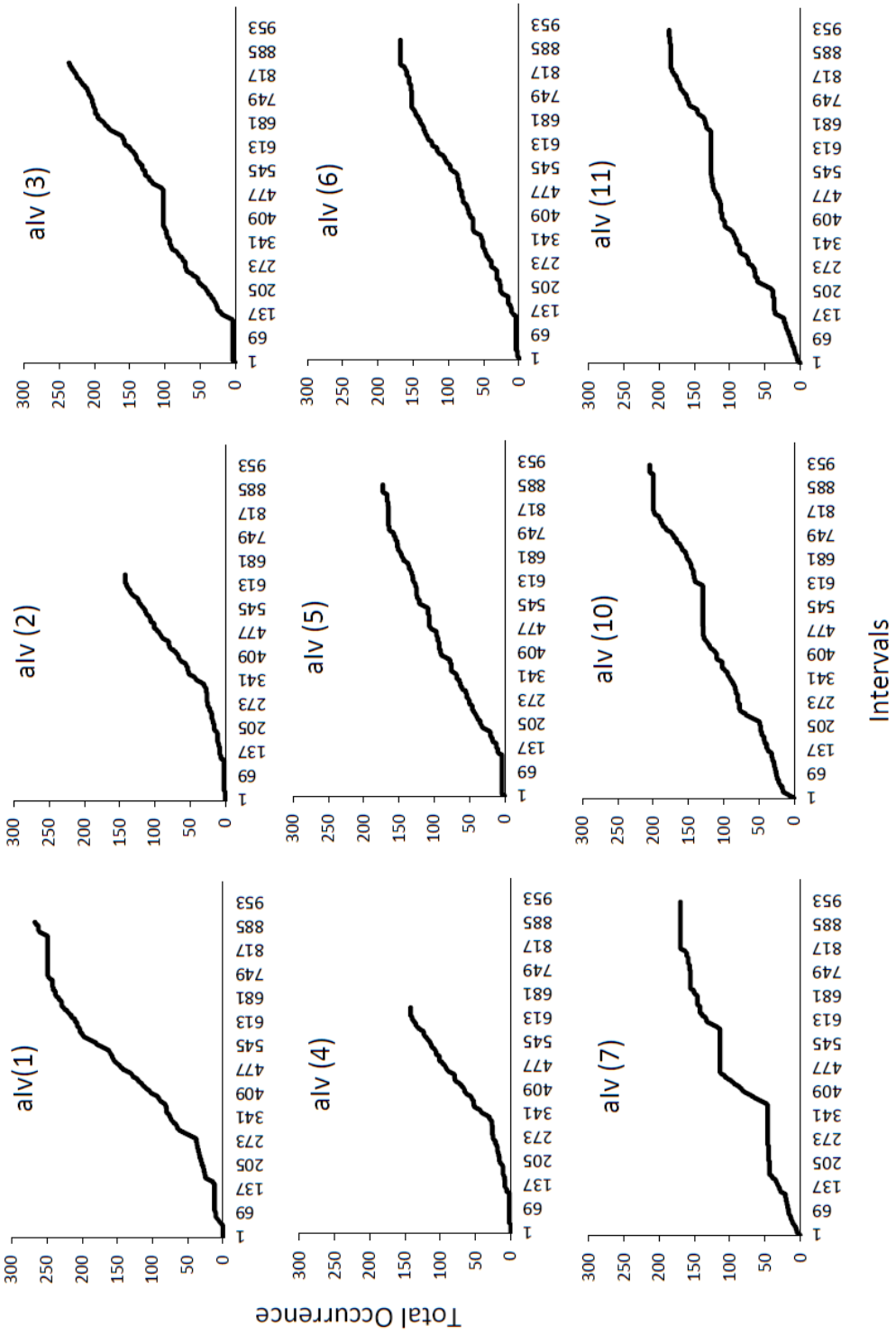

Figure 1. Cumulative record of antecedent Instruction vocal (aIv) across sessions.

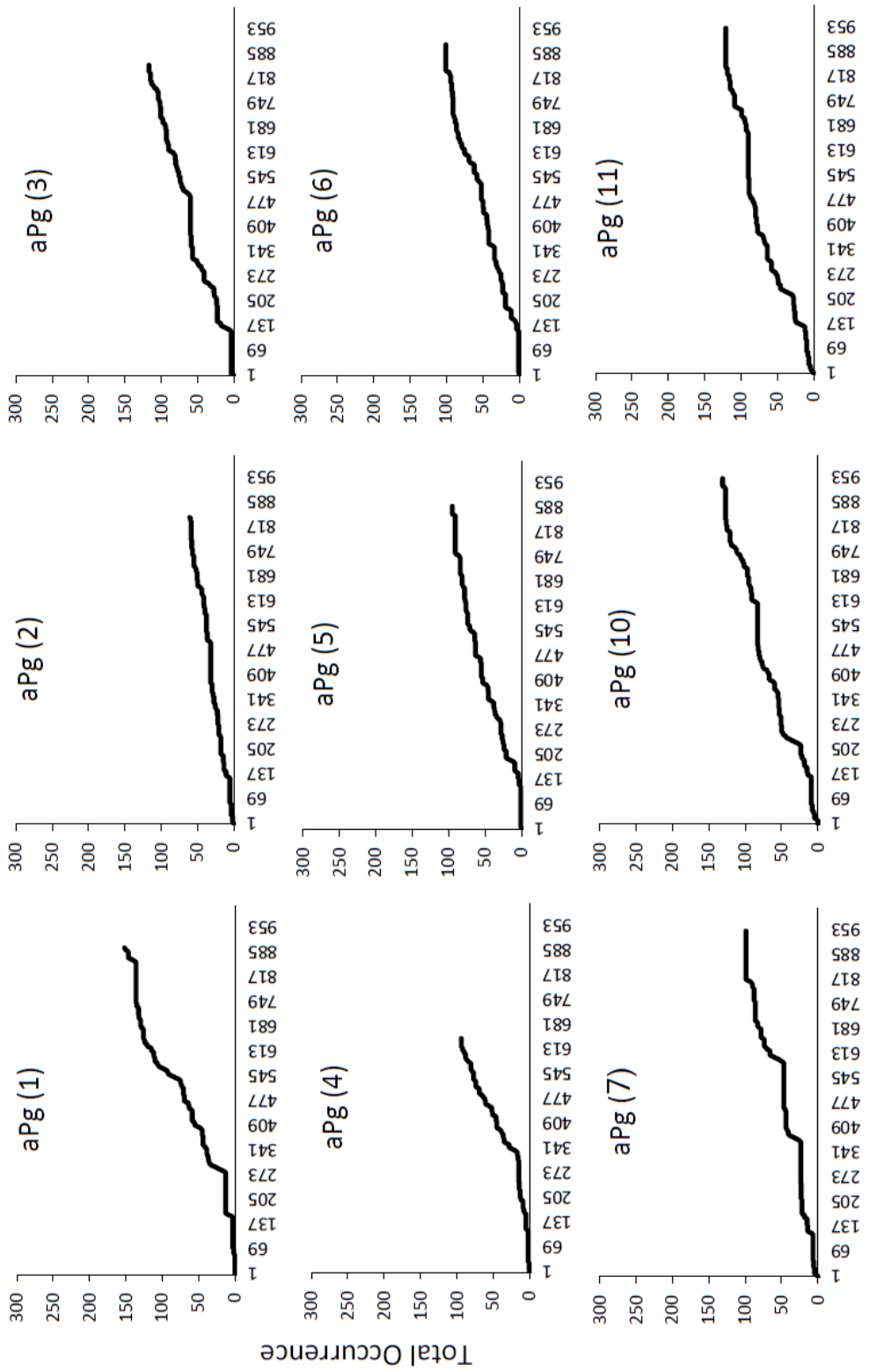

Figure 2. Cumulative records of antecedent Model duplicative

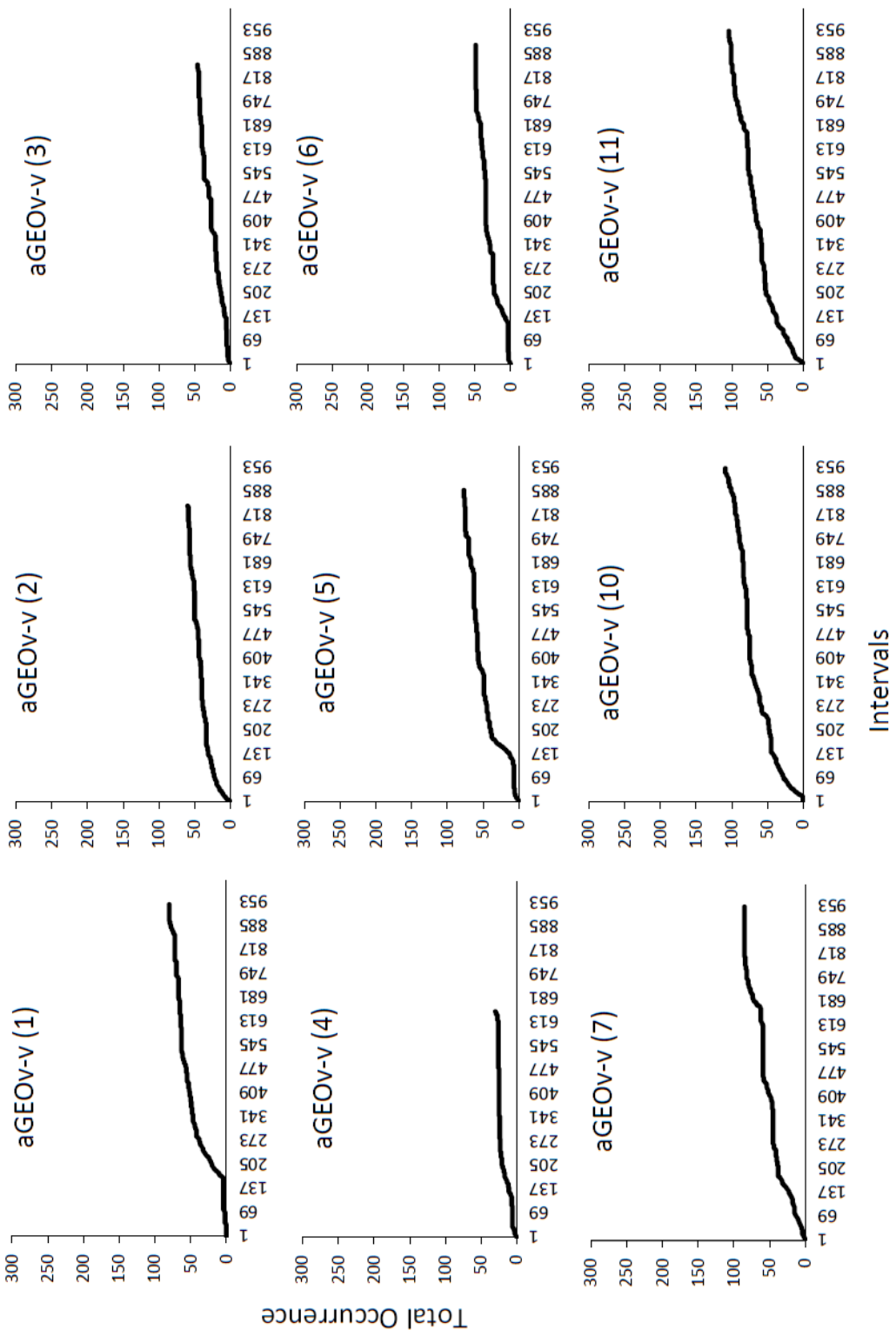

Figure 3. Cumulative records of antecedent General Establishing Operation vocal-verbal (aGEOv-v) across sessions.

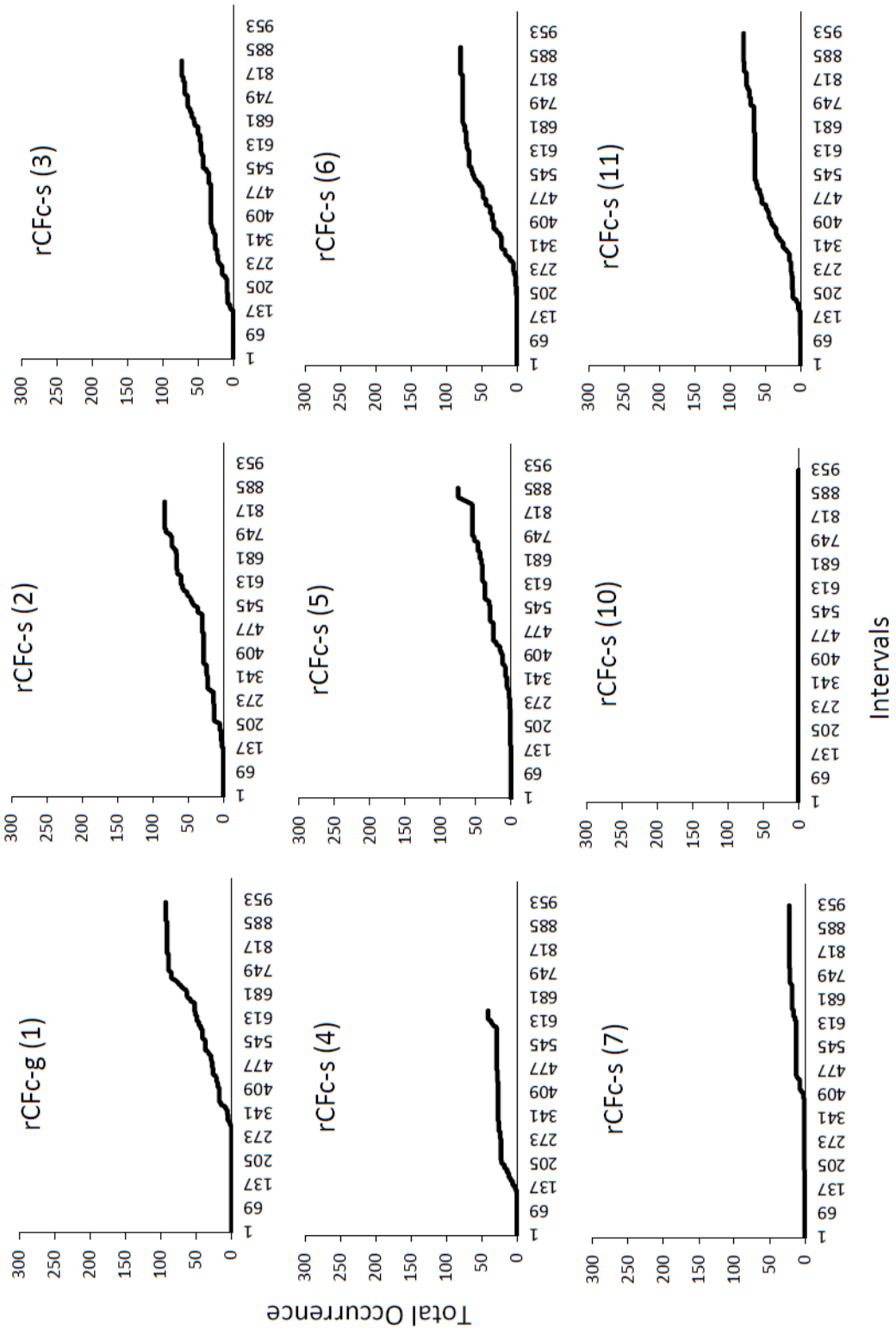

Figure 4. Cumulative record of reactive Corrective Feedback corrective-specific (rCFc-s) across sessions.

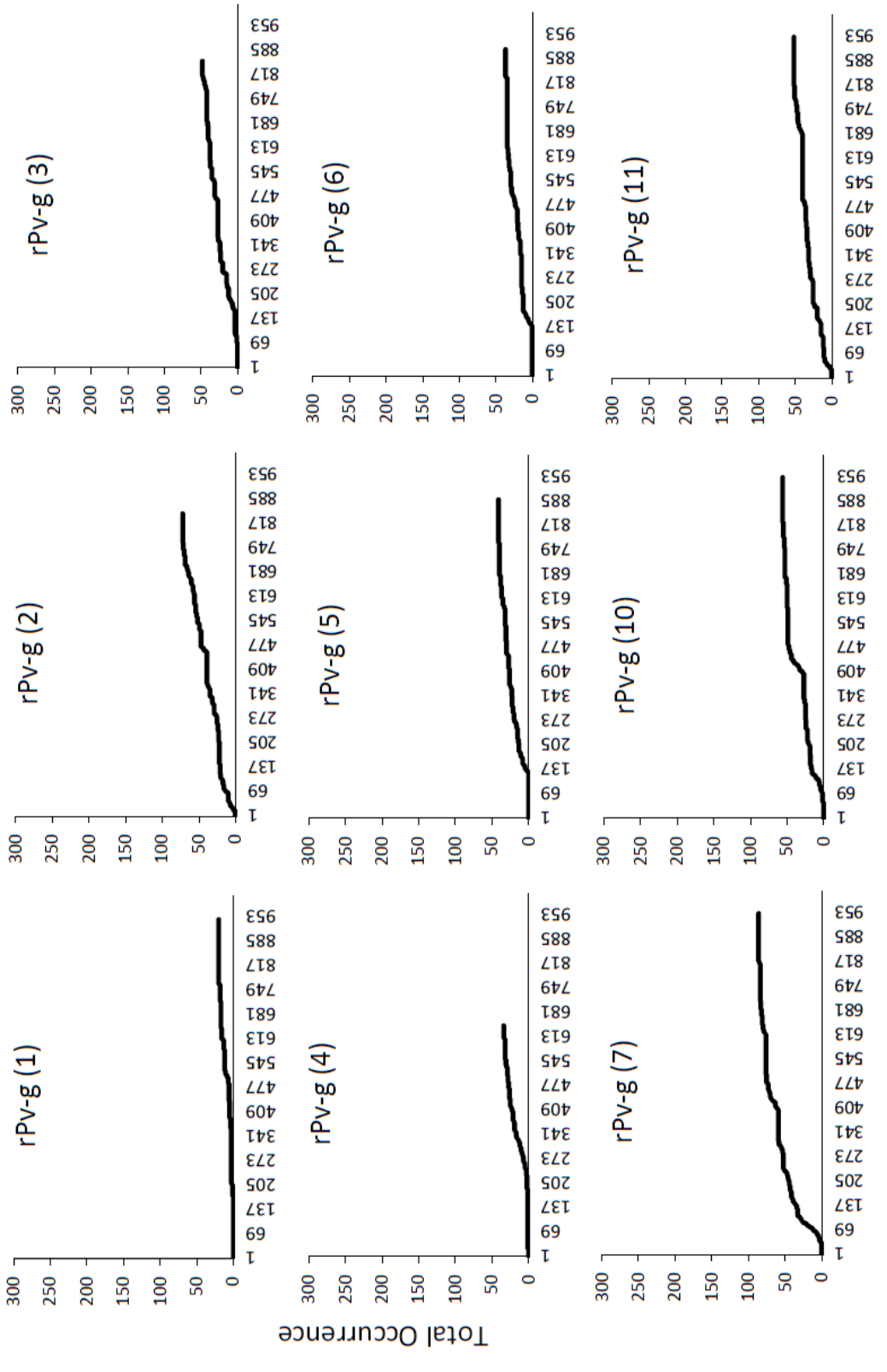

Figure 5. Cumulative records of reactive Praise vocal generic (rPv-g) across sessions.

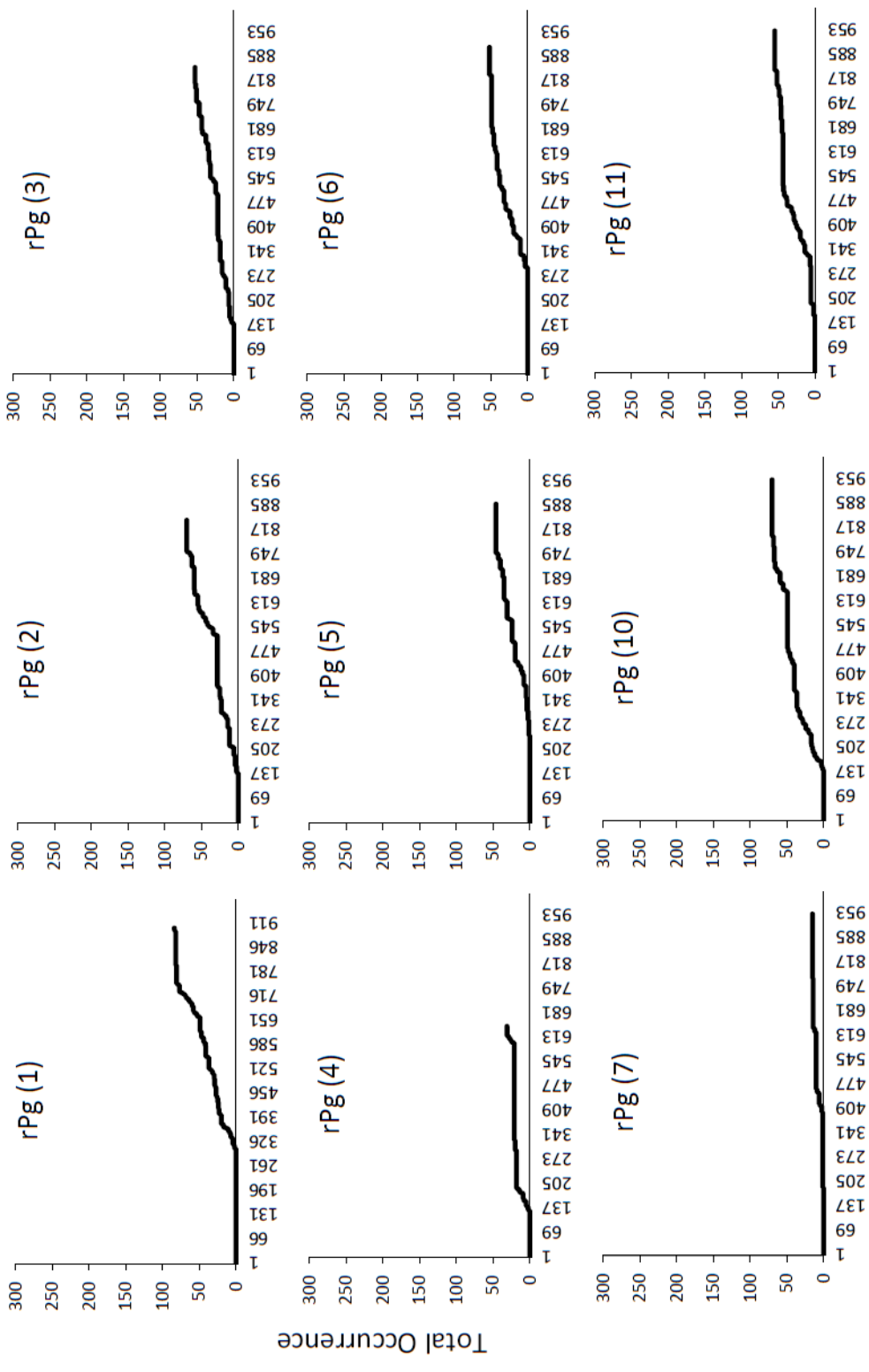

Figure 6. Cumulative records of reactive Prompt gestural (rPg) across sessions.

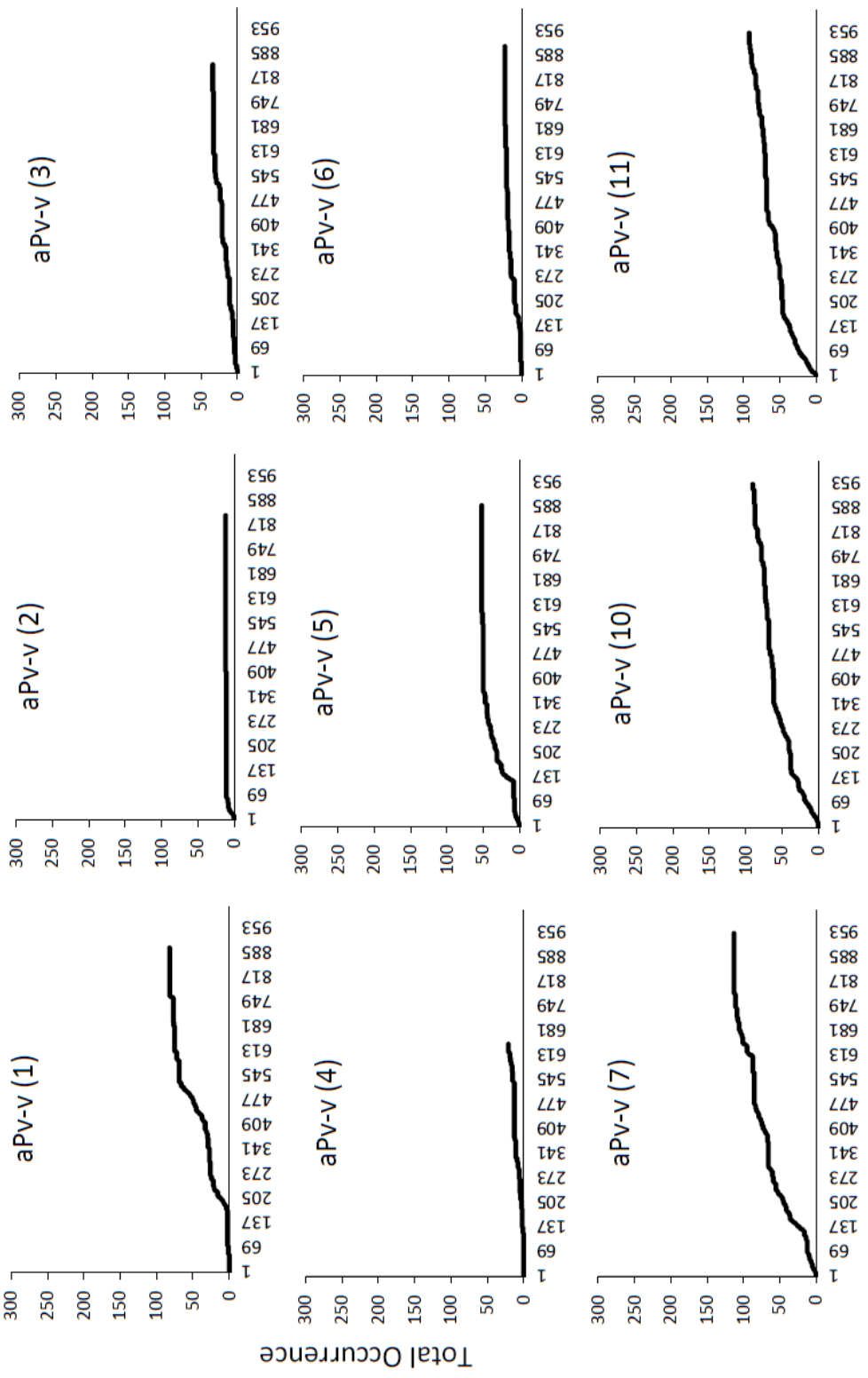

Figure 7. Cumulative record of antecedent Prompt vocal-verbal (aPv-v) across sessions.

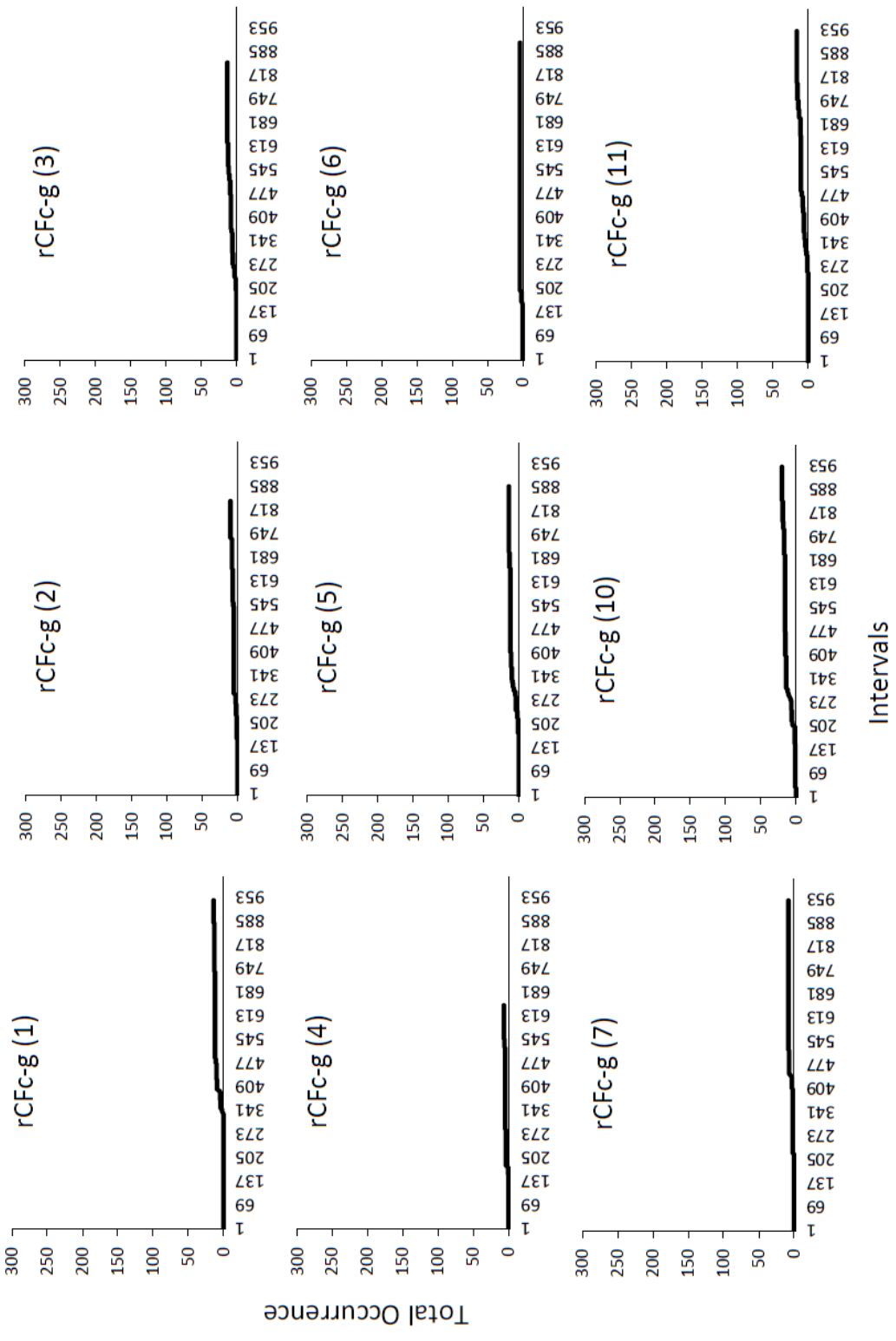

Figure 8. Cumulative record of reactive corrective feedback corrective generic (rCFc-g) across sessions.

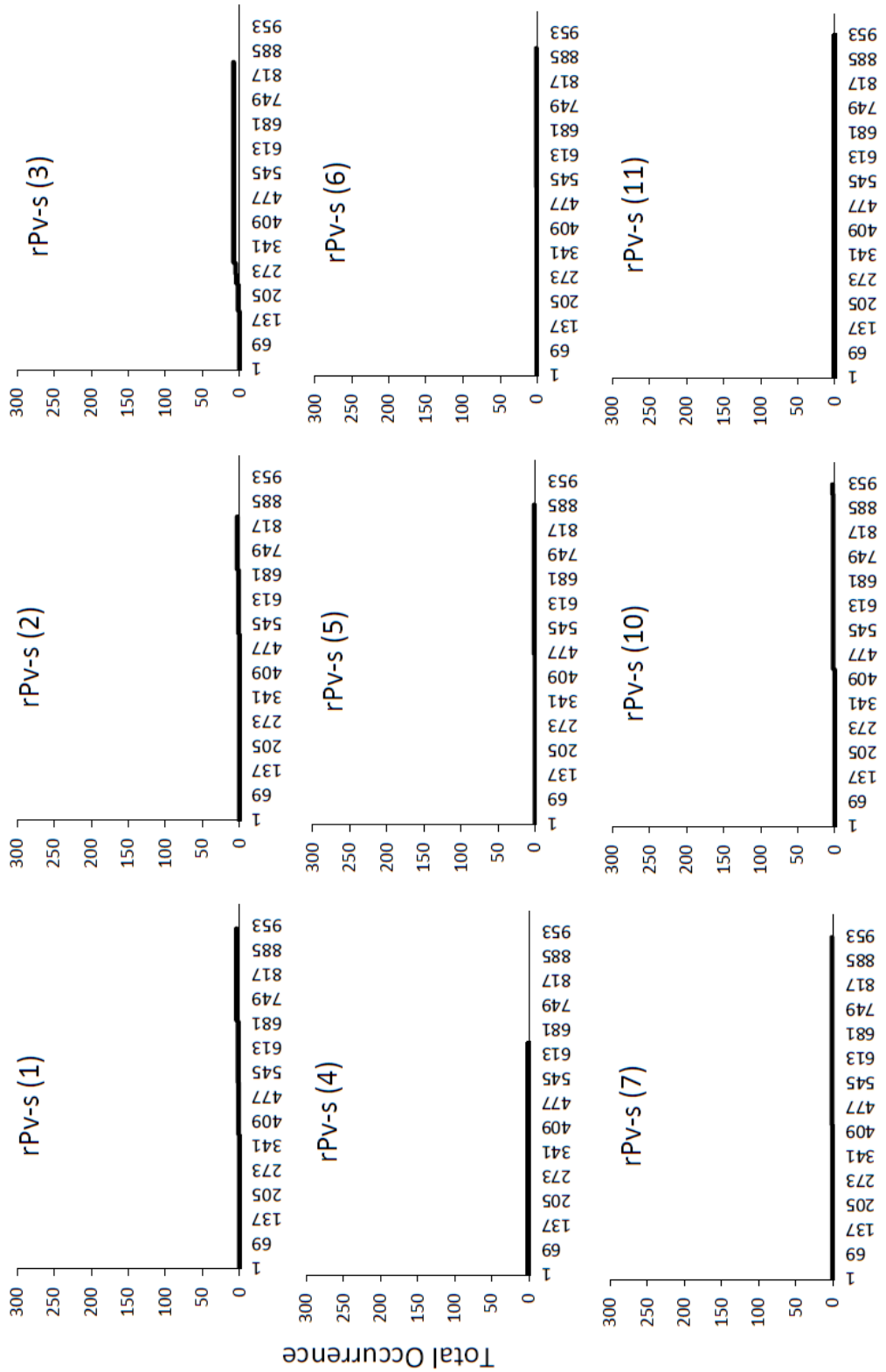

Figure 9. Cumulative record of reactive Praise vocal-specific (rPv-s) across sessions.

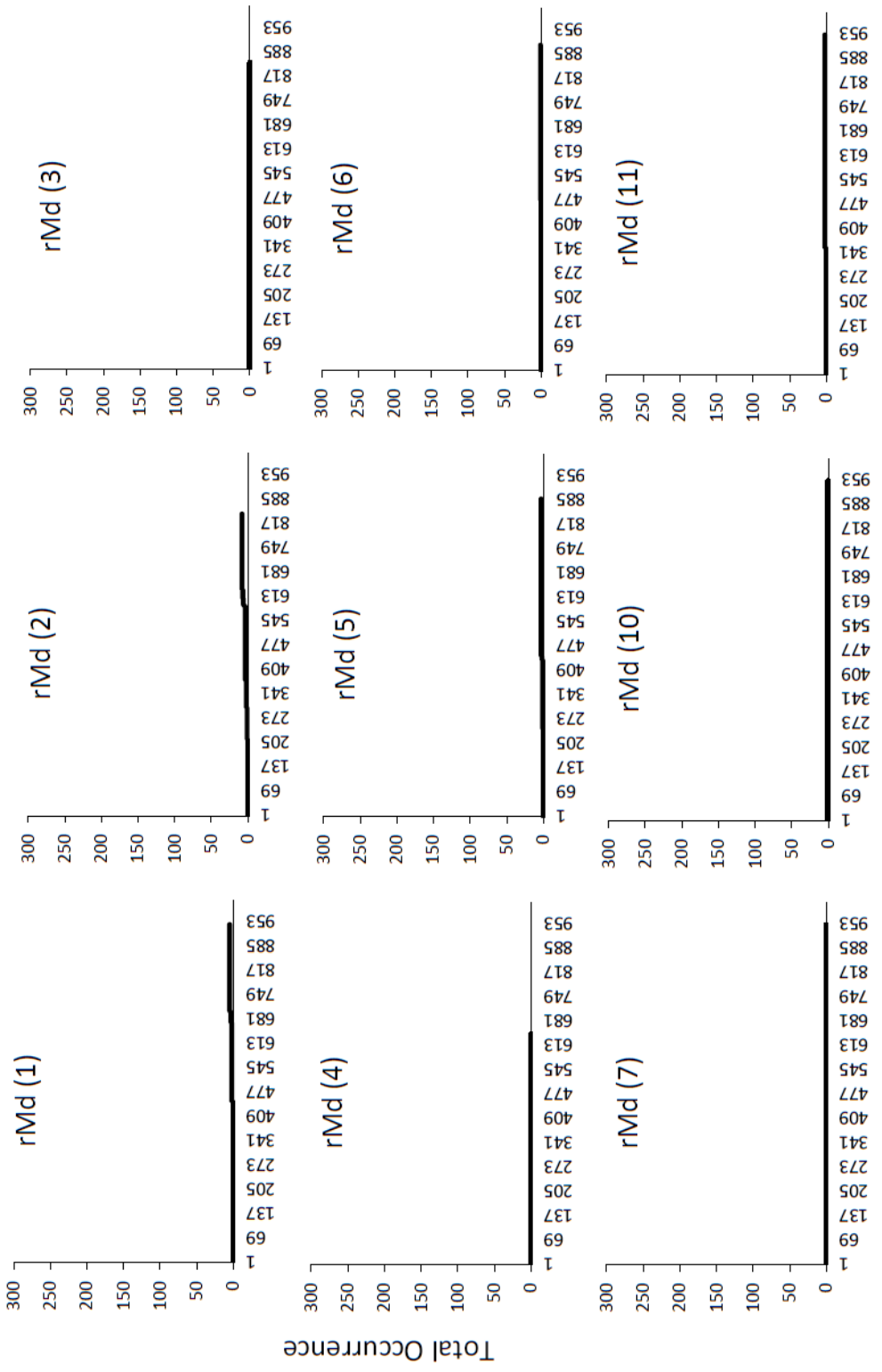

Figure 10. Cumulative record of reactive Model duplicative (rMd) across sessions.

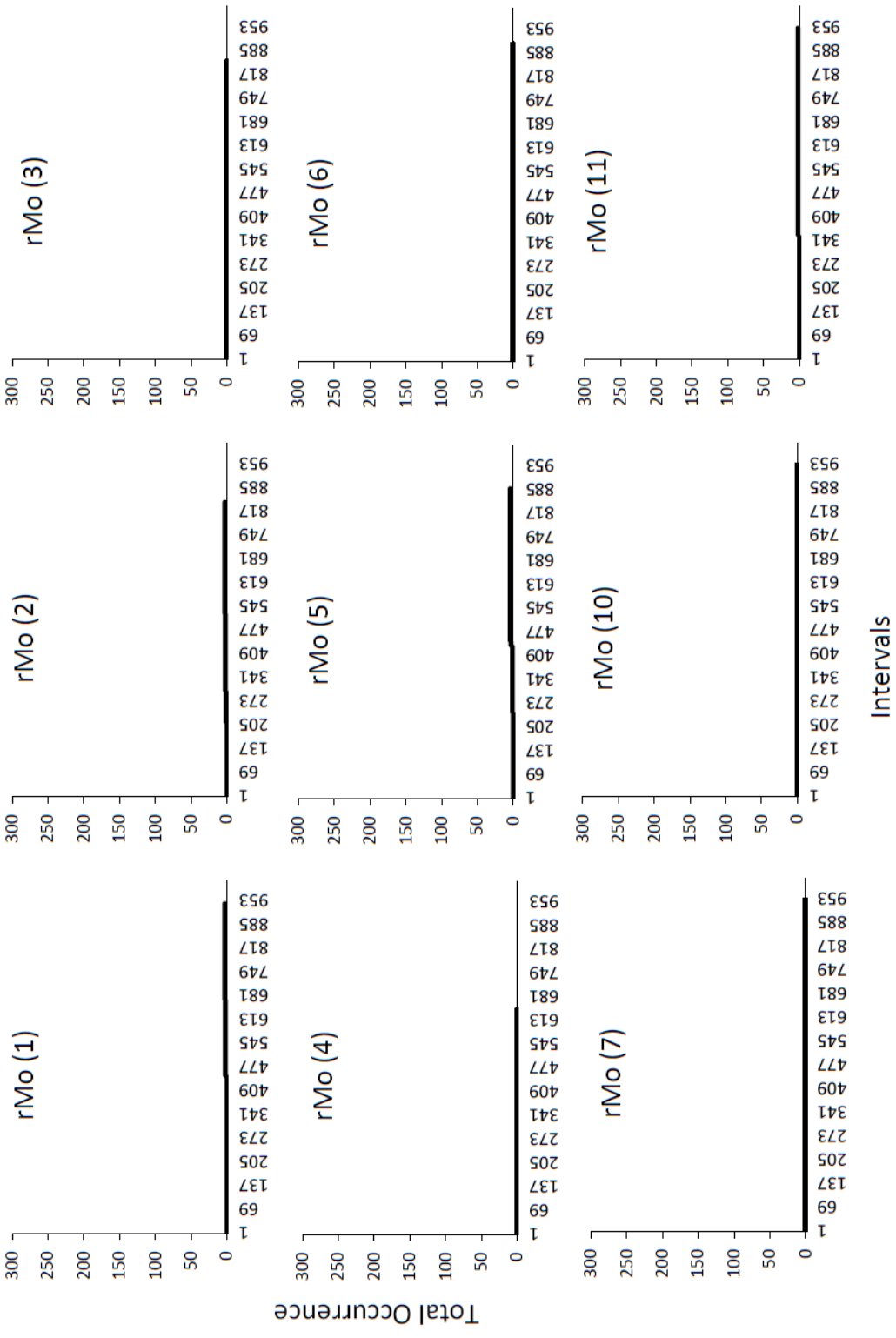

Figure 11. Cumulative record of reactive Model oppositional (rMo) across sessions.

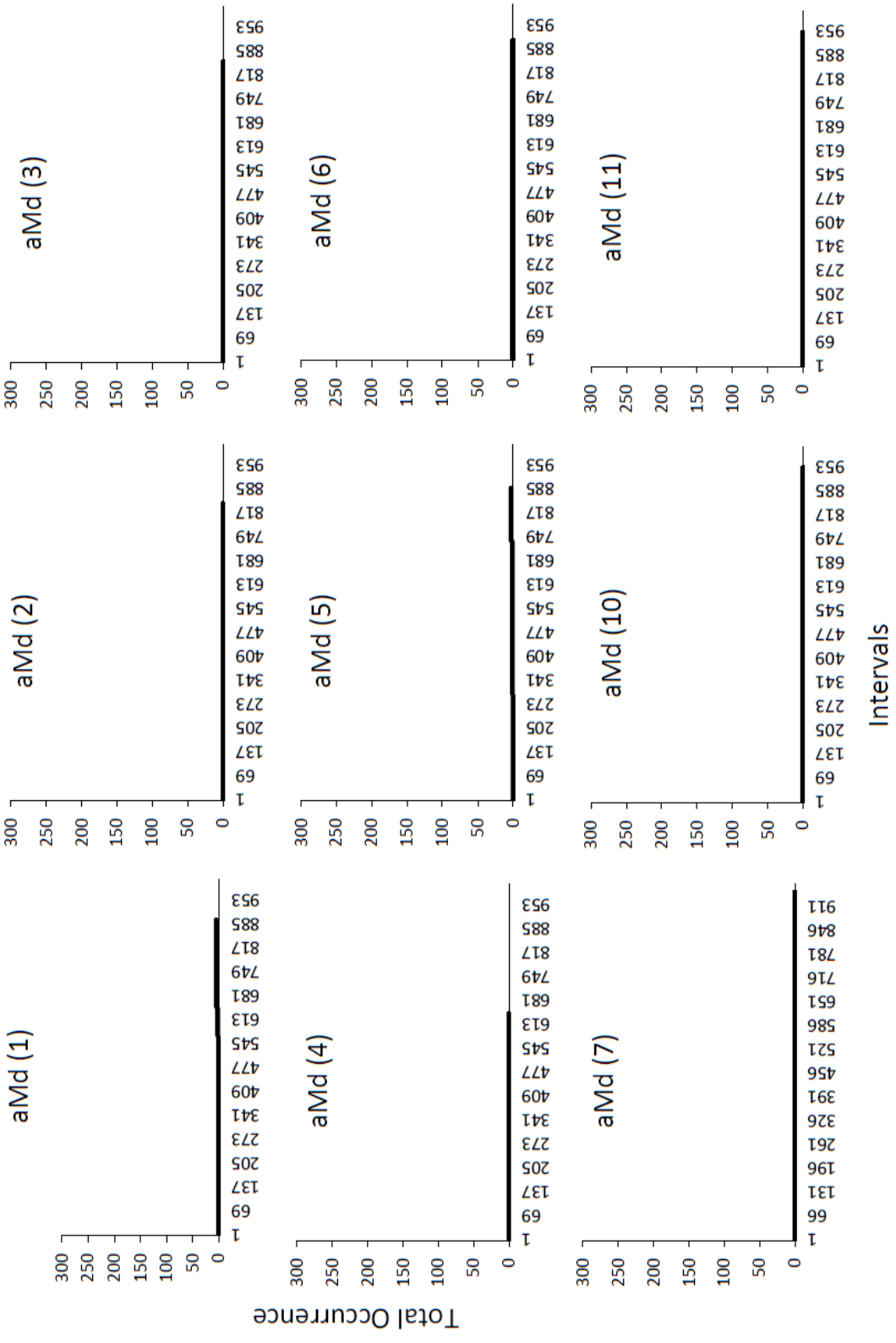

Figure 12. Cumulative record or antecedent Model duplicative (aMd) across sessions.

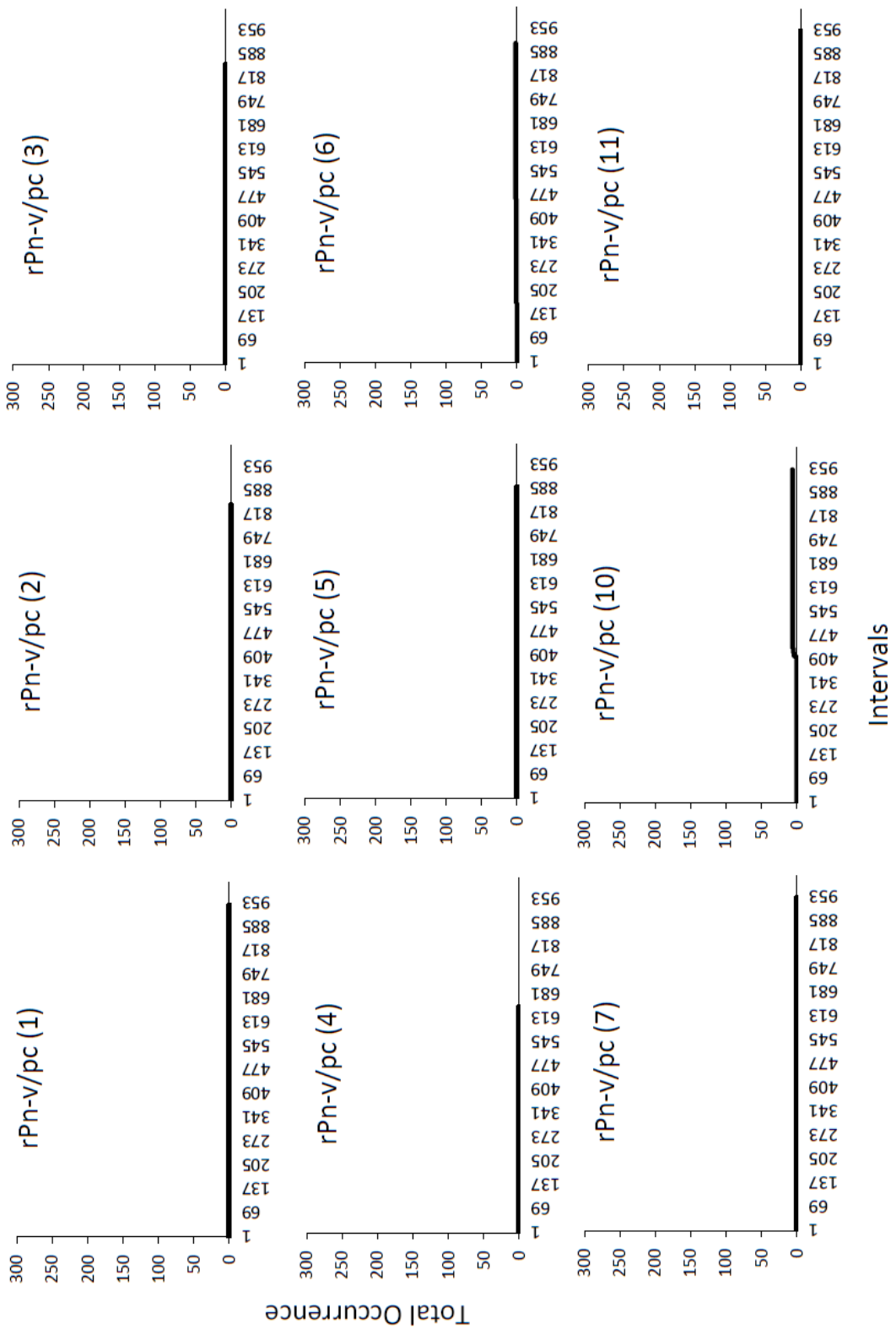

Figure 13. Cumulative Record of reactive Praise non-vocal/physical contact.

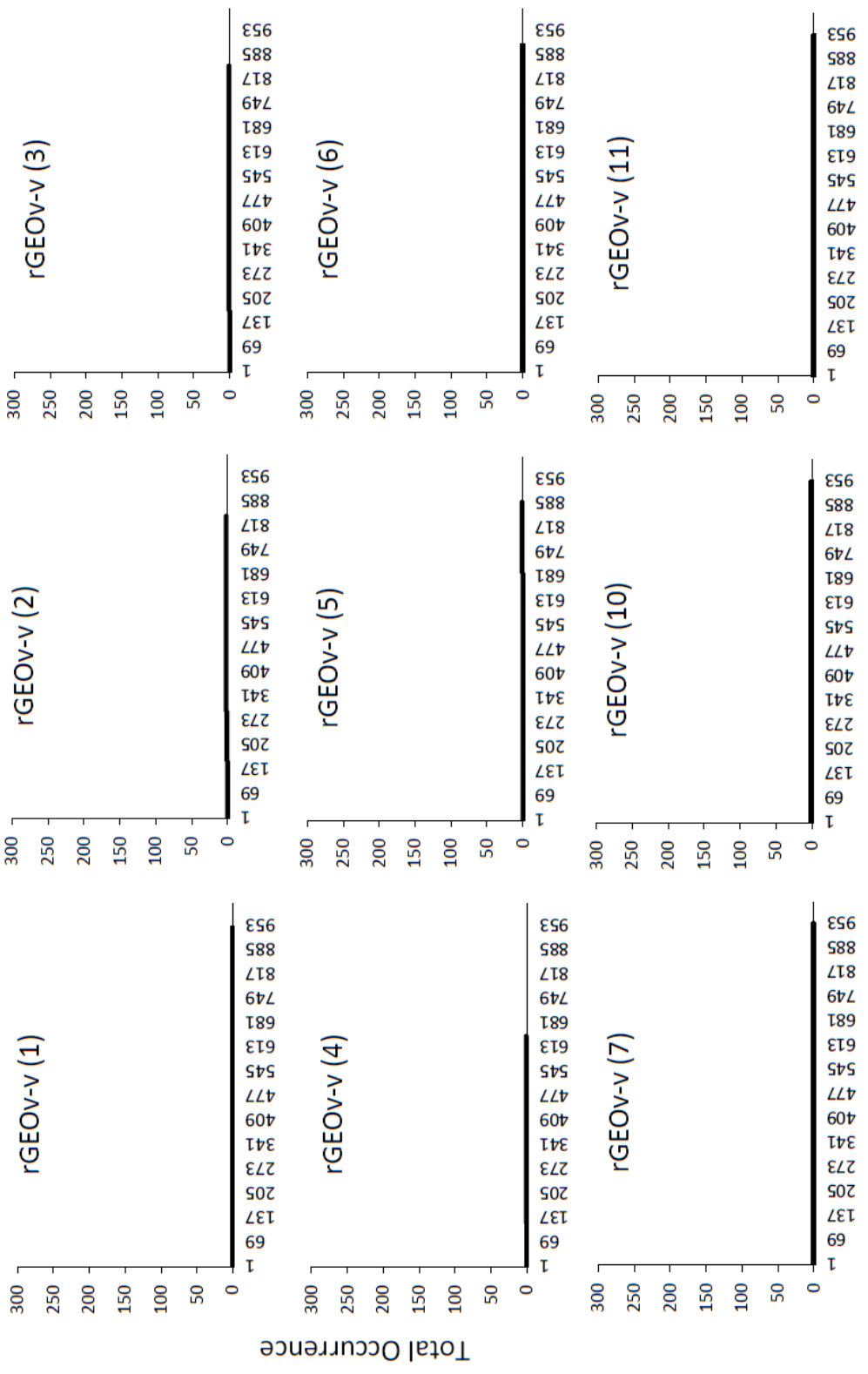

Figure 14. Cumulative record of reactive general establishing operation vocal-verbal (rGEOv-v) across sessions.

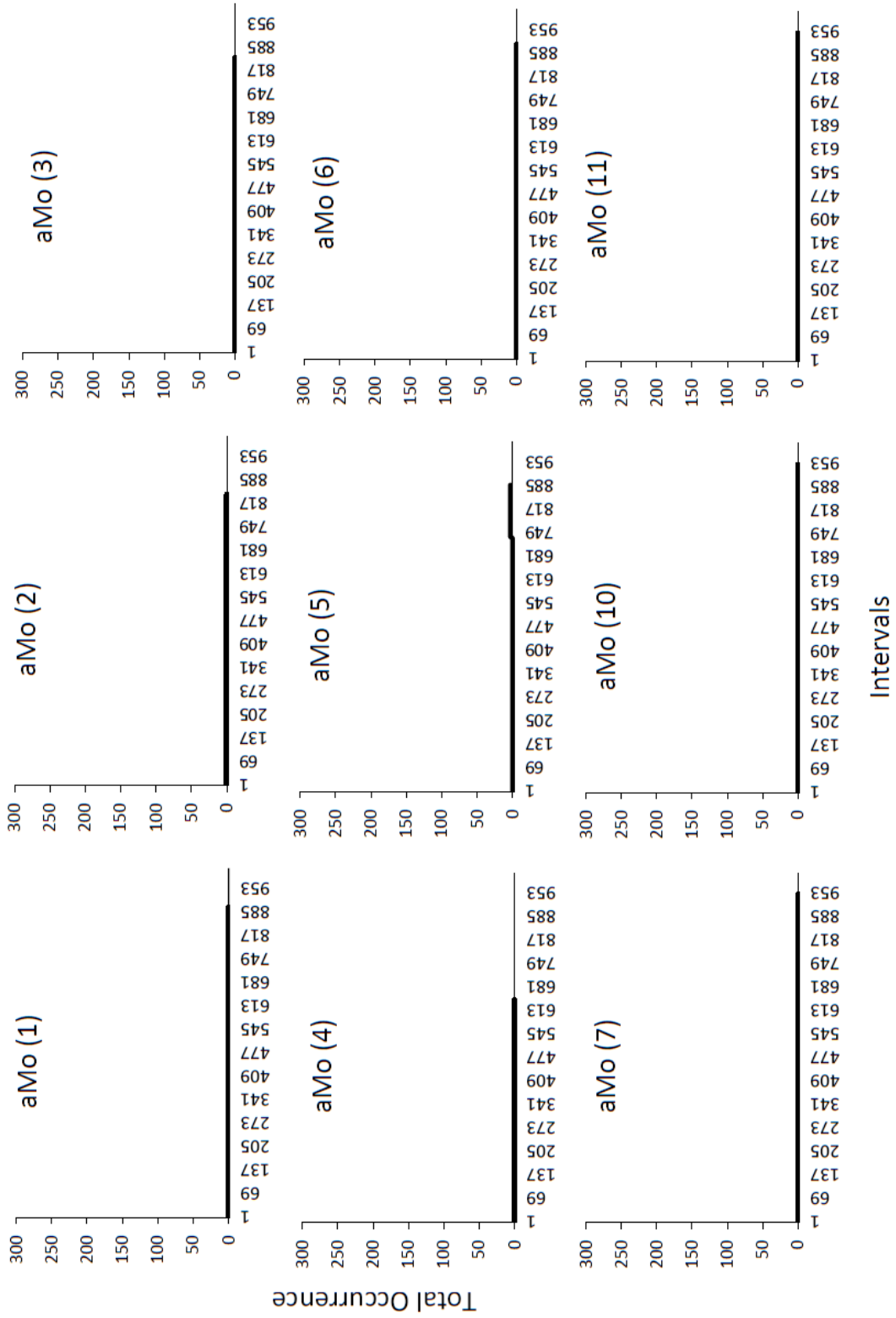

Figure 15. Cumulative record of antecedent Model oppositional (aMo) across sessions.

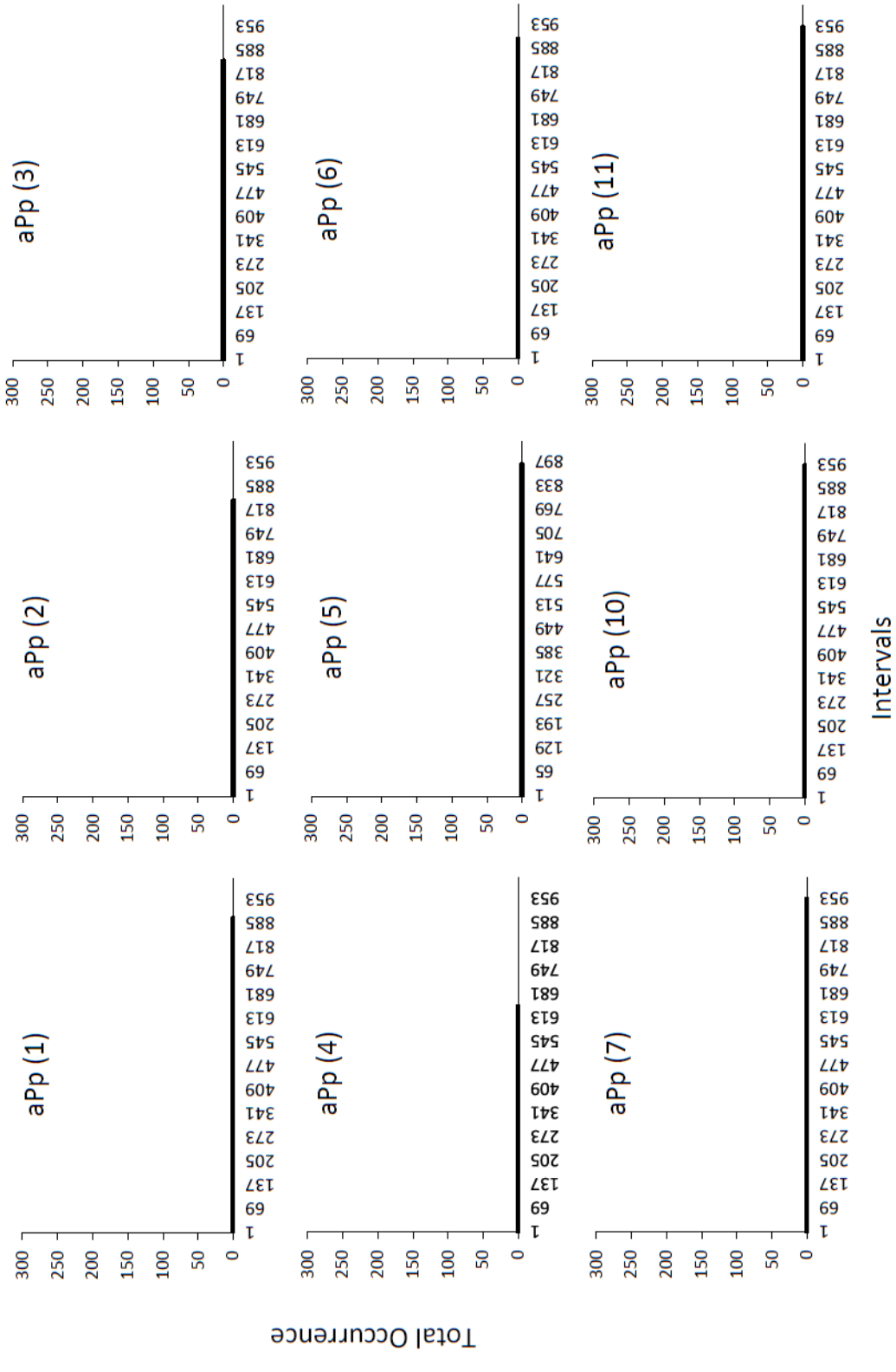

Figure 16. Cumulative record of antecedent Prompt physical (aPp) across session.

Appendix K: IRB Approval

Institutional Review Board (IRB)

720 4th Avenue South AS 210, St. Cloud, MN 56301-4498

Name: Andrew Massey

Email: maan1101@stcloudstate.edu

IRB PROTOCOL DETERMINATION: Expedited Review-1

Project Title: Developing a Taxonomy of Coaching Behavior

Advisor Benjamin Witts

The Institutional Review Board has reviewed your protocol to conduct research involving human subjects. Your project has been: **APPROVED**

Please note the following important information concerning IRB projects:

- The principal investigator assumes the responsibilities for the protection of participants in this project. Any adverse events must be reported to the IRB as soon as possible (ex. research related injuries, harmful outcomes, significant withdrawal of subject population, etc.).

- For expedited or full board review, the principal investigator must submit a Continuing Review/Final Report form in advance of the expiration date indicated on this letter to report conclusion of the research or request an extension.

-Exempt review only requires the submission of a Continuing Review/Final Report form in advance of the expiration date indicated in this letter if an extension of time is needed.

- Approved consent forms display the official IRB stamp which documents approval and expiration dates. If a renewal is requested and approved, new consent forms will be officially stamped and reflect the new approval and expiration dates.

- The principal investigator must seek approval for any changes to the study (ex. research design, consent process, survey/interview instruments, funding source, etc.). The IRB reserves the right to review the research at any time.

If we can be of further assistance, feel free to contact the IRB at 320-308-4932 or email ResearchNow@stcloudstate.edu and please reference the SCSU IRB number when corresponding.

IRB Chair:

Dr. Benjamin Witts
Associate Professor- Applied Behavior Analysis
Department of Community Psychology,Counseling, and Family Therapy

IRB Institutional Official:

Dr. Latha Ramakrishnan
Interim Associate Provost for Research
Dean of Graduate Studies

OFFICE USE ONLY

SCSU IRB# 1725 - 2237	**Type:** Expedited Review-1	**Today's Date:** 1/9/2018
1st Year Approval Date: 1/9/2018	**2nd Year Approval Date:**	**3rd Year Approval Date:**
1st Year Expiration Date: 1/8/2019	**2nd Year Expiration Date:**	**3rd Year Expiration Date:**