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A triadic comparison of the use of observational learning amongst team sport athletes, coaches, and officials

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ABSTRACT

Objective: The purpose of this research was to investigate patterns of observational learning implemented by team sport athletes, coaches, and officials.
Method: The Functions of Observational Learning Questionnaire (FOLQ; Cumming, Clark, Ste-Marie, McCullagh, & Hall, 2005) was administered to 240 participants (20 athletes, coaches, and officials from basketball, baseball, ice hockey and soccer respectively).
Results: Analysis of variance revealed that the skill function ($M = 5.33$, $SD = 1.16$) was significantly highest across all participants, followed by the strategy ($M = 4.81$, $SD = 1.23$), then performance functions ($M = 3.33$, $SD = 1.23$). The results also indicated that coaches ($M = 5.62$, $SD = 0.90$) scored significantly higher than athletes ($M = 5.16$, $SD = 1.27$) and officials ($M = 5.20$, $SD = 1.23$) on the skill function; coaches ($M = 5.15$, $SD = 1.13$) ranked significantly higher than athletes ($M = 4.74$, $SD = 1.32$) and officials ($M = 4.55$, $SD = 1.15$) on the strategy function; and officials ($M = 3.61$, $SD = 1.20$) scored significantly higher than coaches ($M = 3.05$, $SD = 1.23$) on the performance function.
Conclusions: The pattern of observational learning for all participants was similar to previous findings. Individually, coaches scored highest on the skill and strategy functions, while officials scored highest on the performance function. The results are noteworthy as they provide the first comparison of athletes, coaches, and officials. Comparisons amongst these sport participants may lead to a better understanding of the learning process that occurs through observation for athletes, coaches, and officials.

The terms imitation, modeling, observational learning, and emulation have often been used interchangeably, and sometimes to the detriment of advancements in knowledge (Greer, Dudek-Singer, & Gautreaux, 2006). Observational learning and modeling, as examples, are terms that refer to situations in which individuals copy and then learn new cognitive skills, motor skills, or patterns of behavior following the observation of others (e.g., Bandura, 1986). Heyes (2001) argued that task difficulty, task novelty, and context were also factors that needed to be considered during the observation process. Heyes further contended that learners do not necessarily only copy actions, but may instead be operating at a goal directed level, and used the term emulation to define learning gained through action observation. Regardless of the term used, there is clear converging evidence from neuroimaging studies in humans and neuronal recording studies in non-human primates that the neural circuitry involved in the observation of action overlaps extensively with that involved in the execution of the observed action (for a review see Grèzes & Decety, 2001). Jeannerod (2001) uses such evidence, in addition to other sources, to argue for the functional equivalence among action execution, action observation, and action imagined. Recently, Calvo-Merino, Grèzes, Glaser, Passingham, and Haggard (2006) demonstrated, through fMRI testing of expert ballet dancers, that neural circuitry for both a visual representation of the kinematics of movement, as well as a motoric representation of the motor commands is accessed via observation of human movement. Such findings provide evidence for purely motoric influences through action observation, and not just the visual influences originally proposed. This evidence of visual and motoric neural representations suggests that overt action does not need to happen after action observation for it to be useful. Indeed, findings of this nature provide a greater understanding as to why observational practice is effective for skill acquisition (e.g., Clark & Ste-Marie, 2007).

Cumming and colleagues, however, (Cumming et al., 2005) recently questioned whether observation in the sport realm was only used for skill execution and tested if it was also used for other means. Taking a different research approach, they went directly to the athletes and asked them to provide information concerning

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how they used observational practice. To do so, they developed the Functions of Observational Learning Questionnaire (FOLQ); a questionnaire that was designed to ask athletes to rate the extent to which they used observational learning for a given purpose.

Through the administration of the FOLQ to 200 participants, it was determined that athletes used observational learning for three functions: Skill, strategy, and performance. The skill function highlighted how athletes acquire the execution pattern of motor skills through observation (e.g., learning how to execute a free-throw in basketball). The strategy function referred to how athletes observe and learn to develop game strategies and motor routines (e.g., gaining an understanding of breakout plays in ice hockey). The performance function identified how athletes learn to reach optimal arousal and mental states through observation (e.g., learning to focus one's attention in the batter's box in baseball). Cumming et al. (2005) discerned that athletes used the skill function of observational learning most often, followed by the strategy, and then the performance functions. Several authors have reproduced this pattern of the functions of observational learning within the athletic domain (e.g., Law & Hall, 2009a, 2009b; Wesch, Law, & Hall, 2007). For example, Law and Hall (2009a) investigated the use of observational learning with over 600 varsity athletes and found that both individual and team sport participants used the skill function the most, followed by the strategy and performance functions respectively.

While previous explorations validate that observational learning serves different functions in the sport setting, the research has been limited to athletes. It would seem likely, however, that secondary sport participants, such as coaches and officials, would also benefit from observational learning. Certainly coaches and officials possess similar performance characteristics to athletes, the acquisition of which requires training and resources. Some of these requisite characteristics include domain-specific declarative and procedural knowledge (Côté, Salmela, & Russell, 1995; MacMahon, Helsen, Starkes, & Weston, 2007), tactical or positional strategies (Bloom, Crumpton, & Anderson, 1999; Oudejans et al., 2000), regulation of mental states (Rainey, 1999; Thelwell, Weston, Greenlees, & Hutchings, 2008), and, at least for team sport officials, high-level fitness (Helsen & Bultynck, 2004; Leicht, 2008).

Although similarities do exist, there are distinct differences between the three groups of sport participants. For instance, while athletes must understand different strategies that are to be executed during performance, it is the coaches' responsibility to design, teach, and implement these strategies during practices and competitions (Côté et al., 1995; Saury & Durand, 1998). Similarly, while athletes and coaches must understand basic playing rules, it is the officials' responsibility to learn effective skills and strategies that assist them in understanding, applying, interpreting, and implementing such rules (Helsen & Bultynck, 2004; MacMahon et al., 2007). Therefore, it would be fitting to establish and contrast athletes', coaches', and sport officials' patterns of the functions of observational learning. Thus, the purpose of the present research was to identify and compare reported observational learning use amongst athletes, coaches, and officials.

Preceding research on the functions of observational learning was used to guide this research and two key factors were considered, specifically, gender and sport type. Regarding gender, Cumming et al.' (2005) initial investigation noted that there were no significant differences in the functions of observational learning patterns implemented by male and female participants. Wesch et al. (2007), however, reported that male athletes utilized the performance function of observational learning more than female athletes, though the effect size was quite small ($\eta^2 = 0.03$). More recent investigations have reproduced results similar to Cumming and colleagues. Specifically, Law and Hall (2009b) as well as Hall et al. (2009) yielded no differences in gender for the functions of observational learning. Due to these mixed results and the new populations being tested herein (i.e., coaches and officials), we deemed it appropriate to recruit male and female participants and to analyze potential differences between genders.

For sport type, Cumming et al. (2005) examined possible differences in independent versus interactive sports. They classified independent sports as those where an athlete performs a skill without interacting with an opponent, whereas interactive sports included those where an athlete is in direct competition with their opponent. The authors reported that athletes in independent sports had a greater use of the skill and performance functions of observational learning than athletes in interactive sports. Other researchers have compared individual and team sport athletes and have indicated that individual sport athletes employed a greater use of the skill function of observational learning than team sport athletes, whereas the pattern was reversed for the strategy function (Hall et al., 2009). No significant sport type differences, however, were evident for the performance function.

Interestingly, these two broad categories can be combined to create four different sport type groups. That is, there can be team-independent (e.g., synchronized swimming), team-interactive (e.g., ice hockey), individual-independent (e.g., gymnastics) and individual-interactive (e.g., fencing) sports. Sunderland (2008), in fact, reported differences in the functions of observational learning amongst these four diverse groups, further supporting the importance of clearly delineating the sport type of interest in investigations in this research area. As such, we sought a homogenous group in terms of sport type, and thus, a delimitation of the research was to recruit team-interactive sport participants. This should reduce any possible confounding variables related to sport type that could influence the results (i.e., different patterns of the functions of observational learning use between team and individual or independent and interactive sport participants). Team-interactive sport participants were chosen, as it eliminated sports that do not incorporate all the functions of observation learning. A 100-m sprinter, for example, is likely limited in the strategy function of observational learning. Additionally, team-interactive sports typically are the most popular in terms of registration numbers, thus facilitating the recruiting process. Furthermore, we specifically sought out sport participants from baseball, basketball, ice hockey, and soccer as the coaches and officials for these sports typically operate as teams (e.g., coaches work with a team of assistant coaches and officials work within a team of officials).

In sum, we investigated the functions of observational learning employed by athletes, coaches, and sport officials involved in team-interactive sports. There were four main predictions within this research. The first hypothesis, as has been the case in previous observational learning studies, was that participants would employ the skill function most often, followed by the strategy, then performance functions. The second hypothesis was that athletes would score highest on the skill function, as athletes perform technical skills more frequently than coaches or officials. As mentioned previously, coaches not only have to learn game strategies, but they also must teach these strategies to their athletes (Bloom et al., 1999). Often these strategies can be learned through observing the practices of other coaches. Consequently, the third hypothesis was that coaches would rank highest on the strategy function. Finally, while many sport participants feel pressure during performances, we argue that officials may face even more pressure as they have tremendous external scrutiny from athletes, coaches, fans, and supervisors. The ability to remain calm and focused is a beneficial trait for officials (Dorsch & Paskevich, 2007; Rainey, 1999), and so, they may spend much time observing how other officials perform such skills. Fittingly, the fourth hypothesis was that sport officials would score highest on the performance function.