

*A BEHAVIORAL INTERVENTION FOR TEACHING TACKLING
SKILLS TO HIGH SCHOOL FOOTBALL ATHLETES*

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We evaluated an intervention that combined task analysis and differential reinforcement for teaching tackling skills to 2 high school football athletes. As a result of intervention, both players tackled more proficiently in practice drills and maintained proficient tackling during games.

Key words: athletics, football, performance enhancement

Between 2001 and 2005, football-related injuries accounted for 1,060,823 emergency room visits to U.S. hospitals (Mello, Myers, Christian, Palmisciano, & Linakis, 2009). Among high school football athletes, statistics reveal that for the period of 1984 to 1999, there were 63 injuries resulting in permanent disability (Mueller, 2001). Additional data suggest that having an experienced coach decreases the likelihood of severe injury to players by 50% (Knowles et al., 2009). Some applied research shows that coach-implemented behavioral teaching procedures can improve football skills of youth, high school, and college players during practice and games (Allison & Ayllon, 1980; Smith & Ward, 2006; Stokes, Luiselli, Reed, & Fleming, 2010). Our purpose in the present study was to add to this small research base by evaluating a multicomponent behavioral intervention for teaching the skills necessary to execute a proper tackle by two linebackers on a high school football team.

METHOD

Participants and Setting

The participants were two students who attended a suburban high school and were linebackers on the varsity football team. Tedy, a junior, was 17 years old, and Mike, also a junior, was 16 years old. Both athletes had no more than 4 years experience playing football, were not first-team (starting) players, and had been identified as being poor tacklers by the coaching staff. Tedy and Mike volunteered for the study, understanding that they would receive additional defensive skills training. Their parents provided informed consent.

Measurement

We measured tackling according to a 10-step task analysis (Table 1), which was based on skills recommended by the American Football Coaches Association (1995). Each step (with accompanying definition) was listed sequentially on a recording form. Measurement consisted of placing a plus or a minus next to each step on the task analysis form that the participant executed correctly and incorrectly, respectively, during one-on-one practice tackling drills and scheduled games with league opponents (de-

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doi: 10.1901/jaba.2010.43-509

Table 1
Ten-Step Tackling Task Analysis

Step	Description
1 Appropriate split	Feet slightly wider than shoulder width and weight on toes
2 Buttocks down	Buttocks parallel with the ground
3 Bend knees	Knees bent to 90 degrees
4 Head up	Chin up facing directly in front
5 Face mask in chest	Face mask contacts chest of ball carrier keeping neck "bulled"
6 Drive head toward ball	Slide face mask towards arm holding the ball, keeping neck "bulled"
7 Wrap arms	Wrap arms around ball carrier's hips with hands clasped behind upper thighs
8 Roll hips	Move hip towards ball carrier's sternum
9 Lift with legs	Straighten legs keeping back arched
10 Drive to ground	Move legs until ball carrier is dropped to the ground

scribed below). The senior author had trained the defensive coach to conduct measurement before the study by having him observe videotaped and live action practice drills until both individuals achieved 85% of greater interobserver agreement on three consecutive occasions.

The one-on-one tackling drill started with a participant lying on his back, helmet to helmet in front of a similarly positioned ball carrier. Padded barriers were set 5 yards wide and 5 yards deep from the participant and ball carrier to create a running route. The coach initiated the drill with a verbal command, at which time the participant and ball carrier stood up so that they were facing each other. The participant then had to tackle the ball carrier, who tried to elude or run through the participant within the padded barriers.

Following the intervention evaluation, we measured Tedy's and Mike's tackling during a scheduled game with a high school league opponent. Measurement targeted the initial three tackling opportunities that had been videotaped from their first varsity game.

To assess interobserver agreement, the first author and coach independently recorded data for 20% of practice tackling drills that were videotaped and for both of the videotaped games. Computed as the percentage of steps in the task analysis the coach and senior author agreed the participants executed correctly, mean agreement was 82% (range, 70% to 90%) for the intervention evaluation and 100% for the game assessment.

Procedure and Design

The coach implemented procedures with the participants during practice drills. Intervention was not applied to games.

Baseline. The participants completed 10 tackling drills per practice session under conditions that were in place before the study. Specifically, other team linebackers shouted enthusiastically before (e.g., "C'mon, get ready!") and during (e.g., "way to go!") the drills and following drills in which the participant tackled the ball carrier (e.g., "great hit!"). The coach made similar statements during the drills. If the participants did not tackle the ball carrier, the coach commented negatively (e.g., "That's no good!" "He made you look silly!").

Intervention. During intervention, also implemented during 10 tackling drills per practice session, the baseline conditions remained in effect, with two exceptions. First, the coach withheld negative comments when the participants missed a tackle. Second, positive reinforcement was introduced by having the coach present a colorful helmet sticker to the participants each time they matched or exceeded their previous correct tackling percentage as documented on the task analysis form. Typically, the coach gave stickers to team players who performed exceptionally during games (the participants had no game experience). Although not programmed, these stickers resulted in positive comments and other forms of attention from teammates.

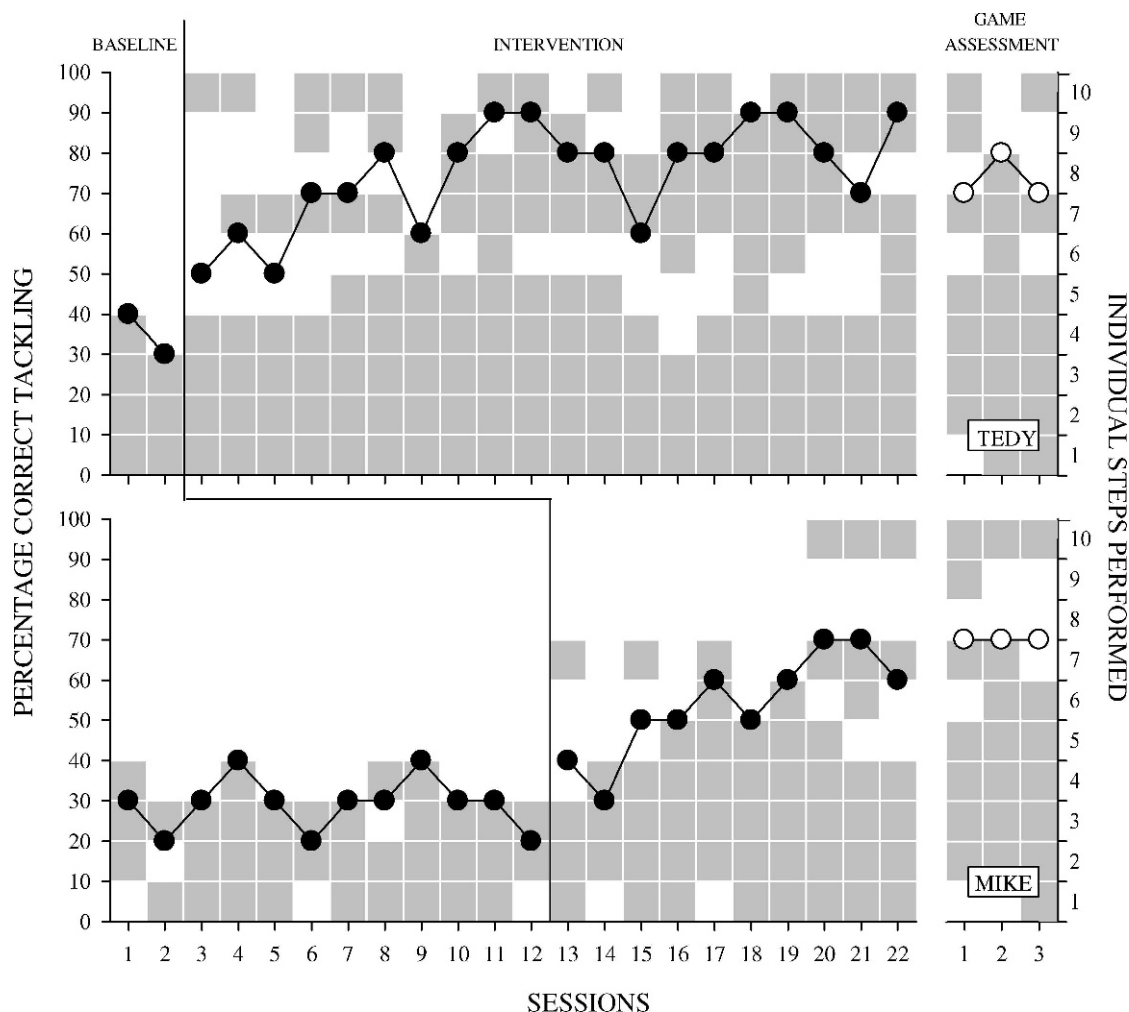


Figure 1. Percentage of tackling steps executed correctly during 10 drills per practice session in baseline and intervention phases (filled circles) and three tackling opportunities during games (open circles). The shaded squares indicate individual steps in the 10-step task analysis that the participant executed correctly.

RESULTS AND DISCUSSION

Figure 1 shows the percentage of tackling steps and each step in the 10-step task analysis the participants executed correctly during baseline, intervention, and game phases. Mean correct tackling in baseline for Tedy was 35%. His performance improved steadily with intervention ($M = 75\%$), which persisted during his first game. Mean correct tackling during baseline was 26% for Mike. His correct tackling

also increased with intervention ($M = 58\%$) and was 70% during his first game. Tedy and Mike routinely missed Steps 5 through 10 of the blocking sequence during baseline. They were able to execute these steps correctly more often in response to behavioral coaching. In summary, the intervention improved the tackling skills of two high school football athletes during practice, and they continued to perform proficiently when assessed in their first post-intervention varsity game.

The factors that led to the improvement of tackling skills are not determinable because the intervention consisted of multiple components. Nevertheless, through task analysis of the complex skills of tackling and differential reinforcement of progressively more features of correct tackling, improvements were evident. During this intervention, the helmet stickers likely functioned as conditioned reinforcers for correct tackling skills. It was also apparent that the possibly aversive consequences for missed tackles used in baseline and absent during the intervention phase were not necessary during practice for proficient tackling to occur.

As judged by the coaching staff, demonstrating proper technique was critical for these young athletes to prevent potential injury and to have them "game ready." The intervention did indeed set the occasion for their inclusion into actual games. Direct measurement was designed according to the 10-step task analysis because our concern was to have Tedy and Mike learn the basic component skills necessary to execute a tackle correctly. Nevertheless, the relation between the tackling of a ball carrier in practice and games and performance of the 10 skills remains unknown because we did not measure successful tackles during practice or games. This remains an important relation to be discovered. Determining the relation between other game outcomes (e.g., yards gained and points scored by the opposing offensive team) and tackling proficiency as measured in the current study also deserves further measurement and analysis.

The study was limited because we did not assess the integrity with which the coach implemented the procedures, and there were no formal measurements of social validity with either the coach or players. Although the postintervention assessments were promising, data were recorded only during the initial three tackles within a single game for each partici-

pant. Therefore, in addition to expanding the number and type of primary direct measures of a player's performance, future research should include measurement of intervention integrity, social validity, and extended performance during game conditions.

Our findings support the use of task analysis and differential reinforcement as behavioral interventions for improving tackling skills of high school football athletes. Beyond the procedural enhancements outlined above, additional research should evaluate this or similar behavioral interventions for other football skills (e.g., passing, blocking) and explicit strategies to promote practice-to-competition performance generalization and maintenance.

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Received December 17, 2008

Final acceptance September 23, 2009

Action Editor, Gregory P. Hanley