IMPACT OF FUNCTIONAL BEHAVIORAL ASSESSMENT AND INDEPENDENT GROUP CONTINGENCIES ON ACTIVITY LEVELS OF OBESE ADOLESCENTS

Jeannie Golden, BCBA-D
Kelli Minton, RBT
East Carolina University

Acknowledgments

- Tom Raedeke
  - *Ph.D, Kinesiology Professor*
- Mike McCammon
  - *MS, Kinesiology Professor*

PSYC 6353: BEHAVIORAL ASSESSMENT & INTERVENTION

- Cipani, E. & Schock, K. (2011). ***Function Behavior Assessment, Diagnosis, and Treatment: A Complete System for Education and Mental Health Settings*** New York, NY: Springer Publishing Company
- Graduate students in Kinesiology
  - *Examples of activity behaviors*
  - *Adolescent activity program*
  - *Limited literature FBA in physical activity*

Outline

- Physical Activity
  - *Importance*
  - *Interventions*
  - *Current Levels of Activity*
- Functional Behavioral Assessment
  - *Potential Application*
  - *Exercise Behaviors*

Importance of Physical Activity

- Youth
  - *Builds and maintains healthy bones, joints, muscles*
  - *Helps with healthy weight control*

- Adults
  - *Reduce risk of chronic disease (Type II Diabetes, asthma, bone and joint issues)*
  - *Reduce risk of all-cause mortality by 31% (Haskell, 2007)*
  - *Improves mood*
  - *Reduces risk of depression and anxiety*

Current Levels of Activity

- 42% of children age 6-11 meet recommendations
  - *11.9% of adolescents*
  - *5% of adults aged 20 – 59*

(Troiano et. al, 2008)

- Compounding issues:
  - *1 in 5 youth are obese*
    - Tripled since 1970
  - *65% of adults overweight/obese*
    - Doubled in 20 years

Physical Activity Interventions

- Focus of interventions, government task forces
  - *Healthy People 2020*
  - *Play 60*
  - *CDC, AHA, USDHHS*
- Physical activity interventions are typically
  - *group-based*
  - *education-based*
  - *action-based*
- Largely ineffective
  - *Nearly 60% of people who adopt a new program drop out within the first 6 months) (Rhodes, 2010)*
  - *Remain inactive*

Falling Short

- Motivation labels – cyclical reasoning
- Ignores long term v. short term conundrum
- Ignores physiologically aversive components
- Typically
  - *Group-based – "one-size-fits-all"*
  - *Education-based – persuasion based*
  - *Action-based – goal-setting and self-monitoring*
- Why not Function-based?

FBA in Exercise Settings

- Potential Application:
  - *Reduce blame on client (e.g. not 'motivation' but 'motivating operations')*
  - *Individual programming (based on activity abating behavior)*
  - *Target observable behaviors*
  - *Address legitimate aversive component concerns*
  - *Roll with Resistance (serve need in the same way)*
  - *Check the Environment*
  - *Check the Training strategies*

Activity Abating Behaviors

- Behaviors that serve to maintain low levels of activity
  - *Often obstacles to physical activity promotion or adherence*
  - *Prevent participant from receiving prescribed exercise treatments and benefits*
  - *Avoidance behaviors (e.g. excessive socializing prior to or during transitions of exercise)*
  - *Escape behaviors (e.g. taking unauthorized or prolonged breaks)*

Current Study Parameters

Setting – Project Mentor

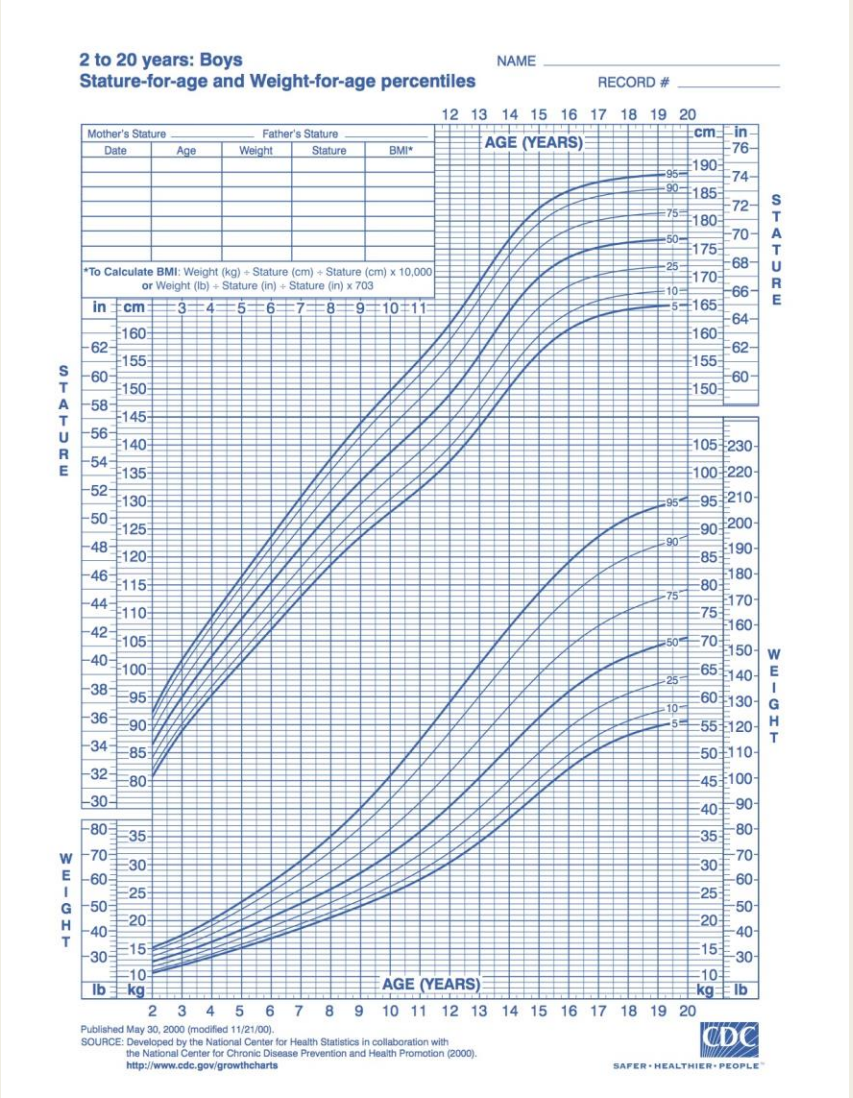
- 12-week program for activity promotion in obese/overweight population in rural eastern North Carolina
- 1-hour sessions on 3-nights per week of one-on-one supervised exercise
- Conducted in a full-service gym (cardio and weight-training equipment)
- Outdoor areas for alternate activities such as sports and games
- Polar heart rate monitor to gauge and report intensity

Participants

- 15 mentees – 15 mentors
- Mentees aged 12 – 18
  Adolescents 85% and above
- Mentors college seniors
  Kinesiology major students

Height/Weight Parameters

- Adolescents percentile ranking
- 85th percentile is considered overweight
- 95th percentile is obese
- Labels ‘‘overweight’’ and ‘‘obese’’ respectively, are often used in the literature.



Mentee Training

Setting:

- 12-week program for activity promotion in obese/overweight adolescent population
- 1-hour sessions on 3-nights per week of one-on-one supervised exercise
  - *Conducted in a full-service gym (cardio and weight-training equipment)*
  - *Outdoor areas for alternate activities such as sports and games*
  - *Polar heart rate monitor to gauge and report intensity*

Mentor Training

- Semester-long training and course 3 hours per week
  - *Motivational Interviewing*
  - *Anti-Fat Bias*
  - *Physical Training*
- Progression
- Skill Acquisition
- Modification

FBA Addition:

- Target Behaviors
- 3-Term Contingency
  - *ABC Chart Recordings*
- Data Collection
  - *Frequency*
  - *Duration*
- Functions
- Replacement Behaviors
- Intervention Implementation

Mentor Procedures

- Objectively define target behavior(s)
- ABC Chart Recordings
  - *Minimum of 5 sessions*
  - *Use to hypothesize functions*
- Collect Baseline Data
  - *Minimum of 5 full, 50 minute sessions*
  - *Average duration/frequency used to determine schedule for intervention*
  - *Reliability: 13 / 15 mentors had 1 full session of reliability. Average reliability: 87%*
- Intervention Implementation
  - *Continue to collect daily data*

Group Contingency Literature

- Supports the feasibility of group contingencies to promote desirable behaviors (Hulac, D. M., & Benson, N. 2010).
  - *Lend themselves to generalization by teaching appropriate behaviors rather than focusing on inappropriate ones*
- Skill teaching, differential reinforcement, group contingency and self-management (Kamps, D., Conklin, C., & Wills, H. 2015).
  - *Applied intervention to whole class and individuals with EBD*
- Difficulties include correct functional assessment by teachers and staff
  - *Training of staff, working one-on-one with BCBA and using examples can help with reliability and implementation (Ellingson, S. A., Miltenberger, R. G., Stricker, J., Galensky, T. L., & Garlinghouse, M. 2000).*

Commonly Observed Target Behaviors

- *Ceasing all movement (stopping all foot movement for 30 seconds or more)*
- *Ceasing vigorous-moderate movement (HR below 160 bpm)*
- *Refusal 'saying no'*
- *Asking 'why'*
- *Cell-phone use*
- *'Hurting'*
- *Hugs instead of running*
- *Walking away (with attitude)*
- *Runs and hides*

Participant	Antecedent (A)	Behavior (B)	Consequence (C)
JC	High-intensity exercise	Verbal complaint of 'hurt'	Delay of or escape from exercise
Ian	A: Weighing in at beginning of evening B: Moderate to intense activity	A: Attempts to distract with conversation and physically cover number B: Begins unrelated conversation and slows pace	A: Delays process and receives adult attention B: Slows activity and receives adult attention
Heba	Playing group activity	Initiates more sedentary rule for game	Cessation or delay or moderate to vigorous activity
Alexus	A: Playing group game B: Moderate to vigorous activity	A: Walks away B: Walks away	A: Cessation of activity B: Cessation of activity
Jaysean	A: Warm-up activity B: Playing group game	A: Begins conversation B: Tells unrelated story	A: Cessation of exercise and receives adult attention B: Cessation of activity and access to peer attention
Tori	Moderate exercise	Picks up and uses cell phone	Ceases activity and accesses cell phone
Nor	Walking or jogging (i.e. moderate to intense exercise)	Slows pace below moderate level or ceases movement	Escape from moderate to vigorous activity
Jacob	A: Exercise beginning B: Transition to next activity	A: Talks with nearby friend B: Begins unrelated conversation	A: Escape from exercise B: Delay of upcoming exercise
Ben	Initiation of activity	Engages in unrelated and unsolicited conversation	Delay of exercise
Q	High intensity exercise	Ceases activity after average of 1 minute	Escape from high intensity exercise
Aradamir	Jogging (i.e. moderate to intense exercise)	Ceases activity after average of 3 minutes	Lowers activity level to light to moderate

Table 1
ABC Chart Recordings

ABC Charts

Mentee: _____ Mentor: _____

Date/Time	A	B	C
		Changing the subject to non-exercise related items	
		Ignoring request to exercise	
		Taking excessive break	
		Talking instead of exercising	
		Using cell-phone instead of exercising “let me show you…”	
		Running and hiding	
		Stopping all movement	
		Complaining of ‘hurt’	
		Ceasing all movement	
		Saying ‘no’ and refusing to exercise	
		Complaint ‘this is stupid’	
		Asking ‘why’	

Mentee: _____ Mentor: _____

Date/Time	Antecedent	Behavior	Consequence

Hypothesized Functions

- Although target behaviors may be similar in topography, the function can be very individualized
- May be plausible case for both *Escape* and *Access*
  - *Can only determine with further data collection*
- Function further broken down
  - *Direct Escape*
  - *Direct Access*
  - *Socially-mediated Escape*
  - *Socially-mediated Access*

See Cipani, E., & Schock, K. M. (2011) for classification system

Antecedent	Behavior (of Mentee)	Consequence (What happens next)	Hypothesized Function (Access)	Hypothesized Function (Escape)
Transition or 'down-time'	Hugs mentor instead of running	Gets hug and encouragement Delay or avoidance of exercise	Access to Attention or Pleasant Physical Stimulation	Escape Delay/Avoidance of Aversive Physical Stimulation/Difficult Task

Participant	Target Behavior	Hypothesized Function	Classification
JC	Verbal behavior 'hurting' followed by cessation of exercise	Escape from aversive physiological stimulation	Socially mediated escape
Ian	Distraction behaviors	Access to peer or adult attention	Socially mediated access
Heba	Exercise delay or cessation	Escape from aversive task	Direct escape
Alexus	Walk-aways	Escape from aversive task	Direct escape
Jaysean	Excessive conversation	Access to adult or peer attention	Socially mediated access
Tori	Excessive cell phone use	Access to tangible	Direct access
Nor	Slowing pace below moderate intensity or cessation	Escape from difficult task	Direct escape
Jacob	A: Transition to next exercise B: High intensity exercise interval	Escape from aversive task	Socially mediated escape
Ben	Unrelated and unsolicited conversation	Escape from aversive task	Socially mediated escape
Q	Cessation of movement during high intensity exercise	Escape from aversive physiological stimulation or difficult task	Direct escape
Aradamir	Cessation of jogging	Escape from difficult task	Direct escape

Table 2 • Target behaviors, hypothesized functions and classifications

Baseline Data

Duration/Latency Recording

Student: ______________________
Observer: ____________________
Behavior: ____________________
Behavior initiation: __________________
Behavior termination: ___________________ **Total time Recorded:** _____________

Date	Time		Duration
	Response Initiation	Response Termination	

Whole Interval Recording Form

Student's Name: ______________________ Teacher: ______________________

Subject/Period: ______________________ Date(s): ______________________

Behavior Definition (in specific, observable, measurable terms):

____

____

Total Observation Time: __________ Length of each interval: __________

Date	Interval #										Total times behavior occurred (X)
	1	2	3	4	5	6	7	8	9	10	
O or X											

Date	Interval #										Total times behavior occurred (X)
	1	2	3	4	5	6	7	8	9	10	
O or X											

Date	Interval #										Total times behavior occurred (X)
	1	2	3	4	5	6	7	8	9	10	
O or X											

Date	Interval #										Total times behavior occurred (X)
	1	2	3	4	5	6	7	8	9	10	
O or X											

Behavior Goals

- The goal for seven of the adolescents (participants 1 through 7) was to decrease the number of occurrences (frequency) of their target behaviors.
- The goal for two of the adolescents (participant 8 and 9) was to decrease total time (duration) of target behaviors.
- Finally, for two of the adolescents (participants 10 and 11) the goal was to increase time spent (duration) performing positive exercise behaviors.

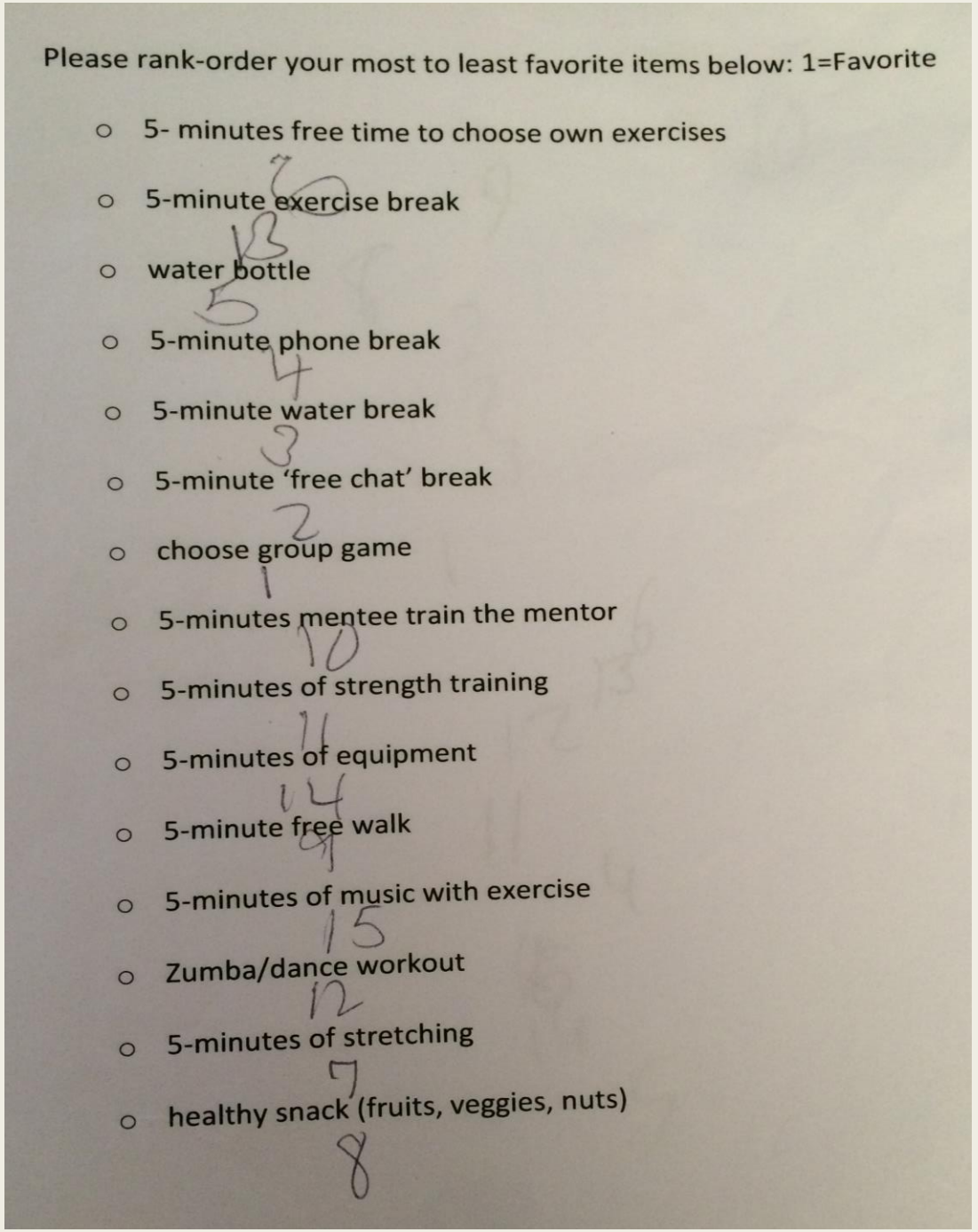
Participant	Hypothesized Function	Classification	Replacement Behavior
JC	Escape from aversive physiological stimulation	Socially mediated escape	Differential Reinforcement of Lowered Rates of Behavior
Ian	Access to peer or adult attention	Socially mediated access	Differential Reinforcement of Lowered Rates of Behavior
Heba	Escape from aversive task	Direct escape	Non-Contingent Escape
Alexus	Escape from aversive task	Direct escape	Non-Contingent Escape
Jaysean	Access to adult or peer attention	Socially mediated access	Differential Reinforcement of Lowered Rates of Behavior
Tori	Access to tangible	Direct access	Omission Training (DRO)
Nor	Escape from difficult task	Direct escape	PreMack Principle
Jacob	Escape from aversive task	Socially mediated escape	Tolerance Training with Non-Contingent Escape
Ben	Escape from aversive task	Socially mediated escape	PreMack Principle
Q	Escape from aversive physiological stimulation or difficult task	Direct escape	PreMack Principle
Aradamir	Escape from difficult task	Direct escape	Shaping

Table 3 • Replacement behaviors based on hypothesized function classification

Preference Assessment

Please rank-order your most to least favorite items below:

- 5- minutes free time to choose own exercises
- 5-minute exercise break
- water bottle
- 5-minute phone break
- 5-minute water break
- 5-minute ‘free chat’ break
- choose group game
- 5-minutes mentee train the mentor
- 5-minutes of strength training
- 5-minutes of equipment
- 5-minute free walk
- 5-minutes of music with exercise
- Zumba/dance workout
- 5-minutes of stretching
- healthy snack (fruits, veggies, nuts)



Please rank-order your most to least favorite items below: 1=Favorite

- 5- minutes free time to choose own exercises
- 5-minute exercise break
- water bottle
- 5-minute phone break
- 5-minute water break
- 5-minute 'free chat' break
- choose group game
- 5-minutes mentee train the mentor
- 5-minutes of strength training
- 5-minutes of equipment
- 5-minute free walk
- 5-minutes of music with exercise
- Zumba/dance workout
- 5-minutes of stretching
- healthy snack (fruits, veggies, nuts)

Research Design

- Changing criterion in independent group contingency ‘Good Behavior Game’ – Token System
  - *Phase 1: Week 1: 3 points*
  - *Phase 2: Week 2: 5 points*
  - *Phase 3: Week 3: 7 points*
- Board of Achievement
  - *Names, points, reinforcers*
- Contingency mapping prompts

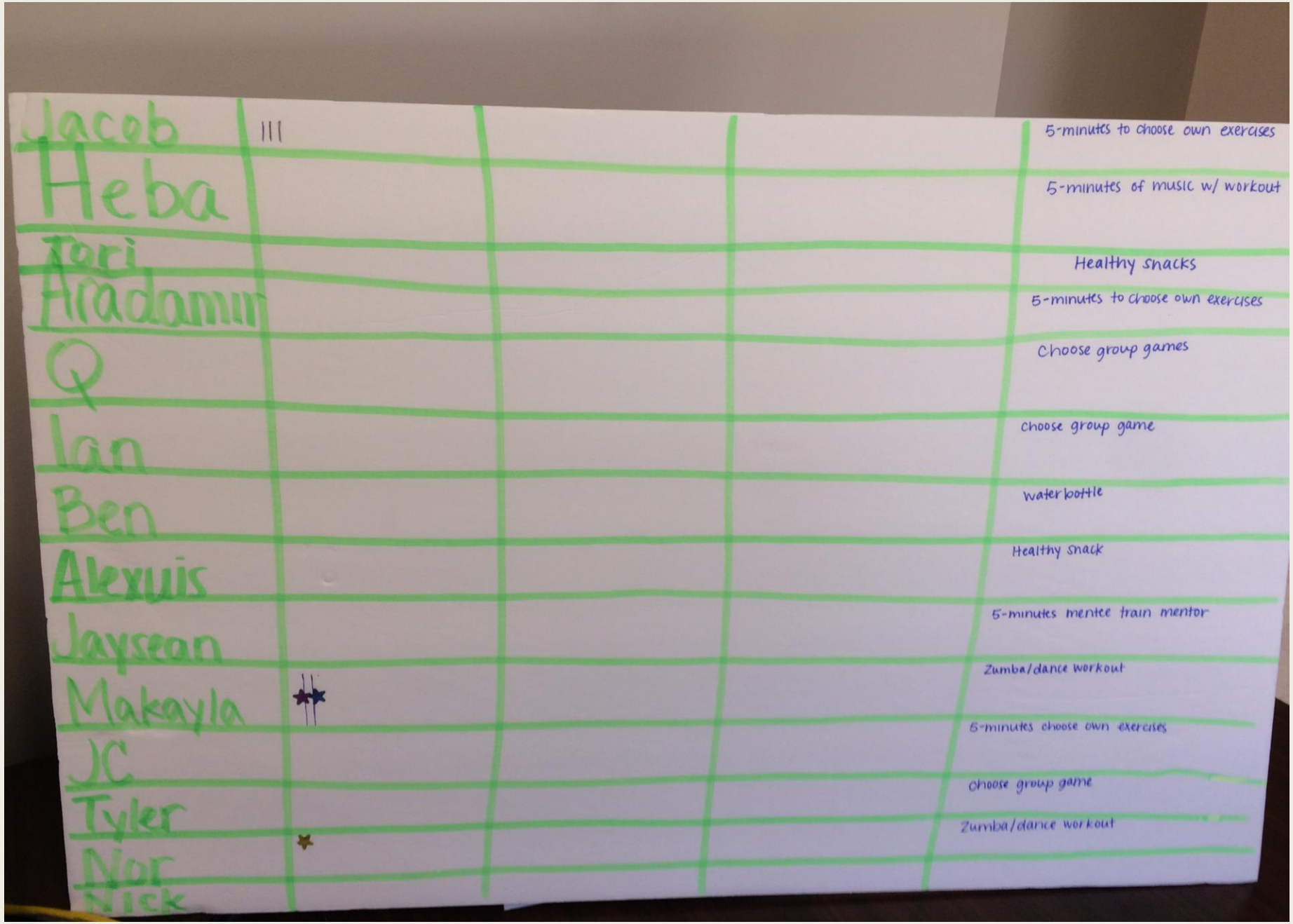
Good Behavior Game

- Mentor intro:
  - *I have been walking around noticing some behaviors we can improve upon*
  - *Everyone gets their own goal and how to earn points*
- Posted point board with names, columns for points, preferred R
  - *Able to post own points using markers, stickers*
  - *Points earned my meeting ‘goal for the day’*

Room for Improvement

Alexus

- Target:
  - *Currently taking 6 phone breaks per night*
- Goal:
  - *Take 5 phone breaks per night*
- How to:
  - *Decide ahead of time when the break will be (ex. After a hard activity, at different times during the night 7:10, 7:20, 7:30 pm)*
- Earn 1 point:
  - *Every night you only use your phone 5 times*
  - *Every time you don't use the phone when you might have before*


Jacob
III
5-minutes to choose own exercises
Heba
5-minutes of music w/ workout
Tori
Healthy snacks
Aradamir
5-minutes to choose own exercises
Q
Choose group games
Ian
choose group game
Ben
waterbottle
Alexuis
Healthy snack
Jayson
5-minutes mentee train mentor
Makayla
Zumba/dance workout
JC
5-minutes choose own exercises
Tyler
choose group game
Nor
Zumba/dance workout
Nick

Contingency Mapping

Results

- The goal for seven of the adolescents (participants 1 through 7) was to decrease the number of occurrences (frequency) of their target behaviors.
- The goal for two of the adolescents (participant 8 and 9) was to decrease total time (duration) of target behaviors.
- Finally, for two of the adolescents (participants 10 and 11) the goal was to increase time spent (duration) performing positive exercise behaviors.

Participant 1. For JC, the target behavior was cessation of exercise by complaining that he was ‘hurting’.

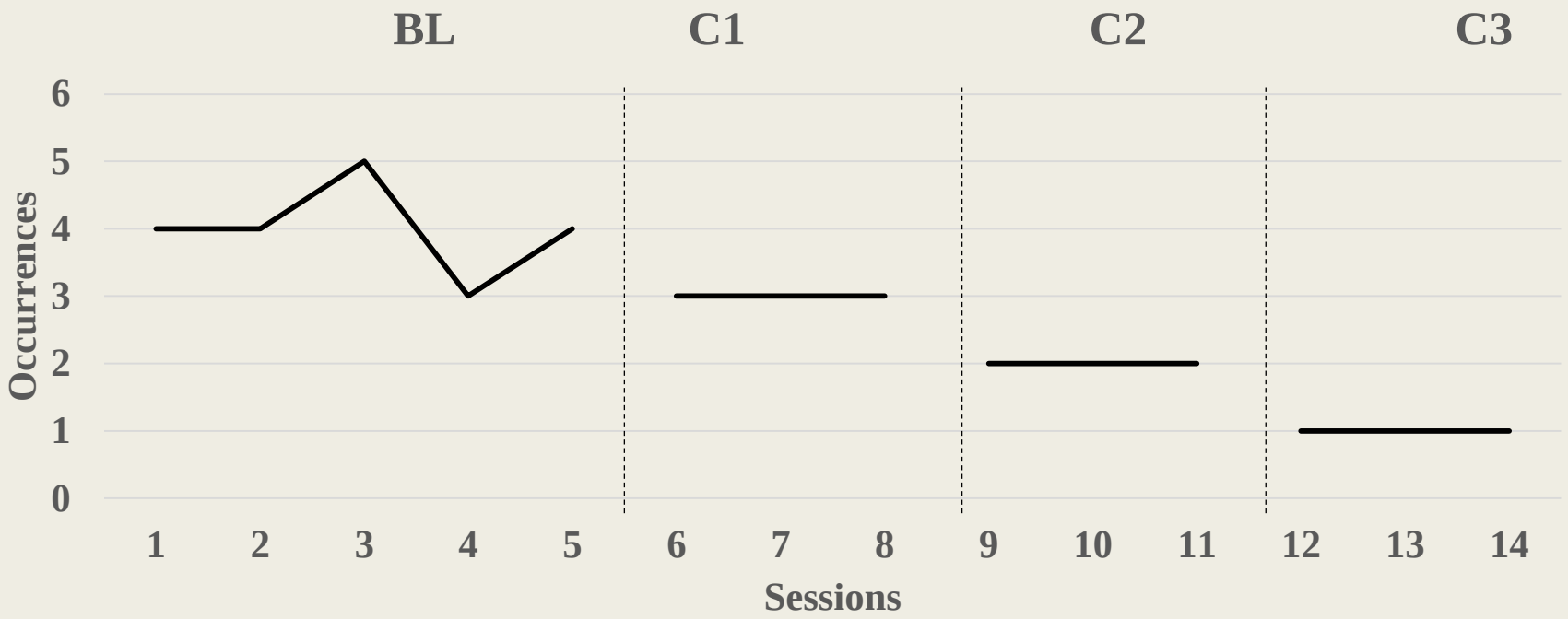


Figure 1. Occurrences of complaining of ‘hurting’ and escape behavior.
Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Participant 2. For Ian, the target behaviors were distraction and unrelated behaviors for which he received attention from the mentor, so the function was deemed to be socially mediated access.

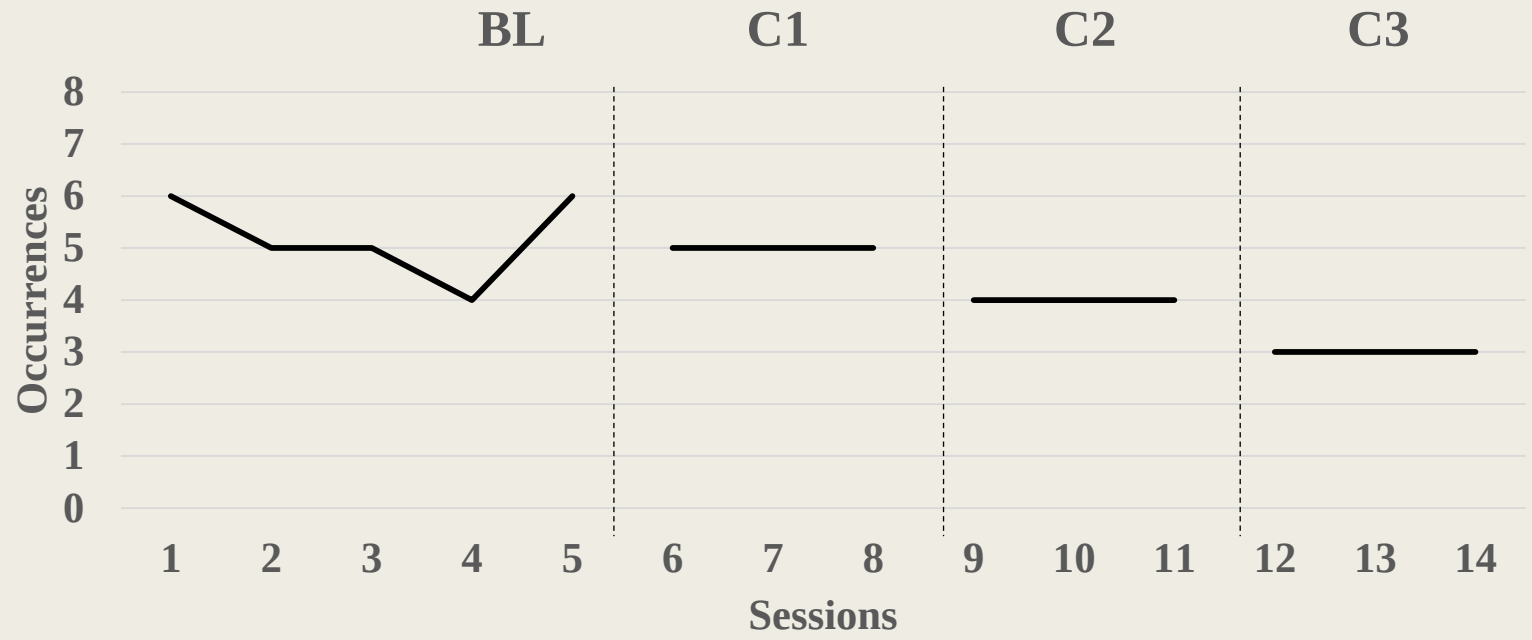


Figure 2. Occurrences of distracting behaviors

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Participant 3. For Heba the target behavior was exercise delay or cessation in the form of direct escape.

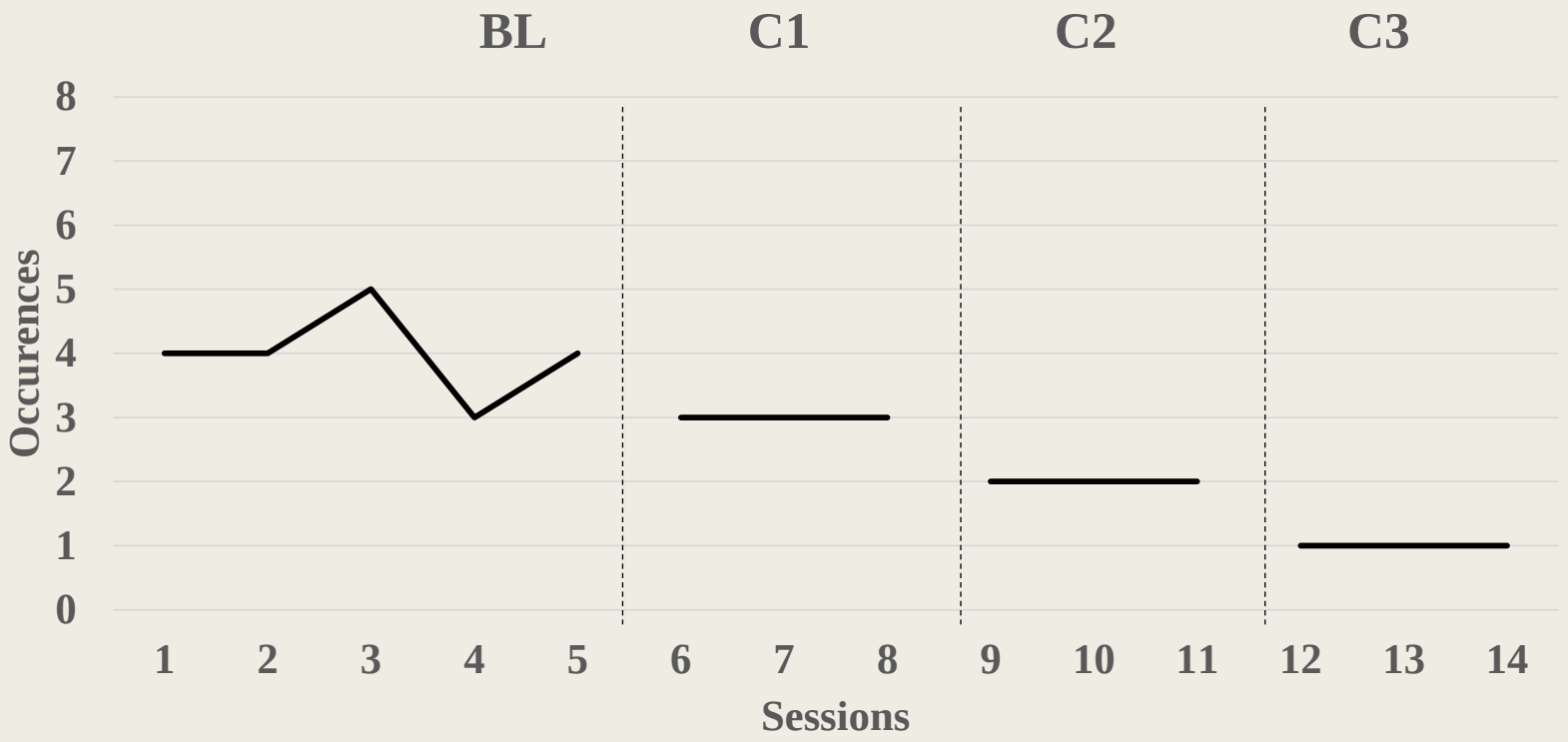


Figure 3. Occurrences of delay behaviors

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Participant 4. Alexus' target behavior consisted of walking away which functioned as direct escape.

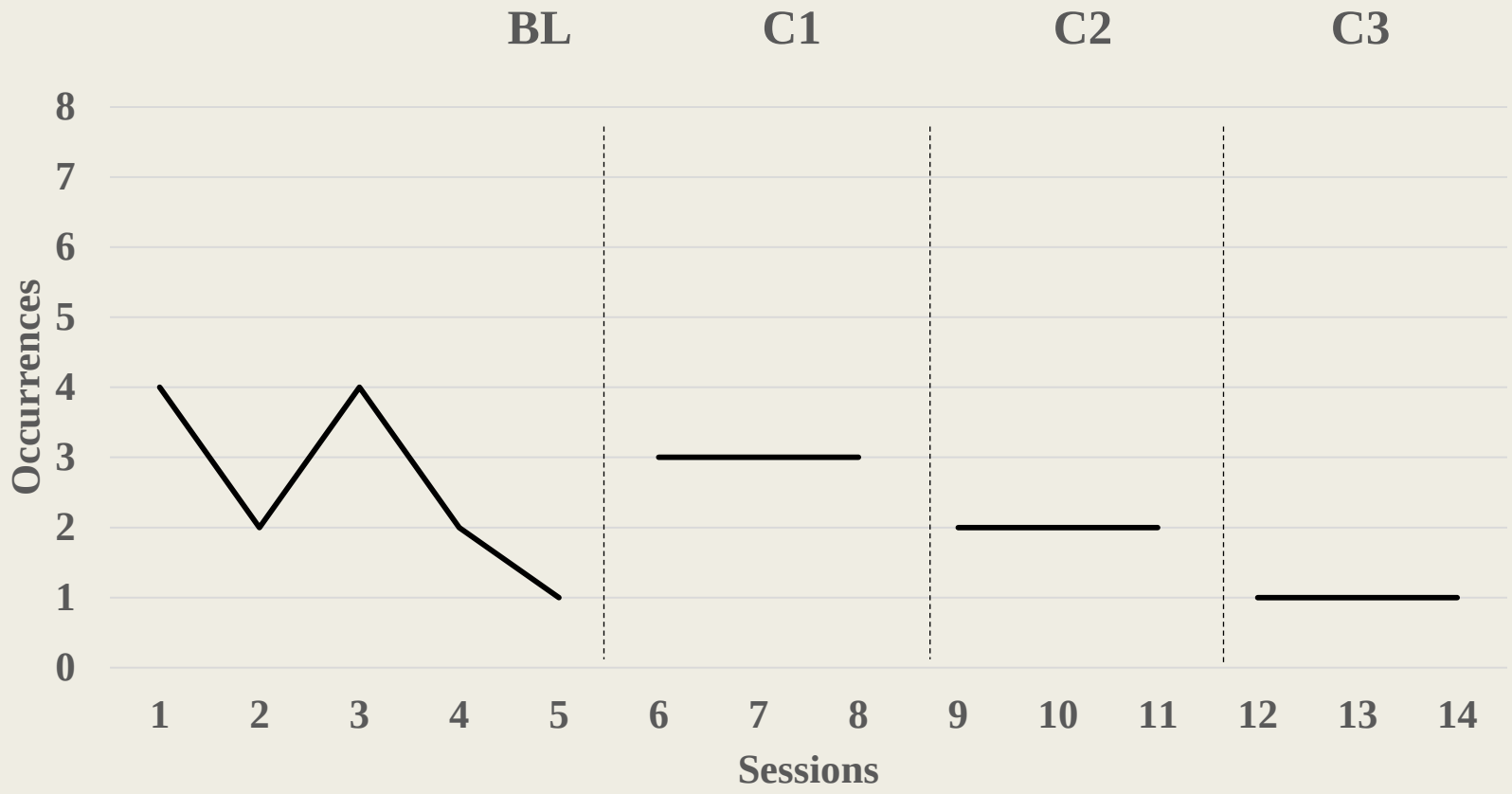


Figure 4. Occurrences of walk-aways

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Participant 5. For Jaysean the target behavior was excessive conversation which served the function of socially mediated escape.

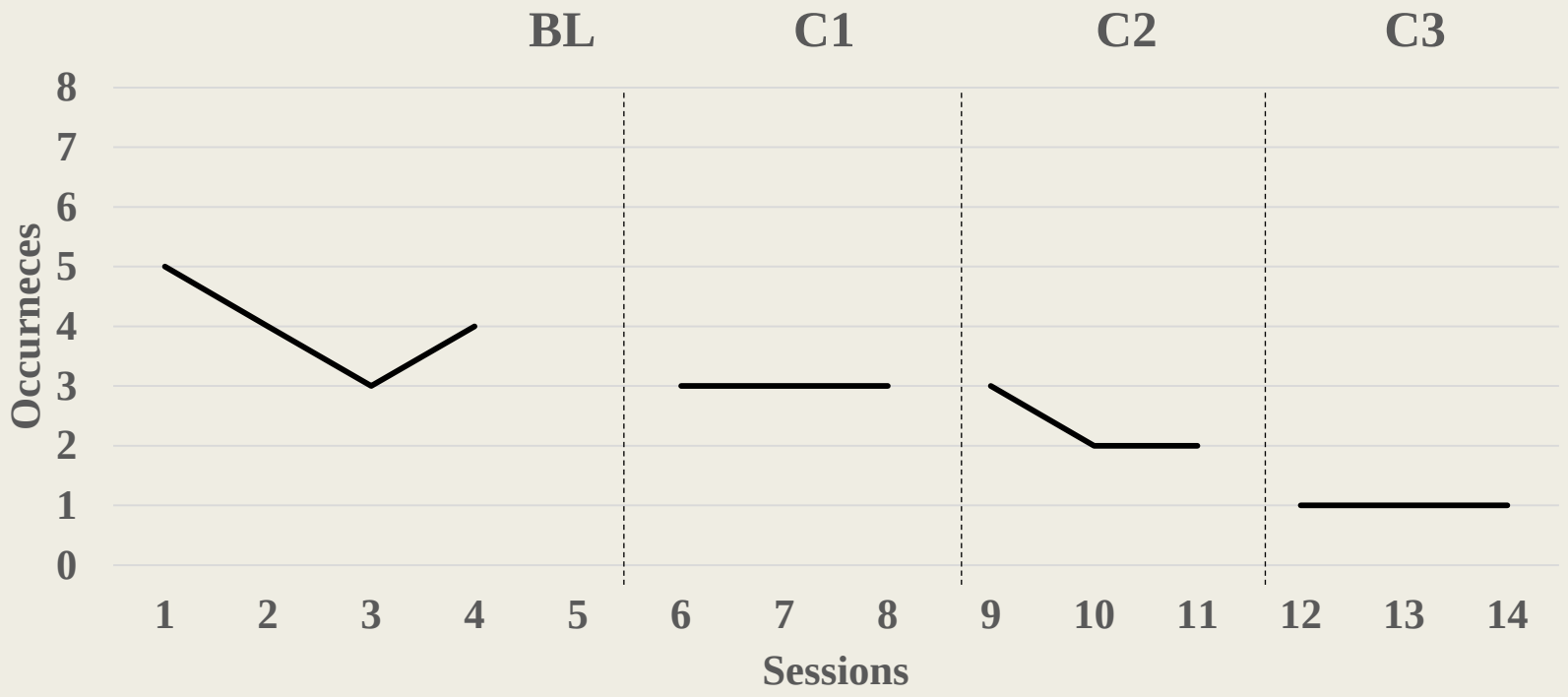


Figure 5. Occurrences of excessive conversation

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Participant 6. Tori engaged in excessive cell phone use which functioned as direct access to preferred items/activities.

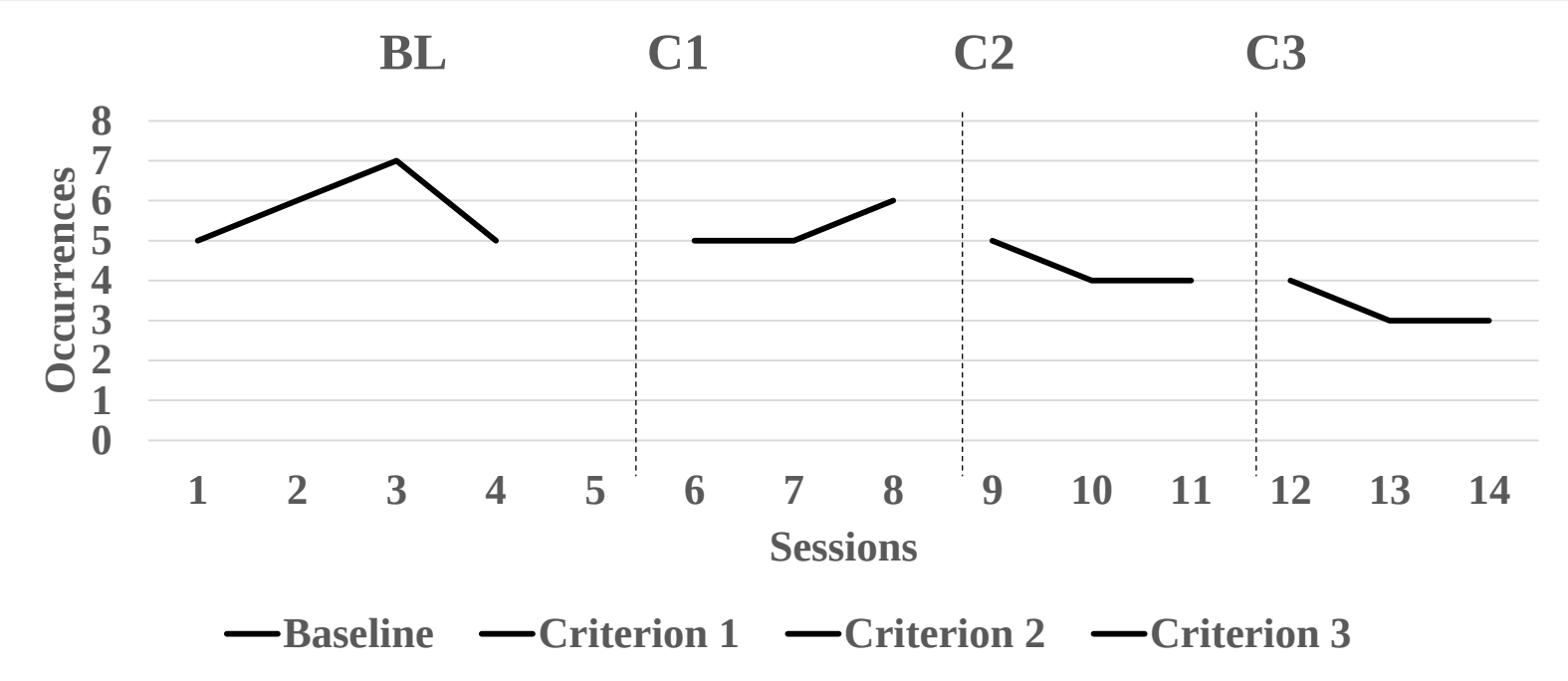


Figure 6. Occurrences of cell phone use

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Participant 7. Nor engaged in the target behaviors of slowing the pace below moderate intensity or cessation of exercise which functioned as direct escape.

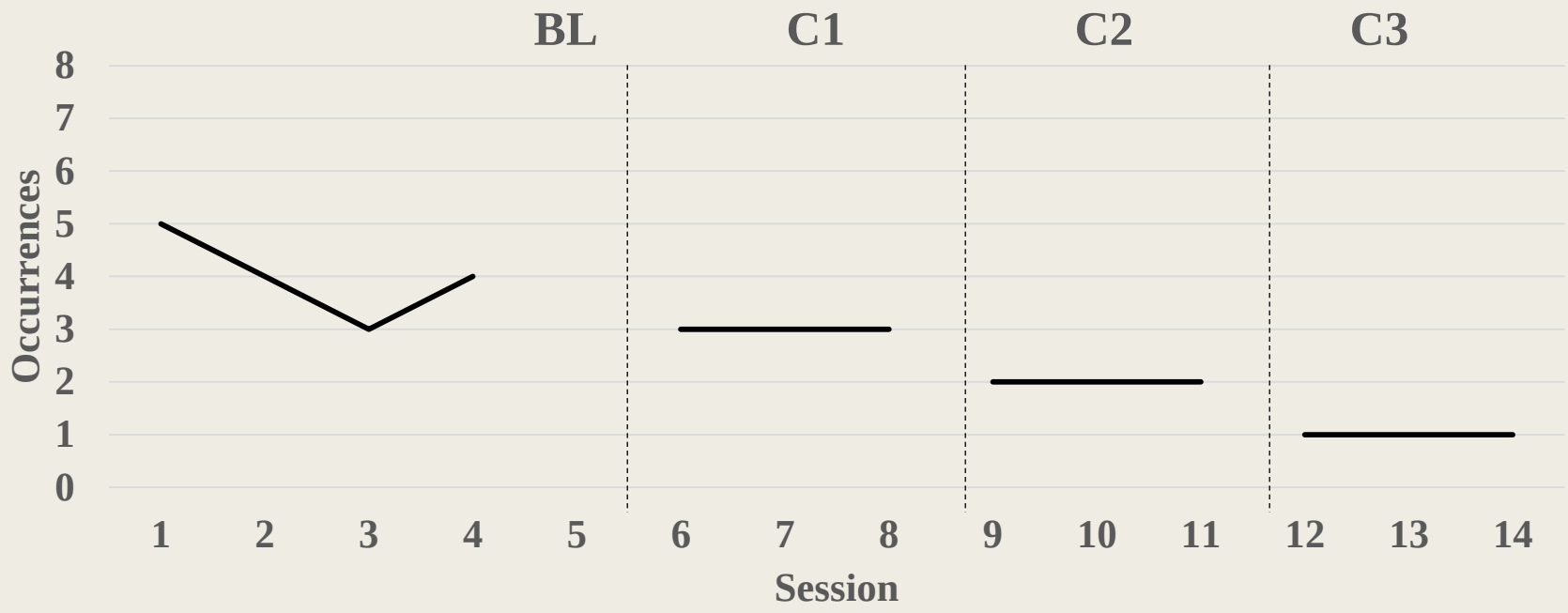


Figure 7. Occurrences of cessation

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Results – Decrease Frequency

- Overall, for the first seven participants, the mean number of occurrences during baseline was 4.22.
- During the three intervention phases, the mean number of occurrences was 3.33, 2.45, and 1.61, respectively.
- Although the criterion for reinforcement varied across participants, they all exhibited a steady decline in the target behavior, each close to and/or matching the criterion.

Participant 8. Jacob engaged in unrelated and excessive conversation which functioned as socially mediated escape.

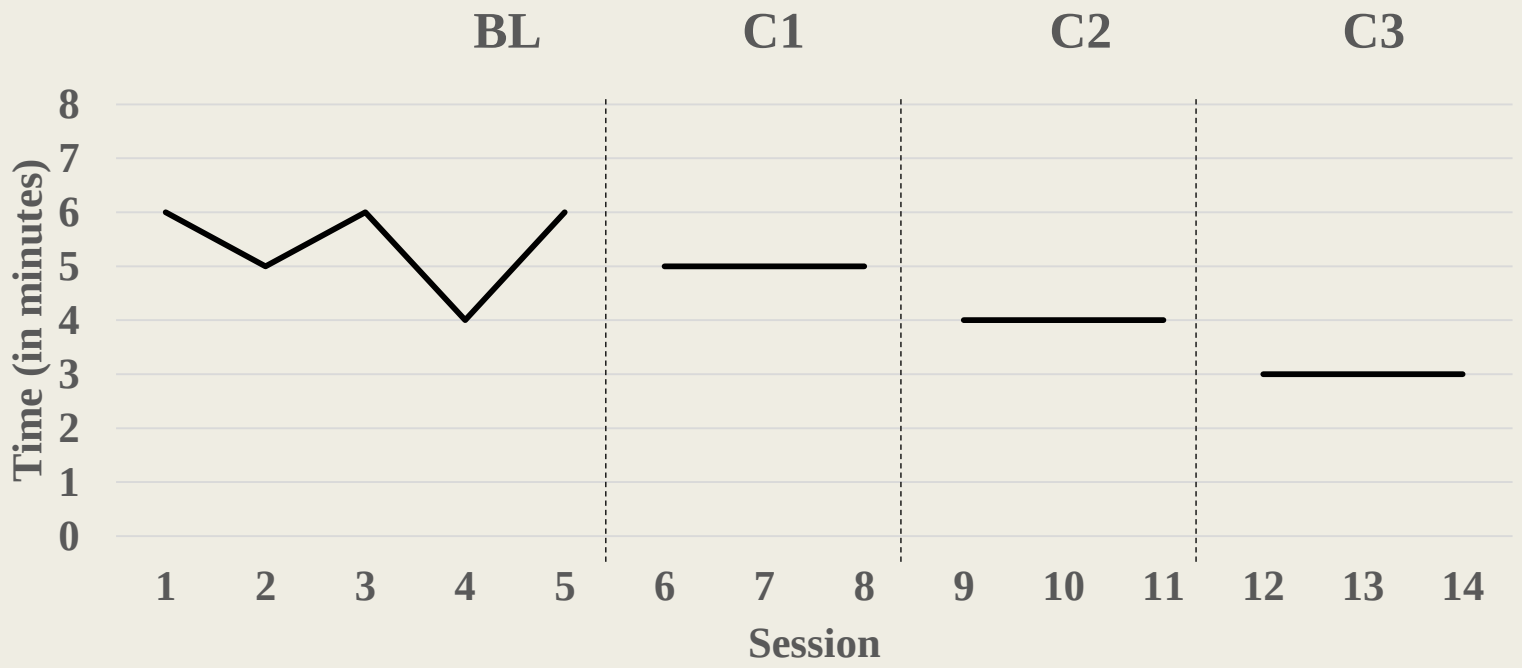


Figure 8. Time spent in conversation.

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Participant 9. Ben engaged in unrelated conversation which functioned as socially mediated escape.

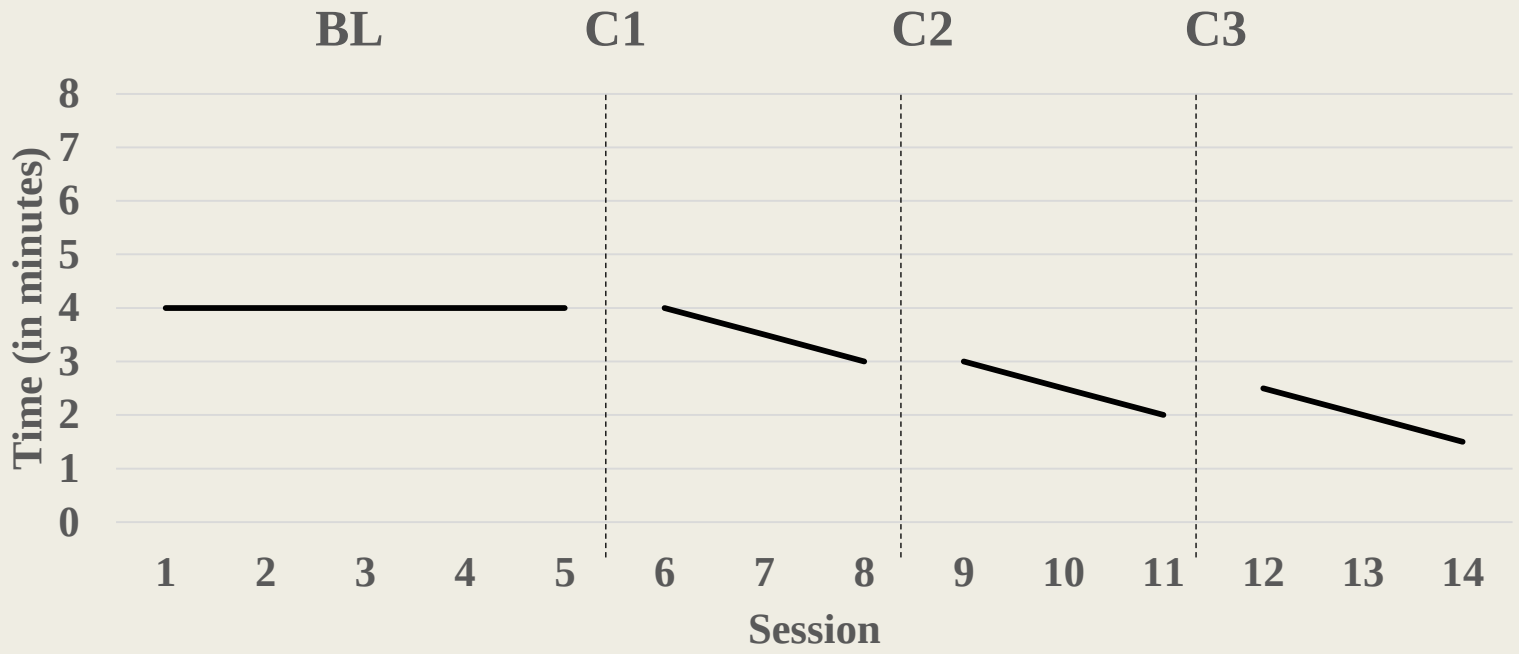


Figure 9. Time spent in excessive conversation.

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Results – Decrease Duration

- For participants 8 and 9, the average duration at baseline was 4 minutes and 32 seconds.
- During the three intervention phases, the average duration was 4 minutes and 15 seconds, 3 minutes and 15 seconds, and 2 minutes and 30 seconds, respectively.
- Although the criterion for reinforcement varied across participants, they both exhibited a steady decrease in duration of activity abating behavior.

Participant 10. Q exhibited cessation of movement during of high intensity exercise which functioned as direct escape. The goal for Q was to increase the average number of minutes per bout of high intensity exercise.

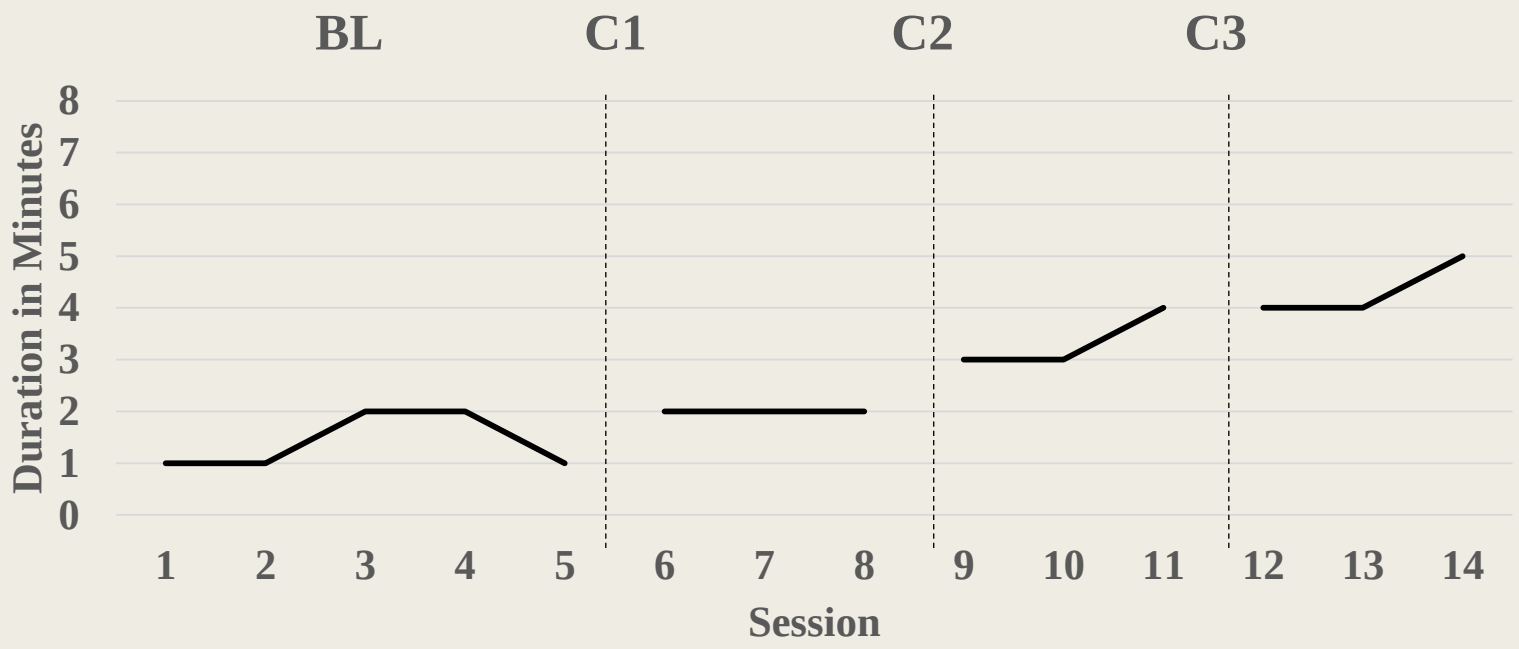


Figure 10. Average minutes per bout of high intensity exercise

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Participant 11. For Aradamir the goal was to increase the time he spent jogging, since the target behavior was the cessation of jogging which functioned as direct escape.

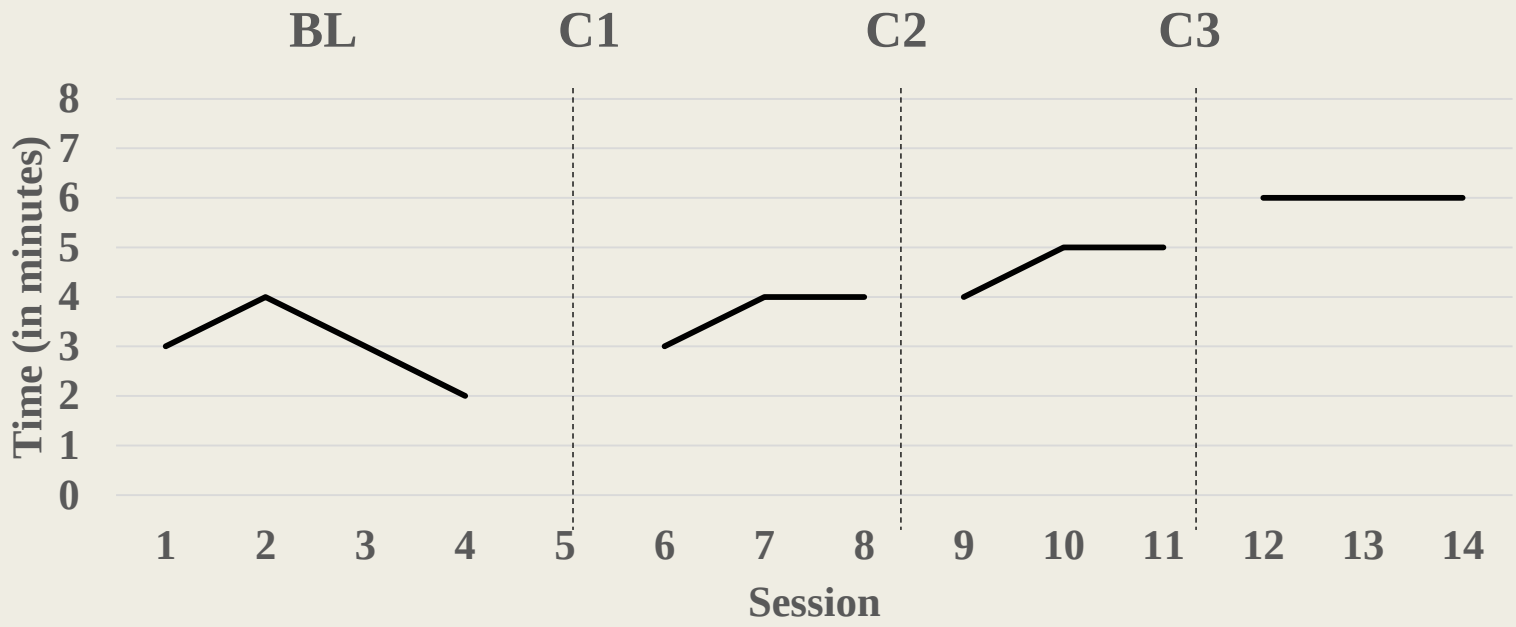


Figure 11. Time spent jogging

Note. BL = Baseline; C1 = Criterion 1; C2 = Criterion 2; C3 = Criterion 3.

Results – Increase Duration

- For participants ten and eleven, the average duration at baseline was 2 minutes and 12 seconds.
- During the three intervention phases, the mean number of occurrences was 2 minutes and 50 seconds, 3 minutes and 59 seconds, and 5 minutes and 9 seconds, respectively.
- Although the criterion for reinforcement varied across participants, they each exhibited a steady increase in positive exercise behaviors.

Effectiveness

- Shaping activity behaviors
  - *Longer exercise times (i.e. moderate to vigorous)*
  - *Fewer breaks*
  - *Longer time between phone use*
- Mentors Observations:
  - *Anecdotally marked improvements in mentee behavior and 'attitudes'*
  - *Rated overall effectiveness of FBA:* ***86%***
  - *Rated overall feasibility of implementation:* ***79%***
- Mentees anecdotally enjoyed intervention, points, reinforcers

Implications

- Feasibility
  - *Mentor training*
- Maintenance
  - *By increasing the criterion each week, essentially thinning the schedule of reinforcement*
- Generalization
  - *Other health behaviors*
  - *Other exercise settings*

Conclusions

- Functional Assessment has a place in activity research
- FBA led to improved positive exercise behaviors
- Improved behaviors led to greater adherence to activity
  - *Provide opportunities for maintenance*

Discussion

- Application of FBA in activity promotion settings
  - *Applicable*
  - *Feasible*
  - *Effective*

- Potential of FBA in activity promotion as ‘best practice’

References

Ayabe, M., Brubaker, P. H., Mori, Y., Kumahara, H., Kiyonaga, A., Tanaka, H., & Aoki, J. (2010). Self-monitoring moderate-vigorous physical activity versus Steps/Day is more effective in chronic disease exercise programs. *Journal of Cardiopulmonary Rehabilitation and Prevention, 30*(2), 111-115. doi:10.1097/HCR.0b013e3181be7c80

Alsop, B., Furukawa, E., Sowerby, P., Jensen, S., Moffat, C., & Tripp, G. (2016). Behavioral sensitivity to changing reinforcement contingencies in attention-deficit hyperactivity disorder. *Journal of Child Psychology and Psychiatry*.

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of lanned behavior. *Journal of applied social psychology*, *32*(4), 665-683.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Macmillan.

Birkimer, J. C., Druen, P. B., Holland, J. W., & Zingman, M. (1996). Predictors of health behavior from a behavior-analytic orientation. *The Journal of social psychology*, *136*(2), 181-189.

Brown, K. E., & Mirenda, P. (2006). Contingency mapping use of a novel visual support strategy as an adjunct to functional equivalence training. *Journal of Positive Behavior Interventions*, *8*(3), 155-164.

Cipani, E. & Schock, K. (2011). *Function Behavior Assessment, Diagnosis, and Treatment: A Complete System for Education and Mental Health Settings.* New York, NY: Springer Publishing Company

Ellingson, S. A., Miltenberger, R. G., Stricker, J., Galensky, T. L., & Garlinghouse, M. (2000).Functional assessment and intervention for challenging behaviors in the classroom by general classroom teachers.*Journal of Positive Behavior Interventions*, *2*(2), 85-97.

Finucane, M. M., Stevens, G. A., Cowan, M., Danaei, G., Lin, J. K., Paciorek, C. J., ... Ezzati, M. (2011). National, regional, and global trends in body mass index since 1980: Systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants. *Lancet (London, England)*, *377*(9765), 557–567. http://doi.org/10.1016/S0140-6736(10)62037-5

Fogel, V. A., Miltenberger, R. G., Graves, R., & Koehler, S. (2010). The effects of exergaming on physical activity among inactive children in a physical education classroom. *Journal of applied behavior analysis*, *43*(4), 591-600.

References (Continued)

Gustafson, T. B., & Sarwer, D. B. (2004). Childhood sexual abuse and obesity. *Obesity reviews*, *5*(3), 129-135.

Hayes, L. B., & Van Camp, C. M. (2015). Increasing physical activity of children during school recess. *Journal of applied behavior analysis*, *48*(3), 690-695.

Huhman, M. E., Potter, L. D., Nolin, M. J., Piesse, A., Judkins, D. R., Banspach, S. W., & Wong, F. L. (2010). The Influence of the VERB campaign on children's physical activity in 2002 to 2006. *American Journal of Public Health*, *100*(4), 638-645.

Hulac, D. M., & Benson, N. (2010). The use of group contingencies for preventing and managing disruptive behaviors. *Intervention in School and Clinic*, *45*(4), 257.

Hustyi, K. M., Normand, M. P., Larson, T. A., & Morley, A. J. (2012). THE EFFECT OF OUTDOOR ACTIVITY CONTEXT ON PHYSICAL ACTIVITY IN PRESCHOOL CHILDREN. *Journal of Applied Behavior Analysis, 45*(2), 401-5. Retrieved from http://search.proquest.com.jproxy.lib.ecu.edu/docview/1032785594?accountid=10639

Jung, J., Suroto, Fukugasako, Y., & Takahashi, T. (2005). The effects of group contingency strategy on students' behaviors in physical education classes in korea using multiple baseline design. *International Journal of Sport and Health Science, 3*, 46-56. doi:10.5432/ijshs.3.46

Kamps, D., Conklin, C., & Wills, H. (2015). Use of self-management with the CW-FIT group contingency program. *Education & Treatment of Children, 38*(1), 1-32.

Kamps, D., Wills, H. P., Heitzman-Powell, L., Laylin, J., Szoke, C., Petrillo, T., & Culey, A. (2011). Class-wide function-related intervention teams: Effects of group contingency programs in urban classrooms. *Journal of Positive Behavior Interventions*, 1098300711398935.

Larson, T. A., Normand, M. P., Morley, A. J., & Miller, B. G. (2013). A FUNCTIONAL ANALYSIS OF MODERATE-TO-VIGOROUS PHYSICAL ACTIVITY IN YOUNG CHILDREN. *Journal of applied behavior analysis*,*46*(1), 199-207.

Larson, T. A., Normand, M. P., Morley, A. J., & Hustyi, K. M. (2014). The role of the physical environment in promoting physical activity in children across different group compositions. *Behavior modification*, *38*(6), 837-851.

Marcus, B. H., Banspach, S. W., Lefebvre, R. C., Rossi, J. S., Carleton, R. A., & Abrams, D. B. (1992). Using the stages of change model to increase the adoption of physical activity among community participants. *American journal of health promotion*, *6*(6), 424-429.

References (Continued)

Moore, J. (1990). On mentalism, privacy, and behaviorism. *The Journal of Mind and Behavior,*19-36.

Must, A., & Strauss, R. S. (1999). Risks and consequences of childhood and adolescent obesity. *International Journal of Obesity & Related Metabolic Disorders*, *23*.

Parsons, T. J., Power, C., Logan, S., & Summerbelt, C. D. (1999). Childhood predictors of adult obesity: a systematic review. *International journal of obesity*, *23*.

Rhodes, R. E., Fiala, B., & Conner, M. (2009). A review and meta-analysis of affective judgments and physical activity in adult populations. *Annals of Behavioral Medicine*, *38*(3), 180-204.

Soler, R. E., Leeks, K. D., Buchanan, L. R., Brownson, R. C., Heath, G. W., Hopkins, D. H., & Task Force on Community Preventive Services. (2010). Point-of-decision prompts to increase stair use: a systematic review update. *American journal of preventive medicine*, *38*(2), S292-S300.

Stephens, T., Jacobs Jr, D. R., & White, C. C. (1985). A descriptive epidemiology of leisure-time physical activity. *Public health reports*, *100*(2), 147.

Strauss, R. S., & Pollack, H. A. (2003). Social marginalization of overweight children. *Archives of pediatrics & adolescent medicine*, *157*(8), 746-752.

Troiano, R. P., Berrigan, D., Dodd, K. W., Masse, L. C., Tilert, T., & McDowell, M. (2008). Physical activity in the United States measured by accelerometer. *Medicine and science in sports and exercise*, *40*(1), 181.

Trost, S. G., Kerr, L. M., Ward, D. S., & Pate, R. R. (2001). Physical activity and determinants of physical activity in obese and non-obese children. *International Journal of Obesity & Related Metabolic Disorders*, *25*(6).

Van Camp, C. M., & Hayes, L. B. (2012). Assessing and increasing physical activity. *Journal of applied behavior analysis*, *45*(4), 871-875.

Valbuena, D., Miltenberger, R., & Solley, E. (2015). Evaluating an Internet-based program and a behavioral coach for increasing physical activity. *Behavior Analysis: Research and Practice*, *15*(2), 122.

Wright, D. B., Mayer, G. R., Cook, C. R., Crews, S. D., Kraemer, B. R., & Gale, B. (2007). A preliminary study on the effects of training using Behavior Support Plan Quality Evaluation Guide (BSP-QE) to improve positive behavioral support plans. *Education and Treatment of Children*, *30*(3), 89-106.

Thank you for your attention.
QUESTIONS?

- Contact us:

Jeannie Golden

golden@ecu.edu

Kelli Minton

mintonk11@students.ecu.edu