

*THE EFFECTS OF VERBAL INSTRUCTION AND SHAPING TO
IMPROVE TACKLING BY HIGH SCHOOL FOOTBALL PLAYERS*

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We evaluated verbal instruction and shaping using TAG (teaching with acoustical guidance) to improve tackling by 3 high school football players. Verbal instruction and shaping improved tackling for all 3 participants. In addition, performance was maintained as participants moved more quickly through the tackling procedure.

Key words: athletic performance, football, coaching, instructions, shaping

Football is an aggressive sport and can result in serious injury. From 1984 through 1999, 63 injuries resulted in permanent disability among high school football players (Mueller, 2001); likewise, more than 1 million people in the United States visited the emergency room for football-related injuries between 2001 and 2005 (Mello, Myers, Christian, Palmisciano, & Linakis, 2009). Many of these injuries may have been a result of poor or unsafe tackling.

Stokes, Luiselli, and Reed (2010) evaluated differential reinforcement to improve tackling. During the intervention, the coach withheld negative comments and provided differential reinforcement when the athletes completed all 10 steps of a tackling task analysis. Results showed an increase in performance for two athletes. In addition, improved performance carried over to game play.

Stokes, Luiselli, Reed, and Fleming (2010) implemented teaching with acoustical guidance (TAG) and descriptive feedback with and without video feedback to improve offensive line-pass blocking. TAG provided immediate feedback in the form of an auditory stimulus to shape successive approximations of the terminal behavior. Video feedback and TAG were effective in improving offensive line-pass blocking.

Although previous studies have examined differential reinforcement to improve tackling (Stokes, Luiselli, & Reed, 2010) and TAG to improve line-pass blocking (Stokes, Luiselli, Reed, & Fleming, 2010), no research has evaluated TAG to improve tackling. The purpose of the present study was to use TAG paired with verbal instruction to improve tackling by high school football players. The application of verbal instruction and TAG to shape tackling form may improve safety and make football players more effective.

METHOD

Participants and Setting

We distributed a flyer to a high school team for an informational session regarding improving tackling skills. In the informational session, we described all features of the study and answered questions posed by players or parents; informed consent was obtained from the parents and assent was received from each participant. Only students who had played high school football for a minimum of 1 year were eligible to participate.

The participants were three high school football players, ages 16 to 17 years. All participants played the linebacker position. A linebacker's main duty is to stop the forward motion of the opposing team by making tackles. Ryan was 1.9 m tall and weighed 90.7 kg, Daniel was 1.8 m tall and weighed 81.6 kg. Chad was 1.85 m tall and weighed 95.2 kg. Sessions occurred on the football practice field

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doi: 10.1002/jaba.36

independent of regularly scheduled practice time. No other athletes were on the field.

Response Measurement and Interobserver Agreement

The dependent variable was tackling, divided into four different components. All components were based on procedures described by the American Football Coaches Association (1995) and were verified by two high school coaches and instructions from a textbook on tackling (Tepper, 1998). All skills were taught sequentially.

The initial skill, *angle*, was defined as taking the correct angle to the offensive ball carrier. The correct angle was determined by the player's first three steps heading toward the contact area. The contact area was a confined space in which the ball carrier was tackled. The participant led with the foot that was on the same side as the contact area. The second skill, *face mask and shoulder*, was defined as the tackler making initial contact with the ball carrier with his face mask touching the ball and his shoulder making contact with the ball carrier's midsection. The third skill, *arms and feet*, was defined as wrapping arms around the ball carrier while the tackler moved his feet in a running motion to stop the ball carrier's momentum. The fourth component, *bring down*, involved the tackler driving his shoulder into the ball carrier's abdomen and bringing him to the ground.

A second observer recorded the responses from the videotaped sessions using a trial-by-trial method concurrent with but independent of the primary data collector. Observers had been trained on all components of the tackling task analysis. Interobserver agreement was calculated during at least 45% of sessions across all conditions. Agreement was computed by dividing the number of agreements by the number of agreements plus disagreements of components of the tackling task and converting the result to a percentage. Mean interobserver agreement was 90% for baseline (range, 85% to 100%), 93% for the shaping procedure (range, 90% to 100%),

and 94% for the progressive speed phase (range, 85% to 100%). Overall mean agreement was 92%. We evaluated the treatment integrity of TAG based on the accuracy and immediacy of delivery of the auditory stimulus. Mean treatment integrity across all conditions was 94% (range, 90% to 98%). Mean interobserver agreement for auditory stimulus delivery across all conditions was 96% (range, 92% to 100%).

Materials

Each participant was required to be properly equipped for game play. We used five cones and a dummy bag (1.8-m high foam hitting bag) with a football attached by hook-and-loop tape to set up the tackling drill (Sandusky & Bryant, 1997) that is described in detail below. Two gym mats were used to cushion falls during the walking and jogging phases of the intervention.

Procedure

We used a shaping procedure embedded within a multiple baseline design across participants. Verbal instruction and shaping (TAG) were used for each component skill and the terminal skill. During the progressive speed phase (i.e., walk, jog, run conditions), we trained players together so that each participant could serve as a ball carrier for the tackler. During sequential phase changes, we verbally instructed the participants, based on the task analysis. We also taught the skill in the upcoming phase and told the participants, "When you complete the skill, if you hear a beep from the megaphone, that indicates you completed the skill correctly." We informed the athlete that he must complete the previous skills in conjunction with the new skill to receive a beep.

All skills were trained in the context of a tackling drill, which placed the tackler and ball carrier (or a dummy in some phases) 9.1 m apart facing each other. Players then ran at a designated barrier cone that was 45 degrees forward from both players to the left or the right. The ball carrier attempted to get past the cone. The tackler

attempted to stop the forward progress of the ball carrier before he reached the barrier cone.

We used a trial-based procedure in which each session consisted of 10 trials: five trials to the left and five trials to the right. When an athlete engaged in the target behavior for that particular phase, the researcher provided a beep. The researcher then recorded a correct or incorrect response prior to conducting another trial. To move to the next phase of the intervention, players had to meet the mastery criterion of 80% correct tackles for two consecutive sessions for all phases. We used a megaphone beep setting so that participants could hear the auditory stimulus; it needed to be loud enough to compete with general noise in the environment.

Baseline. The tackler started at the initial designated spot and was instructed to tackle the ball carrier at the barrier cone at full speed. No verbal instruction, feedback, or programmed consequences for correct or incorrect tackles were provided.

Shaping. We conducted all trials at walking speed using a dummy bag. A researcher simulated a ball carrier's movement by placing the dummy bag in the same position as the ball carrier and moving it towards a barrier cone. Four subphases (i.e., angle, face mask and shoulder, arms and feet, and bring down) coincided with the tackling task analysis. We provided verbal instruction for each component of tackling before each subphase and informed the players about the TAG as described previously. To receive a beep for correct form, the participant had to perform the skills correctly in sequence in walking speed against the dummy bag. After the participants met criterion for each skill, they were given a four-tackle probe of the terminal skill against a live ball carrier at full speed.

Progressive speed phase. We provided participants with verbal instruction that described correct tackling in all phases of the progressive speed phase. Accurate completion of each of the four skill components of correct tackling in the correct sequence for the entire trial produced one

beep as the reinforcer. We conducted tackling sessions with a live ball carrier who moved at varying speeds. Before progressing to the next speed phase, we conducted a four-tackle probe with a live ball carrier who moved at full speed. The purpose of this probe was to assess generalization of potential correct responding to all four component skills of the terminal skill. The speeds (walk, jog, and run) were not operationally defined.

RESULTS AND DISCUSSION

Figure 1 depicts the results for all participants. All participants' performance was low during baseline and increased to high levels during shaping and the progressive speed phase. Results add to the research on behavior-analytic approaches to sports performance, providing football coaches with an additional tool to teach tackling quickly and efficiently. In addition, we were able to reduce the number of tasks required for a correct tackle. Stokes, Luiselli, and Reed (2010) used a 10-step task analysis; in the current study we used a four-step task analysis. This reduction was the result of eliminating components that would occur if the athlete followed the four-step task analysis. For example, if an athlete makes contact with the face mask on the ball (Skill 2), his head will automatically be up. This instruction modifies outdated instructions such as putting a face mask in the chest of the ball carrier. Placing a helmet on the ball increases the probability of dislodging the ball and reduces the probability of compressing vertebrae by making contact with a human chest.

One limitation was the difficulty of providing the beep at the exact moment of completion of the target behavior. At times, participants were moving at a sprinting speed. Training on the timing of beeps for coaches is recommended. Although the procedure was effective for one-to-one instruction, it would not be possible to provide multiple sounds in a full team practice. Fortunately, tackling drills are done individually

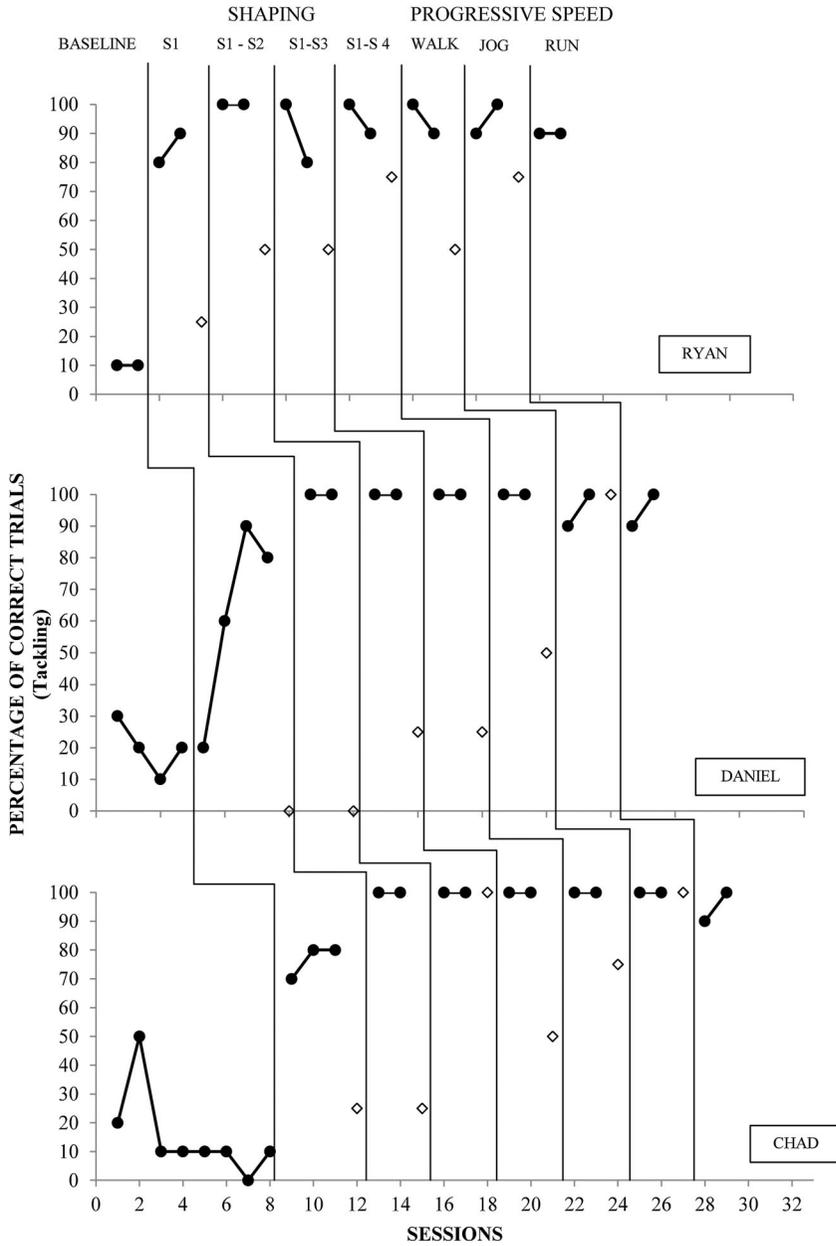


Figure 1. Percentage of correct trials of tackling across all training phases. Open data points represent generalization probes of a complete tackle against a live ball carrier. (In the shaping procedure, S = skill.)

in practice and not as a group. Each skill in the task analysis can be shaped by breaking the players into groups and engaging in each skill one at a time.

Future research should evaluate the extent to which the effects of the intervention are

maintained during game play. Future research also should examine ways to implement the intervention for the whole team during practice, evaluate the separate and combined effects of TAG and verbal instruction, and compare TAG as feedback to verbal feedback.

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Received January 26, 2012

Final acceptance October 4, 2012

Action Editor, David Wilder