

Examining the Use of a Self-controlled Self-modeling Video within a Competitive Setting

Kelly Vertes

Thesis submitted to the Faculty of Graduate and Postgraduate Studies in partial fulfillment of the requirements for the degree of Master's of Arts in Human Kinetics

School of Human Kinetics

Health Sciences

University of Ottawa

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Acknowledgements

I could not have completed this thesis without the help and support from many important people. First, thank you to the trampolinists who volunteered to be in this research project and who made this research possible, and Heather McManus for allowing me to work with her competitive trampoline team. Thanks to my committee members for excellent feedback on this project. Thanks to my lab members for your help (e.g., saving my thesis document the day before I needed to hand it in) and guidance along the way. Thanks to my parents and other family members for your support throughout this endeavor. Finally, many thanks to my supervisor and mentor, Diane Ste-Marie, for her guidance, feedback, editing, and support in both school and life throughout the last 5 years.

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Abstract

Feedforward self-modeling (FF-SM), the process of viewing an edited video of the self-performing above one's current ability (Dowrick, 1999), has been shown to be an effective tool for enhancing athletes' competitive performance (Ste-Marie, Rymal, Vertes, & Martini, 2011). At 3 consecutive competitions, 9 trampolinists aged 9-16 years old were provided a FF-SM video of their trampoline routine one hour prior to competing and were provided the opportunity to control their viewings at their leisure. On average, the trampolinists viewed their videos 5 times per competition at 2 different time intervals. Interviews revealed that they perceived the video enhanced their performance. They indicated they chose to watch it to assist with skill execution; although, self-reported outcomes did include increased motor execution, increased self-efficacy, use of task strategies, and adaptive inferences. Throughout the span of the intervention, the trampolinists reported changes in their use of imagery, self-talk, and self-observation.

Chapter 1: Literature Review

It is well understood that individuals are constantly influenced by the behaviors of others. Bandura's social cognitive theory (1986) emphasized that observing the self and others; referred to as modeling and/or observation, is one of the strongest mechanisms of transmitting behaviors, attitudes and values. Bandura described the social cognitive theory as a triadic reciprocal relationship that exists among the person, behavior and environment in relation to the model. The observed information is processed at the level of the person, affecting one's cognitive processes and /or affective states, which ultimately shape one's future actions.

Bandura (1977, 1986) acknowledged that the characteristics of the modeling intervention, such as model-viewer similarity, could enhance one's attention and motivational processes during modeling, thus enhancing the outcomes of a modeling experience. Another factor thought to contribute to observation benefits is self-efficacy, a situation-specific form of self-confidence (Bandura, 1977, 1986, 1997). He proposed that modeling interventions can provide the two strongest sources of self-efficacy to the observer: a mastery experience (i.e., seeing one's best past performance) and a vicarious experience (i.e., seeing a person similar to oneself succeed at a given behavior) (Bandura, 1977, 1986). Consequently, certain characteristics of a modeling intervention can be manipulated to enhance mastery and vicarious experiences provided to the viewer.

Athletes are constantly searching for advancing technologies to reach their peak performance in sport. Given the two important factors of model similarity and self-efficacy sources, recent research by Ste-Marie, Rymal, Vertes, and Martini (2011) tested whether an overlooked video-based technique, a feedforward self-modeling (FF-SM) video, would serve to enhance athletes' competitive performance. FF-SM displays the self on video performing above one's current ability, through the use of editing software. Ste-Marie et al.'s findings revealed

that gymnasts' competitive beam performance was significantly better at competitions wherein they received a FF-SM video compared to the control competitions in which no FF-SM video was viewed. In the current research, we continue with using a FF-SM video in a competitive setting, however within the sport of trampoline. The FF-SM videos were constructed for the trampolinists' compulsory routine by selecting the videoed performances of the trampolinists' doing the ten skills of the routine in small sections. For example, skills one to three were performed repeatedly, then skills two to four then three to five, and so on. Skills performed in these smaller sequences are easier to perform with clean execution as compared to when all ten skills are completed in sequence. With this video footage, the best performances of these sequences are spliced together to create a near perfect execution of the complete ten skill routine. As such, the athlete obtains a mastery experience through observing the self executing best performances previously attained, but, concurrently, obtains vicarious experience due to observing a level of performance of the full sequence that has not yet been attained. Although Ste-Marie and colleagues (2011) already showed benefits associated with these videos, they did this under an experimenter controlled schedule that involved the athlete viewing the feedforward video four times and approximately 15 minutes prior to competing. The unique contribution in the current study is that we are providing the athletes with the video one hour prior to competition and allowing them to choose whether they want to view the video or not. Thus, we are exploring how trampolinists would choose to use their FF-SM videos in competition when provided self-control of their video viewings, and have framed the research within Ste-Marie and colleagues' (2012) applied model of observation use. Before expanding on our research questions, we first outline Ste-Marie et al.'s applied model (see Figure 1).

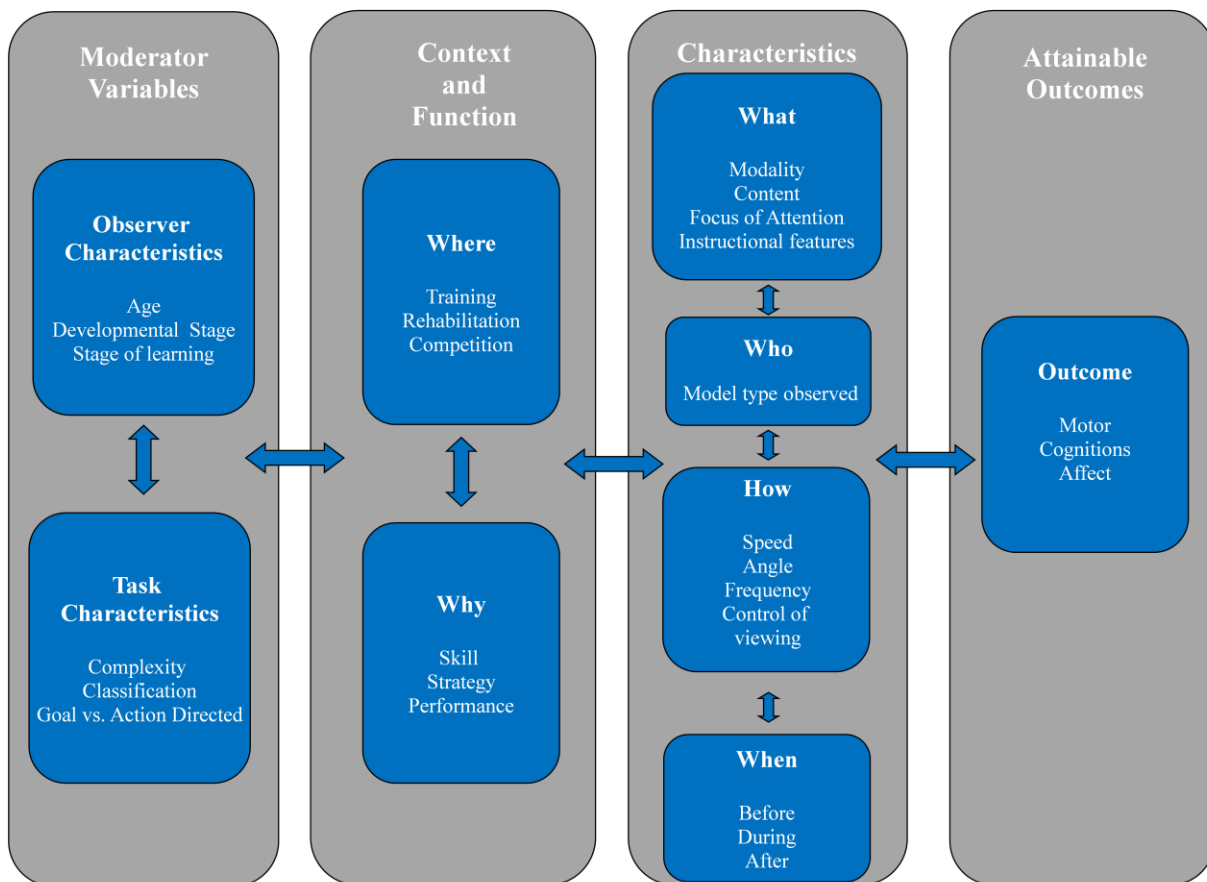


Figure 1. The Applied Model for the Use of Observation (Ste-Marie et al., 2012)

Reprinted from D.M. Ste-Marie et al., 2012, "Observation interventions for motor skill and performance: an applied model for the use of observation. *International Review of Sport and Exercise Psychology*, 1-32. By permission of D.M. Ste-Marie.

At the forefront of this model are the moderating variables; observer and task characteristics. These two variables are acknowledged as moderating variables as they influence the effectiveness of specific intervention characteristics at improving the intended motor, cognitive and/or affective outcomes. Observer characteristics, which have been shown to moderate the effectiveness of a modeling intervention include age, stage of learning, and motivational orientation of the viewer. In fact, in a 2007 meta-analysis, Ashford, Davids, and Bennett highlighted the importance of age and cognitive, verbal and motor development in

influencing observation outcomes. This meta-analysis demonstrated that age affected the physical outcomes obtained from observational modeling; more specifically, children showed greater tendency to gain movement outcome goals and adults showed greater gains in movement dynamic (i.e., form) outcomes. In addition, research has consistently shown that younger children (aged five to seven) benefit from verbal cueing alongside a visual demonstration in contrast to older children (aged eight to nine). Consequently, a visual stimulus alone is insufficient for younger children. Based on these research findings, it is essential that interventionists and researchers are aware of the age and developmental stage of the observers, and thus adjust the modeling intervention characteristics accordingly. Within this research, participants consisted of older children and adolescents; consequently, providing verbal cueing alongside the visual demonstration was deemed unnecessary.

The motivational orientation of the observer has been suggested as another factor which should be considered when creating a modeling intervention. Individuals who display a high task goal orientation are suggested to evaluate their success or failure in a self-referent manner. In contrast, individuals who display an ego orientation evaluate their performance in a norm-referent manner such as through social comparison. In addition, these individuals are motivated due to extrinsic reasons such as demonstrating their superior competence compared to others. Consequently, it is not surprising that Little and McCullagh (1989) have suggested that motivational orientation may interact with the type of information being provided in the demonstration, in that task oriented observers would pay greater attention to movement dynamics information, whereas an ego oriented observer would pay greater attention to movement outcomes. Despite these speculations, research examining goal orientation alongside

observational learning has been sparse, and it is difficult to make conclusions of its effect as a moderating variable at this time.

The characteristics of the task being observed are important variables to be considered when planning a modeling intervention. The findings from Ashford et al.'s meta-analysis revealed that the type of task that is being learned has an impact on the effectiveness of observational modeling. There are three main types of skills: discrete, continuous, and serial. Discrete skills are those that have an obvious beginning and end, such as kicking a ball, while serial skills represent a combination of discrete skills performed together to create a complex task, such as a dance routine. Continuous skills, unlike discrete skills, do not have a clear beginning or end, such as running (Schmidt & Lee, 1999). Within the observational learning literature, discrete skills have been studied most often, such as with figure skating jump performance (Law & Ste-Marie, 2005), a golf swing (Austin & Miller, 1992), jumping over a target (Erbaugh & Barnett, 1986), and volleyball skills (Ram & McCullagh, 2003), but failed to produce significant results. Discrete skills have shown the most equivocal findings compared to skills that are continuous and serial in nature. Continuous skills, such as swimming, have been the subject of study in past literature and a positive impact of observational modeling on physical performance was found (Clark & Ste-Marie, 2007; Dowrick & Dove, 1980; Starek & McCullagh, 1999; Whiting, Bijlard, & Brinker, 1987). To date, serial skills have been studied the least, nonetheless they have shown similar benefits as continuous skills, as shown with speed cup stacking (Granados & Wulf, 2007), and trampoline skills (Ste-Marie, Vertes, Rymal, & Martini, 2011). In terms of the task characteristics for the current research, a trampoline routine is a complex, serial movement task in a closed environment with the goal of perfect execution. These are similar task characteristics to the previously noted gymnastic study by Ste-Marie et al.

(2011), which already demonstrated that this type of task benefited from an observation intervention. Indeed, in the next section, the factor of the context in which the observation interventions is implemented is highlighted.

Following the consideration of the observer and task characteristics, researchers and practitioners must be aware of the context (i.e., where) the modeling will take place, as well as the function (i.e., why) of introducing the intervention, these two variables make up the second level of the framework.

Research that has examined the observation of motor skills has occurred in one of three contexts: training, competition, and rehabilitation. Interestingly however, Ste-Marie and colleagues' review (2012) revealed that over 90% of the observation literature has taken place within a training setting (i.e., laboratory, sport club, and physical education setting), while less than 5% have occurred in a rehabilitation context, and even fewer studies exist in sport competitions. In fact, Ste-Marie et al. (2012) emphasized that examining observation as a tool for competitive performance enhancement is a large gap within the literature, and thus leaves a window for future research. To date, only three studies have examined the effects of a modeling intervention on competitive performance, and only two of these studies (Rymal, Martini, & Ste-Marie, 2010; Ste-Marie et al., 2011) administered the visual demonstrations in the competition setting. Consequently, this study aims to fill this gap within the literature by examining the use of a FF-SM intervention in a competitive trampoline setting.

Recently, researchers have begun examining the reasons why individuals engage in observation. Why observers engage in observational learning, otherwise known as the 'function' of observation learning, was first examined through the Functions of Observational Learning

Questionnaire (FOLQ) created in 2005 by Cumming, Clark, Ste-Marie, McCullagh, and Hall. Findings showed that athletes use observation for three possible functions: 1) skill: aiding in motor acquisition and execution, 2) strategy: aiding in developing and executing strategies, and 3) performance: aiding in reaching one's optimal level of arousal. Research has consistently shown that athletes of all skill levels use the skill function the most, followed by the strategy and then performance function (Cumming et al., 2005; Hancock, Rymal, & Ste-Marie, 2011). Several studies have extended this research to compare whether the functions of observation differ between athletes of diverse sports. Research found that independent sport athletes use more of the skill and performance functions compared to the interactive sport athletes (Cumming et al., 2005). Ste-Marie et al.'s (2012) review of the literature showed that the majority of research has focused on the skill function of observational learning, and there has been scant research that has specifically focused on the performance and strategy functions. In the current research we interview competitive trampolinists and ask them why they chose to view a modeling video in competition. Based on previous findings, we hypothesized that the trampolinists will report using observation for all three functions (e.g., Rymal et al., 2010)

To return to the framework of observation use, once the researcher and practitioners have a full understanding of the moderating variables and the context/function variables, they are then able to manipulate the specific characteristics of the intervention (i.e. what, who, how, when), to achieve the desired outcomes, whether they be cognitive, affective, or motor benefits. The section to follow will provide a description of these intervention characteristics, as well as a brief description of past research on these variables.

Evidently, to achieve the intended outcomes of an observation intervention, the characteristics of the model being observed is a crucial component; this aspect of the framework

is referred to as 'who' (i.e., who is being observed). Broadly speaking, model type falls within two main categories; others as the models, and the self as a model.

The viewing of others as a model is broken down into two broad categories based on the similarity between the model and the viewer. These two classifications are termed a peer model (similar age and gender between model and observer) and a non-peer model (non-similar age and gender between model and observer). Peer and non-peer models can be further characterized by the model's skill level. For example, peer and non-peer models can be skilled (showing proper execution of skill), unskilled (showing incorrect execution of the skill), and learning (transitioning from unskilled to skilled) (Ste-Marie et al., 2012). In addition, coping and mastery models are characterized by the combination of verbal statements alongside a visual demonstration. Similar to a learning model, a coping model moves from an unskilled to skilled performance; however, the improvements in performance are coupled with a transition of verbal statements demonstrating lack of confidence in one's ability to a strong confidence in one's ability to perform the skill being observed. On the other hand, a mastery model is a skilled model that verbally expresses his/her confidence to perform the observed skill (Ste-Marie et al., 2012).

Research examining who is the best type of model has shown that individuals tend to learn and perform better as a result of viewing a skilled demonstration compared to an unskilled demonstration (George, Feltz, & Chase, 1992). In fact, George and colleagues (1992) found that the peer-skilled and non-peer skilled group outperformed the peer-unskilled and non-peer unskilled group, thus displaying a greater importance of skill level than model-viewing similarity for achieving performance outcomes.

Despite George and colleagues (1992) findings, research has nonetheless displayed that model-viewer similarity is related to enhanced learning. Specifically, Gould and Weiss (1981) looked at the influence of model similarity on muscular endurance performance and self-efficacy. The results demonstrated that the participants who viewed a video of a similar model extended their legs significantly longer and had greater self-efficacy levels than the dissimilar model and control group. This research was extended by McCullagh (1987), who also found that the similar model group performed significantly better on the physical performance measures compared to the dissimilar model group; however, self-efficacy levels did not significantly differ between the two conditions (McCullagh, 1987).

Evidently, model similarity appears to increase the effectiveness of an observational learning intervention. It is speculated that when the learners perceive themselves as similar to the model they are observing, they can relate more to the model, and as a result pay more attention to the modeled behavior (Bandura, 1977, 1986, 1997). Consequently, the effectiveness of a modeling experience should be maximized by having oneself as the model due to the model-viewer similarity. The process of viewing oneself, typically on video, performing a skill that one is attempting to learn is referred to as self-as-a-model interventions (Dowrick, 1999).

Self-as-a-model interventions include self-observation and self-modeling (Dowrick, 1999). Self-observation is the process of viewing oneself performing both desirable and undesirable behaviors, such as through video-replay. Whereas, self-modeling is the process of viewing oneself performing an adaptive behavior (1999). Of the two, it is argued that the self-modeling intervention provides the observer with the two largest sources of self-efficacy: a vicarious experience and mastery experience, and has more potential for behavior change (Dowrick, 1999). Consequently, we used a self-modeling intervention.

There are two types of self-modeling interventions; positive self-review and FF-SM. Positive self-review displays one's best past performance. In contrast, through the use of editing software, a FF-SM video displays a performance that is beyond the current ability of the viewer (Dowrick, 1999). For example, one's best skills may be spliced together to create an optimal skill sequence, or a spotter may be spliced out to make the performer appear as if they are performing the task independently. For the current research, the FF-SM video involved the use of editing software to create a near perfect execution of the modeled behavior. Given this, a FF-SM intervention provides athletes with a more powerful mastery experience than does a positive self-review video.

Dowrick's (1999) review of 150 studies revealed that there has been extensive research on the effects of self-modeling within the cognitive and academic domains; however, very limited research has investigated this relationship within a motor domain. To date, the research comparing self-observation and self-modeling interventions within a clinical setting reveal that self-modeling results in significantly greater physical performance improvements compared to self-observation (Dowrick, 1999). Dowrick and Raeburn (1995) compared the effects of self-modeling and self-observation on motor execution among children with various physical disabilities. Although this study revealed greater benefits for self-modeling interventions compared to self-observation within a rehabilitation context, no research at that time had been conducted within a sporting context.

To investigate the benefits of self-modeling within an able-bodied sample, Starek and McCullagh (1999) compared the effects of a peer-modeling and a self-modeling intervention on the physical performance, state anxiety and self-efficacy of beginner swimmers. The results revealed significantly greater performance improvements among the self-modeling condition

compared to the peer-modeling condition; however, no difference existed in state anxiety and self-efficacy between the two groups. Evidently, viewing oneself on video versus viewing a peer model provides additive modeling benefits; however, based on the current findings, these differences are not mediated through self-efficacy or state anxiety. There were several weaknesses, however, in Starek and McCullagh's work, such as a small sample size, a lack of a control group, a between-subject design and a short intervention period.

Clark and Ste-Marie (2007) addressed several of those methodological limitations when they compared the effects of a self-modeling and a self-observation intervention on the physical performance of novice swimmers. Thirty-three novice swimmers were randomly assigned to either a self-observation, self-modeling or control group. Results demonstrated that the physical performance of the self-modeling condition improved significantly more compared to the physical performance of the self-observation and control condition. As a result of these findings, the current research will focus on a self-modeling intervention as opposed to self-observation.

Despite the two research experiments described, research on the effects of self-modeling within the sporting domain has revealed equivocal results. No significant improvements in skill acquisition were revealed within figure skating (Law & Ste-Marie, 2005), balance beam (Winfrey & Weeks, 1993), and volleyball (Ram & McCullagh, 2003); unlike the significant improvements revealed within swimming (Clark & Ste-Marie, 2007; Starek & McCullagh, 1999) and trampoline (Ste-Marie et al., 2011). Although task characteristics have been discussed as an explanation for these equivocal findings, further research is undoubtedly needed.

As previously mentioned, the majority (> 90%) of modeling research takes place within a training setting, the same is true for self-modeling research. Although several studies have

investigated the effects of FF-SM on skill acquisition, very little research has investigated this relationship within a competitive setting (Ste-Marie et al., 2011). To date, only three studies have examined the effects of a FF-SM intervention on competitive performance. In one study, a power-lifter viewed a self-modeling video of her lifting the weight required to win the competition during training. With promising results, the female power lifter improved her performance by 10% and won the competition (1985, as cited in Franks & Maile, 1991). A weakness of this research was that it was a single subject baseline design, and thus the results could not be generalized. Consequently, to extend this research, Rymal et al. (2010) investigated the effects of self-modeling on the competitive performance of divers. However, unlike the intervention with the power-lifter, the participants viewed their videos at the competitions and not during training. The results revealed no significant differences between the performance scores of eight divers at the experimental competition, where they viewed their FF-SM video prior to competing, and their control competition, where they did not view their video.

These results, however, may have been due to several limitations within the research such as the small sample size, the few numbers of competition sites, and the delay between when the divers viewed their self-modeling video and when they competed. To address the limitations of this study, Ste-Marie and colleagues (2011) investigated the effect of a FF-SM intervention on the competitive beam performance of 20 female gymnasts. Limitations were addressed by increasing the sample size and number of data collection sites, as well as by having the gymnasts view their video three times prior to their warm-up and one final time after the warm-up to decrease the delay between viewing their videos and competing. The results revealed that the gymnasts performed significantly better at the experimental competitions in comparison to the control competitions. These results demonstrated that a FF-SM intervention can be used in

competition to enhance one's performance outcomes. Due to the promising results of utilizing a self-modeling video in competitive beam, the goal of the current research is to determine if these results can be extended to other sports; in this case trampoline.

What is being observed (video, live model, point light display), the content of the observation (auditory, visual, focal points of attention) and what instructional features are accompanying observation (verbal cues, visual cues, imagery) are important factors to consider when creating a modeling intervention. Studies have compared whether a live, video, animated and virtual model's differ in their effects on learning (Feltz, Landers, & Raeder, 1979; Kampiotis & Theoradorakou, 2006; Kernodle, McKethan, & Rabinowits, 2008). Kampiotis and Theoradorakou (2006) found that no differences existed in the learning of a handstand when viewing a live model versus an animated model. Similarly, the acquisition of flycasting was not affected by whether a live model or virtual model was viewed (Kernodle et al., 2008). Evidently, no differences seem to exist in viewing a live, video, animated or virtual model. Consequently, we chose to use a full-body video for its ease of administration on the competition floor and the importance of the athlete viewing the entire body throughout each skill of the routine.

In accordance with the social cognitive theory, providing instructional features alongside the viewing of modeled behavior may enhance learning through its effects on attention, retention and motivation to perform the observed behavior (Bandura, 1986). Given the excessive amount of information presented to observers during modeling, providing verbal or visual cues can direct one's focus to the most pertinent elements of the modeled behavior, thus triggering key movement patterns (Landin, 1994), or increasing observers' levels of motivation to attend to the visual stimuli (Rosen, Salas, Pavlas, Jensen, Fu, & Lampton, 2010). No research to date has paired instructional features with observational learning to improve the performance of a skill

that has already been retained in one's memory. Therefore, it is unknown whether instructional features are beneficial in this context. Thus, given that the athletes were given the FF–SM video in advance to use on their own time, no instructional features were used.

An essential component of a modeling intervention is when the modeled behavior is presented to the observer. Ste-Marie et al.'s (2012) review of the literature emphasized that observation can be presented before, during and after a skill is practiced. It was noted that approximately 60% of the reviewed studies presented observation both before and during skill acquisition. To date however, only two studies have manipulated when observation is presented to determine its effects on learning. Furthermore, no studies have examined when observation should be presented within a competitive setting, which is no doubt of value for future research taking place within this high-pressure setting. Within Ste-Marie and colleagues (2011) research examining a self-modeling intervention in competition, the video was viewed three times during the gymnasts' warm-up and once right before they competed; however, the researchers did not get feedback from the gymnasts regarding the timing of their video viewings. It is important for researchers to understand when athletes would prefer using observation within a competitive environment, thus limiting any possible anxiety and additive stress caused by the intervention.

The effectiveness of an observation intervention may also be enhanced by manipulating the how characteristics; more specifically, the angle in which the model is viewed, the speed of the demonstration, the frequency of viewings, and the control over viewing the video. Currently, there is limited research examining these variables.

The angle between the viewer and the observer is a pertinent characteristic of modeling; however, research examining this component of modeling is limited. When assessing viewing

angle, four viewing angles have been identified. There are two angles which are characterized by the observer and the viewer being face-to-face; the objective and looking glass view. Within the objective view the observer is imitating the behavior while using the same limb as the model; therefore, when the model performs an action with his/her left limb, so does the viewer. In contrast, the looking-glass view occurs when the observer mimics the modeled behaviors as though looking through a mirror. Consequently, a right hand movement by the model results in a left hand movement by the observer. The third angle examined is the subjective view, which is characterized by the viewer positioned directly behind the model, thus viewing the back of the model (Ishikura & Inomata, 1995). The last viewing angle occurs when the model is positioned at a 90 degree angle of the viewer, therefore viewing the side of the model. This perspective is referred to as the across viewing angle (Sambrook, 1998).

The objective and looking-glass view have been suggested to have a greater effect on learning as a result of the greater cognitive processing required to flip the visual information, compared to the subjective viewing angle (Ishikura & Inomata, 1995). This enhanced cognitive effort is hypothesized to reduce performance during acquisition, yet increase one's long-term retention. To test this hypothesis, Ishikura and Inomata (1995) compared the learning among three groups; looking-glass, subjective and objective viewing angle. The findings partially supported their hypotheses in that the subjective viewing angle group learned the skill at a faster rate during acquisition compared to the objective and looking-glass group, although the three groups did not differ in retention. Following this research, Sambrook's (1998) findings showed no differences between these groups at both acquisition and retention. Much less research has examined the effectiveness of an across viewing angle, and no research to date has compared this viewing angle with the objective, subjective and looking-glass. Nonetheless, this viewing angle

has been shown to be effective when learning various skills such as a key pressing task (Greenwald & Albert, 1968), and trampoline skill combinations (Ste-Marie et al., 2011). In addition, within a performance enhancement context, viewing a self-modeling video that was displayed in an across viewing angle enhanced the competitive performance of the gymnasts. Similarly, the current research has adopted an across viewing angle for three reasons; a) it enhanced competitive performance in Ste-Marie et al.'s (2011) research, b) it mimics the perspective of the judges, c) it provides movement dynamics information that wouldn't be available from the other angles. Although we controlled the viewing angle of the self-modeling video, we asked the participants whether they liked the angle of video, and if they would have preferred viewing it from another angle.

Although there has been very little research examining the speed of demonstrations, the limited findings have suggested that skill complexity moderates the effectiveness of slow-motion speed (Ste-Marie et al., 2012). Scully and Carnegie (1998) compared the effects of demonstration speed on learning a complex skill; a ballet jumping skill. The results revealed that the group receiving a slow-motion video displayed significantly better foot placement, movement form and relative timing; however, the slow-motion group displayed worse performance in force production and absolute timing. In contrast, more recently Al-Abood, Davids, Bennett, Ashford, and Martinez-Marin (2001) found that viewing a slow-motion video hindered spatial and temporal pattern recognition in limb movement coordination in a less complex, under-hand dart throwing task. Consequently, Ste-Marie and colleagues (2012) have suggested that slow-motion viewings may be beneficial for skills with greater temporal and spatial demands (high task complexity); whereas, real-time viewing may be optimal for simpler skills. Based on these findings, we hypothesized that the trampolinists would benefit from

viewing a trampoline routine in slow-motion due its high spatial and temporal demands. Despite this, participants were provided with a self-modeling video in real-time speed, though we used interview questions to explore whether participants would have preferred having the option of viewing the video at different speeds.

The frequency that a modeled behavior is presented to an observer is another characteristic that can influence the effectiveness of a modeling intervention, and similar to prior modeling variables, has been highly under-researched. Sidaway and Hand (1993) manipulated the frequency in which a modeled presentation was viewed while learning a golf swing task. Participants were divided into one of three groups; the 100% group viewed a demonstration before each practice trial, the 20% group viewed the demonstration every five trials, and the 10% group viewed the video once every ten trials. All three groups displayed similar improvements in performance through acquisition; however, the 100% group demonstrated significantly higher retention and trends towards greater transfer of the task. These findings suggest that providing observers with a high frequency of viewings is beneficial for motor learning.

More recently, research has examined whether having control over the frequency of video viewings enhances learning compared to when the frequency is researcher controlled. In fact, findings revealed that when athletes are provided with greater control over external aspects of their learning environment such as their feedback schedule (Chiviakowsky, Wulf, De Medeiros, Kaefer, & Tani, 2008; Janelle, Barba, Frehlich, Tennant, & Cauraugh, 1997), it has been unequivocally shown that they exemplify enhanced motor learning and performance outcomes compared to individuals with lesser control. For example, Chiviakowsky and colleagues (2008) investigated the effects of self-controlled extrinsic knowledge of results (KR) on the learning and retention of a bean bag throwing task. The participants were divided into

two groups; a self-control group which controlled when they received KR, and a yoked group, which were matched to individuals within the self-control group. This yoked group received the identical feedback schedule as the self-control participant to which they were matched; however, the experimenter controlled their feedback schedule. Interestingly, the results revealed that the individuals in the self-control group, who got to choose when to receive KR, outperformed those within the yoked group. This research demonstrated the benefits of having control over one's own learning. Other research by Wulf and Toole (1999) also found that the self-controlled use of a physical assistance device, ski poles, during practice led to greater motor learning compared to practice without self-controlled learning.

Only three studies to date have investigated the benefits of self-controlled observational learning practice. Janelle et al. (1997) investigated the effects of having self-control over video-replay and external feedback when learning a throwing task. The results revealed that the self group, which had control over their feedback scheduling, outperformed their yoked counterparts. Similarly, Wrisberg and Pein (2002) examined the effects of self-controlled observational learning practice on the learning of a badminton long serve. Individuals were divided into three groups; the self-control group who got to view the mastery model whenever they chose to, a group which viewed the video before each trial (100%), and the control group who did not get to view the video at all. Surprisingly, although the self-control group only chose to view their video on 9.8% of the trials, they had the same learning benefits as the group who viewed their video 100% of the time. These results suggest that viewing a video on 100% of the trials is unnecessary when the observers have control of their viewing frequency.

One of the weaknesses of this research, which was noted by Wulf, Raupach, and Pfeiffer (2005) was that the methodological design failed to include a yoked group; consequently, from

the given results it was not possible to determine whether the self-control group's performance advantages were due to the aspect of self-control or due to the differences in the observational learning viewing schedule. As a result, Wulf and colleagues (2005) addressed this weakness by conducting a similar experimental design when investigating the learning of a basketball jump shot. The results revealed no significant differences in form and accuracy during the acquisition phase. Within the retention phase, however, the self-control group's form scores continued to rise, whereas their yoked counterparts exhibited a drop in performance scores. The self-control group displayed significantly better form scores during retention compared to the yoked group. Although there were no significant accuracy differences between the two groups during retention, the self-control group demonstrated improvement from their last acquisition block, whereas the yoked group displayed a decrement. In addition, the self-control requested feedback only requested feedback on 5.8% of their practice trials, thus displaying the strong effects of self-controlled learning in spite of the low frequency of viewings.

Evidently, research suggests there are performance benefits from having self-control over aspects of one's learning environment such as feedback schedule, physical assistance devices and observational learning. One area that has yet to be investigated in the self-control literature is whether self-control benefits can be transferred to a self-modeling intervention. Since both self-control and self-modeling have been shown to enhance learning outcomes, it is hypothesized that combining them into a single intervention would also be advantageous for learning and performance. Consequently, this research has adopted a self-controlled self-modeling intervention in a competitive setting.

Ste-Marie and colleagues (2012) review of the literature revealed that the majority of observational modeling research has focused on motor outcomes, and much less research

examined the effects on cognitions and affect. More recent research (Clark & Ste-Marie, 2007; Rymal et al., 2010; Ste-Marie et al., 2011) has examined the effects of modeling on cognitive and affective outcomes. Findings suggested that a self-modeling video influences cognitions; more specifically, self-efficacy beliefs (Clark & Ste-Marie, 2007; Rymal et al., 2010) and intrinsic motivation (Clark & Ste-Marie, 2007). Findings have also shown an influence on affect as a result of self-modeling; more specifically, it has enhanced the learners' feelings of satisfaction with their performance (Clark & Ste-Marie, 2007). The current research examined the three attainable outcomes within Ste-Marie et al.'s review: motor, cognitive and affective. Specifically, to examine these outcomes, the trampolinists were interviewed concerning whether they felt the self-modeling video aided their performance (motor), affected their thoughts (cognitions), or their feelings (affect)

More recent studies have examined the effects of modeling on one's self-regulation. More specifically, Ste-Marie et al. (2011) and Rymal et al. (2010) have situated FF-SM within Zimmerman's (2000) self-regulation framework, and it appears as though modeling influences athletes' self-regulatory processes and beliefs (Rymal et al., 2010).

Zimmerman (2000) defines self-regulation as the "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals (p.14)." This theoretical framework was adopted as it is situated within Bandura's social cognitive theory. Zimmerman proposes that one's self-regulatory processes are influenced by a reciprocal interaction between the person, environment, and behavior. For example, a self-modeling video is placed within the environment such as in a competitive setting, which consequently influences one's covert self-regulatory processes such as self-efficacy, motivational beliefs, focus and goal-setting, which can ultimately enhance one's competitive performance. At the level of the person,

Zimmerman proposes that covert self-regulatory processes fall into three cyclical phases: forethought, performance control, and self-reflection (2000).

Staying within a competitive context, the forethought phase includes all of the self-regulatory beliefs and processes which take place before a performance has begun. They are the thoughts, feelings and behaviors which prepare individuals for an upcoming skill or task which they are attempting. This phase is made up of two larger categories: task analysis and self-motivational beliefs (Zimmerman, 2000). The key components of task analysis are goal setting and strategic planning. Goal setting refers to making a specific future plan for learning and/or performance. Someone stating that he or she wants to qualify for the Olympics is an example of goal setting. Strategic planning is defined as the self-generated behaviors used to achieve a certain goal. Using visualization and self-instruction are examples of strategic plans that can be used prior to competing in sport.

Self-motivational beliefs comprise self-efficacy, outcome expectations, task interest, and goal orientation (Zimmerman, 2000). Self-efficacy is a situational specific form of self-confidence (Bandura, 1997). For example, someone saying “I know I can win this race” is a self-efficacy statement. An outcome expectation refers to someone’s thoughts about the final outcome of his/her performance. Someone stating that they think they will get a gold medal is an example of an outcome expectation. Task interest refers to valuing a task due to intrinsic or extrinsic reasons. Finally, goal orientation refers to someone’s ultimate reasoning for doing a particular task. Someone may display a task orientation if his or her rationale for doing a particular task is to achieve mastery; whereas, someone may display an ego orientation if his or her rationale is to outperform others (Zimmerman, 2000, 2004).

The performance control phase of Zimmerman's (2000) self-regulation model encompasses all of the thoughts, feelings and behaviors that occur while a task or skill is being performed, and are designed to improve the quality of one's mental and physical activities. This phase is made up of two larger categories: self control and self-observation. Self-control refers to all of the strategies which occur during a task or skill, and is made up of self-instruction, imagery, attention focusing, and task strategies. Self-instruction involves overtly or covertly talking to oneself about how to proceed while a task is taking place. For example, athletes may use cue words to help focus on specific elements of their performance. Imagery occurs when individuals form a mental image of themselves performing, and attention focusing is the use of strategies to help eliminate distractions from the environment. Task strategies are techniques for breaking down larger skills or tasks into smaller components to aid in learning and performance. For example, a gymnast may break down a flip into three phases such as the takeoff phase, tuck phase, and landing phase. Due to the cyclical nature of the model, many of these self-control strategies were those that had been thought of in the forethought phase as a means to strategically plan for an upcoming behavior and are then carried out during the performance of the task (Zimmerman, 2004).

Self-observation refers to methods of tracking one's performance and external surroundings while performing a task (Zimmerman, 2000). This category is broken down into self-recording, self-monitoring, and self-experimentation. Self-recording refers to physically tracking one's own behavior such as writing down one's performance outcomes in a logbook; whereas, self-monitoring is mentally tracking one's behavior while performing. Self-experimentation is the process of altering specific aspects of one's performance to see the

resultant outcomes. For example, a dart thrower may alter his or her handgrip to see whether it improves or deteriorates his or her aim.

Zimmerman's self-reflection phase is made up of all the self-regulatory processes which occur after a task or skill has been performed. The purpose of this phase is to influence the individuals reaction to his/her efforts, as well as to subsequently effect the forethought self-regulatory processes adopted in future performances, as these three covert phases work in a cyclical fashion. This phase is made up of two major categories: self-judgment and self-reaction (Zimmerman, 2000, 2004). Self-judgments include one's performance evaluation, and the perceived causal reasoning for one's results. Self-evaluation refers to comparing one's performance to a standard or a goal. Oftentimes, performance outcomes are compared to a previous performance, another person's performance, and/or pre-established goals and criteria. A causal attribution is one's reasoning for performance success or failure such as whether it is due to controllable or uncontrollable factors. When someone attributes their failure to poor equipment or facilities, this would be an example of an uncontrollable attribute; whereas, when someone attributes their failure to poor effort, this would be an example of a controllable attribute (Zimmerman, 2000, 2004).

The key elements of self-reaction are self-satisfaction/self-dissatisfaction, and adaptive-defensive inferences. Self-satisfaction and dissatisfaction is the degree of perceived satisfaction or dissatisfaction with one's performance (Zimmerman, 2000). Adaptive and defensive inferences are people's thoughts of how to alter their self-regulatory strategies to improve subsequent performance outcomes. Specifically, adaptive inferences are new proactive strategies such as setting new goals to help improve performance in the future; whereas, defensive

inferences are mechanisms to escape future self-dissatisfaction such as procrastination and avoidance behaviors (Zimmerman, 2000, 2004).

To explore the self-regulatory processes associated with a FF-SM intervention, Rymal et al. (2010) interviewed competitive divers following a modeling intervention that they received in competition. The results revealed that the divers reported engaging in several self-regulatory processes, such as self-motivational beliefs, strategic planning, self-judgments and self-reactions as a result of the video. Consequently, in the current research we will explore whether the trampolinists' self-regulatory processes changed throughout the span of the intervention as a function of the video. More specifically, to explore changes in their use of self-observation video-replay during training, the trampolinists tracked their video use during training the week prior to three consecutive competitions. Moreover, at the closing interview we asked them whether their use of videos and self-regulatory strategies changed since the beginning of the research.

In summary, the purpose of this research was to explore the use of a self-controlled FF-SM video in a competitive setting, and we have situated the research within the 5W, 1H framework of observation use. Specifically, competitive trampolinists aged 9-16 (observer characteristics) were provided a full-body live (what), FF-SM (who) video of serial trampoline routine (task characteristic) within a competition setting (where). This video was provided in real-time (how: speed) from a 90 degree viewing angle (how: angle). In addition, participants were provided the opportunity to control their video viewings at their leisure (how: control of viewing). The videos were provided to the trampolinists approximately one hour prior to competing (when) and were collected after they finished competing. Although we controlled a number of the aspects of the observation intervention, the following research questions exist: (1)

will they chose to use their video?., and if they do, (2) why do they chose to view it?, (2) what were the self-reported outcomes of the self-controlled SM video of the intervention?, (3) what's the frequency of their viewings?, (4) when do the trampolinists choose to view their videos?, (5) what would the trampolinists change about the video to improve its effectiveness (e.g. angle and speed)?, and (6) did the trampolinist' self-regulatory strategy use change as a result of the intervention?

Chapter 2: Method

Participants

Participants consisted of nine male and female trampolinists ($M = 5$, $F = 4$) aged 9-16 years old ($M = 12.7$, $SD = 1.58$), who belonged to a competitive trampoline team located in the province of Ontario. The trampolinists' competitive levels ranged from Provincial level C to novice National (see Table 1 for participant information). This study was approved by the institution's ethics review board.

Table 1

Participants' Gender, Age, Competitive Level and Years Competing

Participant	Gender	Age	Competitive Level ^a	Years Competing
1	F	16	Provincial C	1
2	F	12	Provincial B	2
3	M	14	Novice National	4
4	F	12	Provincial C	1
5	M	14	Novice National	2
6	M	9	Provincial C	2
7	F	13	Provincial C	1
8	M	12	Provincial A	2
9	M	12	Provincial C	1

Note. Provincial athletes compete at the provincial level and represent their city; National athletes compete at a more advanced level and represent Ontario at the Canadian Championships

Materials

Prior to the intervention, materials were used to create FF-SM videos and gain information about the trampolinists video use during training (i.e., pre-intervention). Materials were also used during the competitions (i.e., intervention), and at the conclusion of the intervention (i.e., post-intervention) to examine their use of the FF-SM video at the competitions.

Pre-intervention

A Sony video Handycam (model number DCR-HC65/HC85) mounted on a tripod was used to videotape the trampolinists practicing their competitive compulsory routine during training. The video footage was transferred to a Toshiba laptop where the trampolinists' FF-SM videos were created using the Dartfish Pro editing software. The constructed videos were burned onto Verbatim 4.7 GB DVDs. To track the trampolinists use of self-observation video-replay during training, logbooks made up of one chart where participants checked off each time they used video during practice, were completed during two training sessions the week before each competition.

Intervention

During the intervention phase, five portable Sony DVD players were used for viewing the FF-SM videos at the competitions. A Sony tape recorder was used to record the trampolinists' responses to the interview questions. A competition logbook was provided to the trampolinists to track their use of the FF-SM video in competition. The logbook was four pages long. It consisted of four charts, one for each competition and one example, which were made up of a first column titled "time/date," in which they self-reported what time the viewing took place, a second column titled "number of viewings," where the athletes' reported the number of times

they viewed their video within a single sitting, and a third column titled “location,” where they reported where that viewing occurred. The first page of the logbook consisted of an example of a chart that has been filled out, and a written explanation regarding how to fill it out.

Two short semi-structured interviews were conducted to explore the trampolinists use of the FF-SM video during competition. At the first competition, the trampolinists were asked whether or not they viewed their FF-SM video during the competition. The second question asked them ‘why they did or did not’ view it, while specifically probing whether it was viewed to aid their thoughts, feelings and/or competitive performance. At the third competition, the interview only differed from the first competition interview in that a specific question about the number of times they viewed their video that day was asked.

Post-intervention

A short semi-structured interview was developed to explore when the athletes preferred viewing the video in competition, and whether they felt the video was beneficial, with probing queries on whether it aided their thoughts, affect and performance. Participants were asked what they would change about the video to improve its effectiveness, and finally whether their observation use and their use of other self-regulatory strategies have changed throughout the span of the intervention as a result of the video.

Procedure

Pre-intervention

Permission to approach the trampolinists was granted by the head coach of the trampoline club, and informed consent and assent forms were obtained from the participants and their parents prior to the initiation of data collection. Once the forms were signed and returned to the researcher, the trampolinists were videotaped practicing their compulsory routine in their competitive attire during their regular training hours. The researcher who collected footage and created these videos was a previous National level trampolinist, and thus had the expertise necessary to provide feedback to the athletes to help them execute their skills the best possible, and to determine when adequate footage was collected.

During the videoing, athletes were instructed to do their best on each skill so that an optimal FF-SM video could be created. The camera captured a 90 degree viewing angle (side view), and was positioned approximately seven-to-ten meters from the trampoline depending on the height that the trampolinists' bounced when performing their skills. This video footage was then transferred to the Toshiba laptop, and using Dartfish Pro software, the FF-SM videos were created by choosing the best skills performed by the trampolinists, and splicing those skills together to create a near perfect execution of their compulsory routine. As the trampolinists improved throughout the competitive season, their FF-SM videos were continuously updated to ensure they were always viewing a FF video.

It is important to note that video-replay is a commonly used strategy in the sport of trampoline. In fact, the coaches of the athletes within the current study had a video camera capturing three of the six trampolines in the gymnasium during the competitive team's regular

training hours. This video footage was replayed with a delay of a few seconds on a television screen to allow the trampolinists to view their performances whenever they choose.

Consequently, tracking the trampolinists' use of self-observation video replay during their training allowed us to explore whether they enjoyed using video prior to the initiation of the research, as well as to examine any changes in their use of video throughout the span of the intervention. To track their use (i.e., frequency) of self-observation video-replay during training throughout the span of the intervention, at two practices the week before each competition, the trampolinists received training logbooks where they self-reported the number of times they viewed themselves on video during practice.

Intervention

Athletes used the FF-SM video at three consecutive competitions within their competitive season. The trampolinists compete two routines in the competition; a compulsory routine followed by a more challenging optional routine. The FF-SM video was only constructed for the compulsory routine. At the competition site, the researcher provided each trampolinist with a DVD containing the FF-SM video, a portable DVD player and a logbook during their designated 'stretch time,' which occurred approximately one hour before they competed. The trampolinists could consequently watch the FF-SM video at a number of different intervals within the competition, these intervals of time can be broken up into (a) designated 'stretch time', which is typically 20 minutes in duration, and takes place before the athletes begin having physical practice on trampolines, (b) general warm-up on the trampoline, approximately 30 minutes, in which the trampolinists take turns on the trampoline and wait in a line in between turns, (c) after one-touch warm-up, which occurs at the conclusion of the general warm-up and allows each competitor one last turn on the trampoline before competing, and (d) after competing compulsory

routine, prior to competing the optional routine. The trampolinists used the logbook to self-report on where and how often they viewed their FF-SM videos during the hour long timeframe.

The athletes were administered a short questionnaire after their one-touch warm-up and another one after they competed their compulsory routine. At the first and third competitions, the athletes were interviewed regarding their experiences with the FF-SM video. Originally we were aiming to recruit approximately 15 or more participants. Consequently, interviews were only conducted at the first in third competitions as it gave us the second competition to make up for any interviews that we did not have enough time to complete in the first competition. This interview took place after the athletes had finished competing for the day, approximately one hour after competing the compulsory routine. While it would have been optimal to interview the athletes immediately after competing the compulsory routine, they typically wanted to shift their focus to their optional routine and asked that we not interfere with their competition preparation.

Post-intervention

During the trampolinists' regular training hours the week following the third experimental competition, participants were administered the post-intervention interview

Data Analysis

Why and outcome factors

It was of interest to explore why the trampolinists chose to view their FF-SM videos in competition, as well as the self-reported outcomes of the viewings. Prior to beginning the analysis, all of the statements related to why the video was used were examined and coded separately from the statements pertaining to the outcomes. The same process, however, was followed when analyzing both sets of data. These steps are described next.

Several steps within the analysis were followed to enhance its level of trustworthiness and credibility. In accordance with Hill, Thompson, and Williams (2005) and Creswell's (1998) recommendations to explicitly report potential researcher biases, we acknowledge that based on previous research examining FF-SM in competitive settings (e.g., Ste-Marie et al., 2011) and our own competitive experiences, we expected that the participants would report utilizing the video for all three functions of observation (i.e., strategy, skill and performance), as well as achieving physical, cognitive and affective outcomes as a result of their viewings. At the same time, however, we were open to other possible functions and outcomes that could arise. Following the conclusion of the study, four of the nine trampolinists were individually interviewed for the purpose of member checking. The lead author shared all of the findings with the participants, and provided them with the opportunity to confirm, reject or add to the interpretations of their data collected through the interviews. During these interviews, all of the trampolinists' confirmed our interpretation of their interview responses were accurate, which thus heightened the credibility of the study.

A thematic analysis was performed on the interview transcripts according to Braun and Clark's (2006) guidelines. The first phase involved the lead researcher transcribing the data in verbatim, immersing herself in the data by reading through the transcripts several times, and then eventually noting down ideas and themes. During this phase the researcher noticed that many verbalizations resembled the self-regulatory processes described in Zimmerman's (2000) framework. This theoretical framework has also been adopted in similar research within the past (Ste-Marie et al., 2011; Clark & Ste-Marie, 2007) and thus it was used to assist with this deductive analysis of the interview transcripts

Following this, two interviews from two of the participants were coded individually by four researchers and then they met as a group to discuss their coding outcomes. This group of researchers consisted of one professor, one doctorate student, and two master's students. As this panel of researchers is comprised of individuals of different power levels, we rotated the order of who provided their opinion first during the meetings, as suggested by Hill et al. (2005). To aid the coding process, each researcher was provided with a coding grid which was comprised of a list of operational definitions for each code, and an example of a verbalization that would fall within that code (see Table 2). This grid was written by the lead researcher and the operational definitions were created using terms from Zimmerman's self-regulation framework, and the FOLQ (Cummings et al., 2005). The researchers also read relevant articles related to understanding the operational definitions provided.

As suggested by Braun and Clark (2006), the team of researchers began by classifying verbalizations into initial codes, which were the most precise codes (see Table 2) pertaining to self-regulatory processes and beliefs. Within this phase of analysis, we remained open to the idea that more than one code could occur within a single verbalization. For example, an athlete may have stated that the video was used to increase his/her confidence and aid visualization. This single verbalization would break down into two codes; self-efficacy and imagery. This phase of coding was performed deductively based on Zimmerman's self-regulatory framework (2000). However, there were several instances where the initial codes did not fall within these self-regulatory processes; therefore, a new code was created.

The next phase involved organizing the codes into broader themes. For the question pertaining to the athletes' reasoning for viewing their video, the initial codes were deductively grouped into the three functions of observational learning; skill, strategy, and performance.

Similarly, for the question pertaining to the self-reported outcomes of using the FF-SM video, the codes were deductively organized into the outcome themes within the 5W, 1H applied model of observation; those of motor, cognitive, and affective. Within this phase of coding, although we remained open to new emerging themes; all of the codes fell within the themes of these two models

Through this first meeting, codes were clarified, but it was noted there were still ambiguities with the coding of comments related to motor execution. It was determined that these statements fit in best within the 'skill function' theme. Due to the initial ambiguities, further coding was done by two of the four researchers from the original group. Continued refinements of the coding categories were necessary for the initial codes; however, at the conclusion of this meeting, a consensus was reached on each code. These two researchers then coded one other participant independently, and excellent inter-coder reliability between the researchers was found ($K = .83$) for the total codes through Cohen's Kappa (Cohen, 1960). The lead author alone then coded all the remaining participants' data.

How and when factors

At each competition, logbooks were provided and the entries were examined with respect to the frequency in which the athletes' viewed their videos, and when they chose to view their videos in competition. For each of the calculations, the data from all three competitions were collapsed. To examine the frequency of viewings, the average viewing sessions and total viewings among the entire sample were calculated. A viewing session occurred on a single occasion; however, it can be comprised of more than one consecutive viewing of the video; whereas, the total viewings is the number of times the video was viewed that day, typically across multiple sessions. To examine when the athletes preferred viewing their video in

competition, the percentage of the total viewings which occurred in all four possible timeframes (stretch/before warm-up/ warm-up/in line, after one-touch warm-up, after competing compulsory) were calculated. In addition, the percentage of the sample size that viewed the video during each timeframe was also calculated. There were times where too little information was provided in the logbooks to discern the timeframe in which a viewing session occurred. Consequently, when we examined the proportion of viewings occurring in each timeframe, these miscellaneous viewings were not included.

Changes in self-regulatory processes

To examine changes in self-regulatory processes throughout the span of the intervention, in the closing interview we asked the trampolinists whether they experienced any changes in their strategy use as a result of the intervention we put in place. Furthermore, we tracked how the trampolinists' use of self-observation video-replay changed during training throughout the span of the intervention. More specifically, at two practices the week before each competition, the trampolinists tracked their number of video viewings. For each participant, the average number of viewings from the two practices prior to each competition was calculated. The average frequency of viewings among the entire sample was calculated for all three time periods (i.e., the week before competition one, two and three). Since it was the trampolinists choice whether to use video-replay during training or not, it was considered a form of self-regulation.

Chapter 3: Results

Why and outcome factors

The results revealed that eight of the nine participants used their video at all three competitions. In contrast, one participant used the video at the first competition but chose not to view it at the following two competitions. Consequently, the qualitative results related to when the video was not viewed will be reported and discussed apart from the rest of the data. Each code is presented in Table 2, alongside the number of verbalizations falling within it; thus only the dominant themes will be discussed.

Table 2

Coding grid: descriptions and examples

Coding Category	Description & Example
WHY (n = 22)	Verbalizations that clearly state one's reasoning for watching the video (e.g., I watched the video in order...")
Performance function (n = 6)	to attain optimal arousal and mental states
Self-efficacy (n = 3)	to alter confidence to perform effectively (e.g., "it'd give me confidence for when I do my routine"; p8)
Relaxation (n = 1)	to alter levels of calmness and anxiety (e.g., "for when I do my routine that I am not nervous or anything"; p8)
Mood (n = 2)	to alter mood and/or emotional state (e.g., "I was traveling and I had double mini trampoline yesterday, so I thought just to get into the mood, I thought I would watch it"; p6)
Strategy function (n = 6)	to develop and execute sport strategies

Coding Category	Description & Example
Self-evaluation (n = 3)	to compare the video to self-monitored information (e.g. “lets say I if did a tuck I’d say well...”that was as good as the video so...””; p2)
Imagery (n = 3)	to influence visualization (e.g., “So I could have a recent image in mind of what it looked like”; p9)
Skill function (n = 10)	to acquire information related to the skill, such as remembering certain aspects of the routine (e.g. order of skill, details) and technique (e.g., To see how I could improve on my routines during the competition”; p.9)
OUTCOME (n = 73)	Verbalizations that state the effects of watching the video (e.g., “The video ...”)
Affect (n = 7)	affected feelings or emotional state
Relaxation (n = 5)	affected calmness and/or anxiety (e.g., “After I watch it I feel much more relaxed...””; p5)
Courage (n = 1)	affected ability to confront fears, uncertainty or intimidation. (e.g., “it gave me more courage to try and do that during the routine”; p6)
Frame of mind (n = 1)	affected mental attitude (e.g., “It kinda put me in the right frame of mind”; p5)
Cognitions (n = 44)	affected mental processes
Self-efficacy (n = 18)	affected confidence to perform effectively (e.g., “It made me feel more confident...””; p7)
Task strategy (n = 12)	affected ability to reduce a task to essential parts and recognize the parts as being important (“During the routine it helped me think of how I could kickout and do these skills better”; p5)

Coding Category	Description & Example
Self-evaluation (n = 2)	affected ability to compare self-monitored information with a standard or goal (e.g., “Uhh yah so like when I did a kickout that was very tight I’m like “oh that was like the video, so I am getting better now””; p2)
Adaptive inference (n = 7)	affected conclusions about altering one’s approach during subsequent efforts to perform (e.g., “Yah cause I could see it and then think of ways to do it that way, so during the warm-up I would practice it that way so I can compete it, so it was possible””; p5)
Imagery (n = 4)	affected ability to visualize (e.g., “Because it kinda like makes me visualize in my head cause I already have the video in my head now””; p4)
General (n = 1)	Affected thoughts (e.g., ““I think it did, it improved my thoughts and if you are mentally prepared I think you can do much better””; p2)
Motor (n = 22)	Affected physical performance (e.g., did the video help your performance? “Yes””)

Note. N represents the number of statements which fell within each code and theme

The following is an overview of the results pertaining to why the video was viewed in competition and its self-reported outcomes. The results revealed that the athletes’ reported using the FF-SM video for all three functions of observational learning. More specifically, the majority of the statements fell within the skill function (45.5%), followed by the performance (27.3%) and strategy function (27.3%). The codes representing the skill function indicated that the video served to gain information related to motor execution of the routine, such as technique or memory of the order of skills. For example, Participant 1 stated that “I decided to use it because, it was basically to refresh my memory on my compulsory and how well I can do it back home,” and Participant 9 viewed it “to see how I could improve on my routines during the competition.”

Of the codes pertaining to the performance function theme, 50% were represented by self-efficacy belief statements. As an example, Participant 8 stated that the video was used as “it builds more confidence to myself that ‘hey I can do that routine’now I know I can do it and how good I actually am.” The remaining verbalizations with the performance function theme related to the video being used for relaxation purposes and to get ‘in the mood’ before competing.

Within the strategy function of observation, the video was used most often to improve imagery (50%) and self-evaluation (50%). Participant 2, for example, stated that the video was viewed “because it helps me visualize myself during my routine” and Participant 9 who said it was viewed “so I could have a recent image in mind of what it looked like.” Participants revealed using the video as a tool to self-evaluate one’s performance; Participant 4 mentioned viewing it after competing to “compare how I competed with my video.”

In terms of the outcomes of using the video, the athletes’ responses revealed that the video contributed to all three outcomes, with the cognitive outcomes (61%) being the predominant theme, followed by motor (30.6%) and affective outcomes (> 10%). For the cognitive outcomes, the majority of the codes represented self-efficacy beliefs (41%), task-strategies (27.3%), and then adaptive inferences (16.0%). As an example of how the video increased self-efficacy beliefs, Participant 1 stated “well before actually doing my 1 touch, I did my compulsory twice and I didn’t do very well, so I decided to watch the video and it helped me boost my confidence and say ‘I can do it, I can finish It and I can do well on it.’” The results showed that the video helped the athletes with their task strategies. As an example, Participant 4 mentioned that while competing “I can remember what was on the video so I can remember what to do, like my kickouts and stretches and stuff.”

Motor outcomes were coded when an athlete responded that they perceived their competitive performance outcome was better as a result of the video. When we performed member checking, we confirmed with the participants that a “yes” response to the question as to whether the video helped competitive performance indicated an influence on this motor component. For example, Participant 5’s response was “yah because I think that was one of the best routines I’ve ever done so, it helped me.” The trampolinists who used the video all reported positively to this question, with the exception of one participant who mentioned that he was not sure if it helped because he does not think about the video while he competed. Also to consider is the one athlete who chose not to watch the video following the first competition. When that participant was asked why she did not view the video at competition two, she responded “my reason is that the video would have made me think that I could do the routine without even trying, and well at a competition you really have to try to get a standing. So I think if I watched the video I would have said ‘oh I don’t have to try, this is how my routine looks and yah.’” In addition, she mentioned that the video may have also relaxed her before competing when she stated “well basically I might feel more relaxed but making me feel more relaxed makes me kinda lazy and not do the routine very well.”

Returning to those who did view the video across the three competitions, only 9.6% of the codes represented affective outcomes, and these largely related to video having an influence on their relaxation/calmness before competing. As an example, Participant 5 stated that “after I watch it I feel much more relaxed before I go on to do my compulsory.

How and when factors

Table 3 shows the average number of viewing sessions and the average number of times the FF-SM compulsory routine was watched across the three competitions. On average, the athletes viewed their video 5.2 times per competition, over 2.1 sessions.

Table 3.

Average Viewing Sessions and Total Viewings at Competitions

Competition	Average viewing sessions	Average total viewing
1	2.78	7.2
2	1.89	4.56
3	1.56	3.89

To explore the participants' reasoning for their frequency of viewings, at the third competition they were asked why they viewed the video the chosen number of times that day. The results revealed that the frequency chosen was for two main reasons. The first related to the time available. Several participants reported that they did not view the video more frequently due to time constraints. As an example, Participant 9 stated that "I found that I could watch it two times during warm-up and stretching, two times during specific warm-up and once before I competed my compulsory routine" and Participant 6 said "I watched it that much time because right when I was about to watch it another time I had to go march in".

The second reason that arose was that the athletes continued to view the video until they believed they had the basic idea of the information it provided. For example, Participant 5 stated that he watched it five times "because I find if I just watch it once, I don't really know it enough, and if I watch it too much it then kind of gets overload on my brain and then I start thinking a lot about it, so I figured five was just good enough." Similarly, Participant 8 revealed that "I didn't

watch it more because I had a basic idea of what I can do and now it was time to get into the zone and visualize my routine in my head and visualize that tape.”

With respect to when the viewings occurred, the logbooks revealed that the majority took place during stretch-time and during warm-up (refer to Table 4). Moreover, across each time interval, the number of viewings per sitting was similar. During the closing interview, when the participants were asked when they preferred viewing the FF-SM video most in competition, six of the participants said that stretch time was either their preferred or one of their preferred timeframes. Furthermore, three participants stated enjoying viewing it during warm-up, and three mentioned that they liked viewing it right before competing

Table 4

Total viewings and percentage of viewings at each timeframe

Timeframe	Percentage of Total Viewings	Percentage of sample
Stretch/before warm-up	42.1	89
Warm-up	49.5	62.5
After one-touch warm-up	7.5	22.2
After competing	0.9	11.1

Note. Viewings which took place in an unknown location were not included.

Participants were queried during the interview on why they chose to watch it during the time periods mentioned. They reported viewing the video before warm-up/during stretch for several reasons: (a) to provide them with a confidence boost before warm-up., (b) to get them into the zone before warm-up, (c) it was convenient being able to stretch and watch the video at the same time, (d) it provided the ability to practice positions (tucks, pikes, stretches) while viewing it, (e) it is the time period where they are free to do their own thing. As an example,

Participant 1 explains why she prefers viewing the video during the designated stretch time: “The reason is because when I watched it, I was stretching. I had to basically practice, I practiced straightening my legs, and pikes, and straddles and I’d do tuck kick-outs and stuff like that...”

This participant also mentioned that she would feel psyched out if she watched it too close to the actual competition time. Others, however, enjoyed viewing the video during timeframes closer to competition to distract them from worrying about their routines as well as to get the information in their heads for when they practiced on the trampoline. For example, Participant 7 said “I liked viewing it the best when I am waiting in line cause then I am not worrying about everything while I am waiting for my turn. I’m just watching myself do it. So I’m like watching watching, watching, doing, watching, watching, watching, doing. I liked it.” Moreover, Participant 2 mentioned that she liked viewing it right before competing because then “I’d have it in my head when I went on tramp.”

Participants’ feedback about videos

In the closing interview, the participants were asked what they would change about the FF-SM video to improve its effectiveness. All of the participants stated that they liked the viewing angle (side view) as it allowed them to see the details from their performance, as well as fix the elements that the judges would be seeing. In addition, all of the participants reported that they liked having the video in real-time; however, three participants suggested that it would have been helpful to have the option of viewing the video in slow-motion. Moreover, the only negative remarks about the video, mentioned by four of the participants, were that at times they noticed the glitches in the video as a result of the editing.

Changes in self-regulatory processes

Also within the closing interview, participants were asked whether their use of psychological strategies in training or in competition had changed subsequent to receiving their FF-SM videos in competition. Changes in three self-regulatory strategies were mentioned by the participants: (1) imagery, (2) self-talk, (3) self-observation. In fact, seven of the nine participants revealed that the video improved their visualization because they began imaging the video in their heads when practicing their routine. Thus, the FF-SM video appeared to have an influence on the trampolinists' use of strategies within the performance control phase of Zimmerman's model. Several participants' emphasized that the video allowed them to image themselves with better technique, such as when Participant 4 mentioned "well my imagery used to kinda suck because I used to have not as tight positions and not as straight kickouts, but when I see myself on my video, I see that now in my imagery. I have like better positions, and my imagery of me is better." Several participants also mentioned that the video has helped improve the vividness of their imagery, for example Participant 7 stated that "I think now I can see it more clearly."

In addition to improvements in imagery, two of the participants revealed that the video enhanced their use of self-talk. More specifically, Participant 5 revealed that since he's received the FF-SM video, he has engaged in more positive self-talk, as an example he stated "it helps me say more positive things about myself as I am going and before I go." Similarly, Participant 6 revealed that the video has improved his use of cue words while he's jumping, as shown when he stated, "... the cue words they almost always come automatically into my head when I watch the video and when I do my routines." These two examples emphasize how the FF-SM video affected strategic planning within the forethought phase and strategy use within the performance control phase.

As previously mentioned, the athletes are constantly being videotaped during their regular training, and this visual information is projected on a television screen, allowing them to view themselves on video whenever they choose. To examine whether the trampolinists use of video-replay during training changed throughout the intervention, training logbooks were completed the week prior to each competition. The results revealed a slight increase in the number of viewings from the week prior to the first competition to the third competition (see Table 5). Interestingly, during the closing interview, eight of the nine participants revealed that they liked using video-replay more during training now as a result of the intervention, and seven of the participants stated that they began viewing themselves on video more often during training compared to before the intervention began

Table 5

Frequency of Self-observation Video-replay use during Training

Competition	Number of viewings
1	3.3
2	3.67
3	4.1

Note. Competition = Two practices the week before each competition

Chapter 4: Discussion

The purpose of this study was to explore trampolinists' use of a FF-SM video in competition when provided self-control of their viewings. More specifically, we examined why the video was used and its self-reported outcomes, and the frequency and timing of the viewings. Furthermore we explored what the trampolinists would change about the video to improve its effectiveness as a pre-competition tool, and whether their self-regulatory strategy use changed throughout the span of the intervention.

Why and outcomes factors

A primary aim of the study was to examine why the trampolinists chose to view their videos in competition, and the self-reported outcomes of their viewings. When examining why the video was viewed, the results were consistent with Cumming et al.'s (2005) work examining the functions of observational learning. In fact, all of our initial codes fit within one of the three functions; skill, performance and strategy. Similar to previous research (Cumming et al., 2005; Law & Hall, 2009; Wesch, Law, & Hall, 2007), we found that the skill function (i.e., enhancing motor execution) of observation was the dominant function mentioned by the athletes. Contrary to previous research findings however, which revealed a greater use of the strategy function compared to performance, in the current study, participants mentioned using the video for both of these functions equally. This finding may be due to the sport type, as Cummings et al. (2005) found that the skill and performance functions are used more by athletes competing in independent sports (e.g. trampoline) compared to those in interactive sports.

This greater use of the performance function may be related to the context in which the modeling was being used. In the current study, observation is being used to improve competition performance, whereas participants within the previously mentioned FOLQ studies may have

been responding to the questionnaire considering mainly learning contexts and not considering the wider scope in which observation may be used. Consequently, it's plausible that the functions of observation are moderated by the context. Future research could investigate this hypothesis and test whether the functions of observation differ in rehabilitation, training and competition settings.

Considering the close relationship between the why and outcomes of observation, it is not surprising that cognitive, affective and motor outcomes were reported by the athletes. This finding is consistent with previous work which demonstrated that a FF-SM video served to direct affect, cognitions and motor execution (e.g., Ste-Marie et al., 2011). Outcomes related to increases in task strategies, imagery, self-evaluation, relaxation and self-efficacy beliefs were observed, similar to other research examining the use of observation (Hars & Camels, 2007; Rymal et al., 2010; Tracey, 2011). Interestingly, unlike any previous studies, the adaptive inferences theme (i.e., the video altering one's approach in future efforts to perform) was dominant. As an example, Participant 5 stated that the video helped him "because I could see it and then think of ways to do it that way, so during the warm-up I would practice it that way so I can compete it." Furthermore, new affective codes emerged, such as the video increasing one's courage to compete and getting oneself in the right 'frame of mind.'

In support of Bandura's self-efficacy theory, the current results suggest that the FF-SM self-modeling video has the potential to enhance athletes' confidence levels. We argue that the athlete obtains a mastery experience through observing the self executing best performances previously attained, and, concurrently, obtains a vicarious experience due to observing a level of performance of the full sequence that has not yet been attained. In fact, when examining the outcomes of the video, 25% of the comments were related to enhanced self-efficacy beliefs. In

contrast, self-efficacy was merely mentioned three times when athletes were asked why they chose to watch the video; instead athlete's referred to the use of observation for the skill function. This apparent contradiction suggests that despite the trampolinists predominately viewing the video for motor execution purposes, they nevertheless achieve increased self-efficacy benefits. Due to the vast amount of research displaying the positive effects of self-efficacy on future performance (Feltz, Short, & Sullivan, 2008), this research suggests that FF-SM can be a valuable pre-competition tool. Likewise, when examining the outcome of the FF-SM intervention on motor outcomes, the results displayed that 94% of the time that the trampolinists viewed their video; they perceived it improved their performance.

Interestingly, when coding the interview transcripts it was evident that motor outcomes were often described as a result of affective and cognitive factors. That is, a typical response to the query "did the video help your performance"? was "yes, it did, because now I knew that why be nervous and safe, I could just go all the way now" (P8), and "ya, I think it did, it improved my thoughts and if you are mentally prepared I think you can do much better (P2)" Throughout this coding process it thus became clear that the cognitive and affective outcomes were stepping stones towards achieving the ultimate goal of improving future performance. Given such findings, we question if the applied model for the use of observation should be adjusted such that the cognitive and affective outcomes are mediators of the ultimate goal of achieving an enhanced motor outcome. That is, the applied model may best be portrayed as that shown in Figure 2.

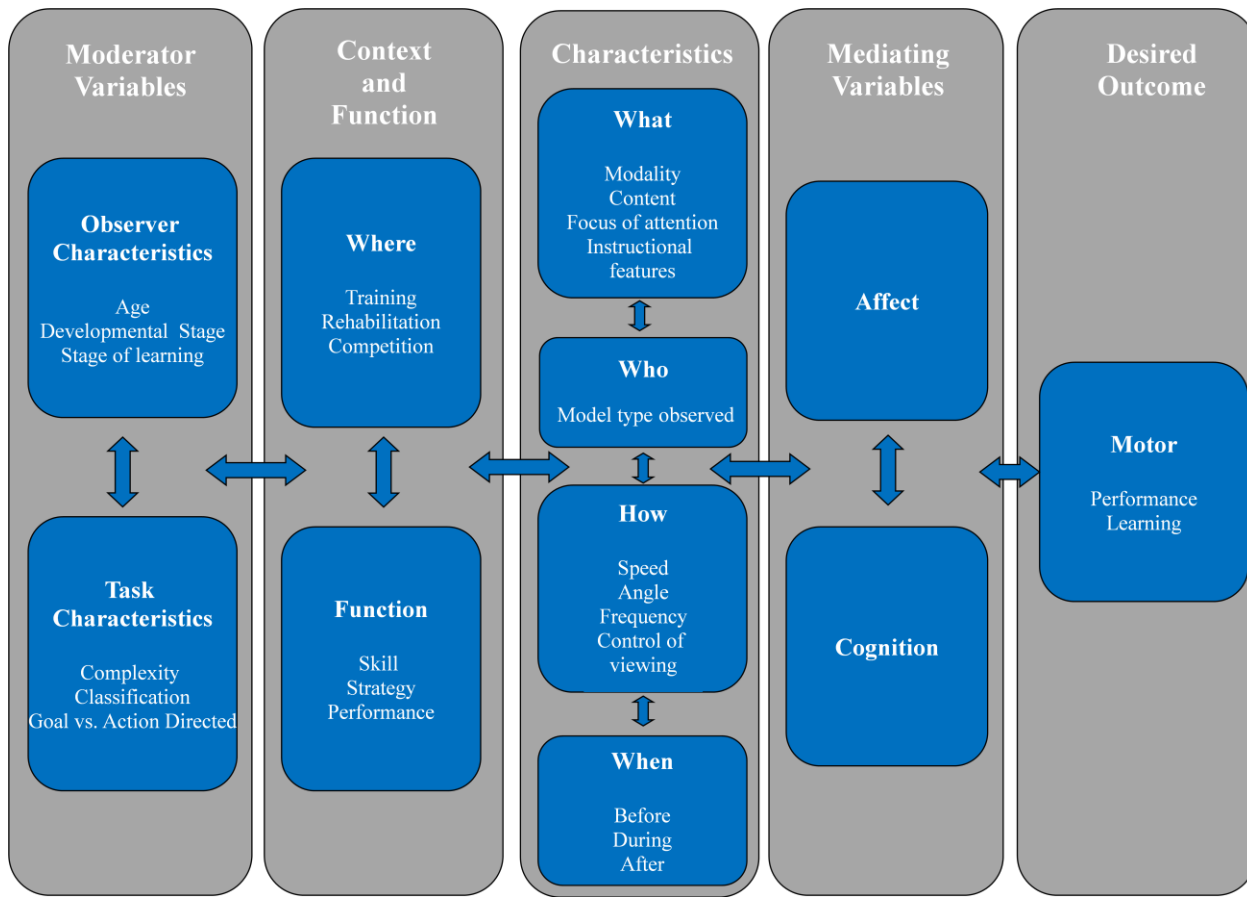


Figure 2. Suggested modified version of the Applied Model for the Use of Observation

For the one individual who chose not to watch the video after the first competition, she had explained that the increased confidence and relaxation caused by watching the video would have made her lazy and would make her think she can do the routine without even trying. Thus, she is still reinforcing the basic premise that the FF-SM video can modify self-efficacy and other performance states. Unlike the others, however, the increased level of confidence and relaxation was perceived as a possible impediment to her performance. These results are consistent with Feltz et al. (2008) and Ede, Hwang, and Feltz’s (2011) inverted U hypothesis for self-efficacy. This hypothesis emphasizes that self-efficacy and effort follow a curvilinear relationship, in that a certain level of increased confidence will have a positive relationship with effort; however, when an individual has overly high self-efficacy beliefs, they will put forth less effort in face of a

challenge. Consequently, perhaps this participant already had high levels of self-efficacy to begin with, and viewing this video would have made her overconfident, and consequently make her 'lazy' at the competition. Alternatively, similar to the inverted U hypothesis for arousal, perhaps each athlete has their own optimal level of self-efficacy, and her optimal level of self-efficacy may be lower compared to the other participants. Evidently, a FF-SM video may not be beneficial for everyone. In the current study, it suited the needs of eight of the nine athletes. Clearly, before implementing such an intervention, it is essential for practitioners to tailor the characteristics of a modeling intervention to needs of the athlete.

How and when factors

A secondary aim of this study was to explore the frequency and the timing of the use of the FF-SM video. On average, the participants viewed their video 5 times per competition, over 2 sittings. Interestingly, this was very similar to Ste-Marie et al.'s (2011) researcher-controlled viewing frequency, in which gymnasts were advised to watch the FF-SM video a total of four times; three times in immediate succession before warm-up and once right before competing. As Ste-Marie et al.'s findings displayed significant performance outcomes of using the FF-SM video; it appears as though the trampolinists in the current study chose an adaptive viewing frequency.

Luckily, the participants were able to disperse their viewings throughout several sittings as a result of the portability of the DVD players. Interestingly, Tracey (2011) conducted a study in which an elite mountain bike racer was similarly provided a self-observation video to watch at his leisure in competition. Although the athlete made efforts to view the video in competition, he reported that using a laptop made it quite challenging and cumbersome. In fact, the athlete made

several comments regarding the importance of portability of the viewing device. To enhance the ease of the viewings, the current research achieved Tracey's (2011) recommendation to use more portable devices such as MP3 players and iPads. Indeed, the athletes in this study had no problem traveling around the gymnasium with their DVD players in hand due to its small size and weight. Participants were able to watch the video while standing in line for their turn on the trampoline, and then while they were jumping they would simply put it under the trampoline or hand it off to their coach. The convenience of the DVD players is highlighted in the following statement where Participant 2 is explaining that she enjoyed using her video "right before I was doing my compulsory, and then I'd just stick it under the tramp, cause then I'd have it in my head when I went on tramp."

When exploring when the athletes would view their videos within the hour timeframe which it was provided to them, the findings revealed that the participants used it most during stretch and during warm-up, which is not surprising considering these were also the longest of the four possible timeframes to view it. Evidently, preferences for when they view the video were extremely specific to the needs of the athletes. While some athletes expressed that they enjoyed viewing it during the time they were taking turns on the trampoline just before competing (i.e., warm-up), others mentioned that viewing it during that timeframe would cause a disruption of flow and preferred to view the video earlier during their general free stretch-time. Thus, practitioners must learn the timing preferences and pre-competition routines of the athlete before choosing when to implement the video in competition. Moreover, the findings revealed that only two of the nine trampolinists' used the video after one touch warm-up, right before competing. Although the point was made that practitioners should learn of the preferences of the athletes, in past research a larger time gap between the FF-SM viewings and competing showed

no performance benefits (Rymal et al., 2010). Yet, significant performance outcomes were found when a FF-SM video was viewed closer in time before competing (Ste-Marie et al., 2011). Unfortunately we did not ask the trampolinists why they did not use the video closer to when they competed. In addition, we did not inform them of the benefits of viewing the video closer to when they competed. We recommend that athletes using video in competition should consider the importance of the timing of their viewings to obtain maximal performance benefits. Furthermore, future research should investigate the maximum time delay between video viewings and performing before the modeling performance benefits are lost.

Participants' feedback about videos

A further aim of this research was to explore whether the trampolinists' would suggest any changes to the FF-SM video to improve its effectiveness. In regard to possible changes of the FF-SM video, several participants stated that they would have enjoyed getting the video in slow-motion in addition to the real-time speed. As previously mentioned, it appears as though slow-motion viewings may be beneficial for skills with greater temporal and spatial demands (high task complexity), such as a trampoline routine. One drawback to using slow-motion within a competitive setting, however, is that the videos would increase in length, and there is limited time available for viewings in this setting. Furthermore, no research to date has examined the effectiveness of slow-motion self-observation videos within a competitive setting, thus presenting an area for future research.

When the trampolinists' were asked what they would change about the videos to improve its effectiveness, the only suggestion made was regarding improvements in the editing so that the splicing of video clips would not be visible. Unfortunately however, trampoline is an extremely

difficult sport to perform this type of editing due to the constant changes in one's height and position on the trampoline from skill to skill during a routine. Although several participants mentioned the glitches in the video as a drawback, the findings from this study suggest that despite the editing, viewing the FF-SM video was perceived as useful for performance, confidence and the use of many other self-regulatory processes and beliefs.

Changes in self-regulatory processes

An interesting finding of the current study was that seven of the nine participants emphasized that the FF-SM video changed their imagery ability, allowing them to have more vivid and/or controlled images. This finding supports Rymal et al.'s (2010) argument that viewing an external image of an adaptive performance can create more controlled images. This is of importance as the ability to create controlled images is essential to maximize the performance benefits of using imagery (Hall, 2001). It was also mentioned that the video helped participants with their use of cue words while performing their routine. Pairing a FF-SM video with the cue words an athlete uses during his/her routine may have the ability to further enhance their self-talk ability. Although research has demonstrated learning advantages of pairing instructional features alongside video demonstration, to our knowledge, no research to date has paired instructional features with observation to improve competitive performance. This would be an interesting area for future research. The findings from the current study suggest that FF-SM has the potential to improve athletes' strategic plans (e.g., imagery) and strategy use (i.e., imagery and self-talk) within the forethought and performance control phase of Zimmerman's (2000) model.

Strengths and Limitations

Notable strengths of this study were the longitudinal nature of the data collection and our use of interviews combined with logbooks to gain an in depth understanding of the trampolinists use of their FF-SM videos. Furthermore, the portability of the DVD players allowed for an accurate portrayal of the athletes' viewing frequency and timing. Evidently, as with any study which takes place within an applied setting, there are external factors which are beyond the researcher's control. Thus, a limitation of the current study was that there were a few instances that the competition was running behind schedule and as a result the participants stretch or warm-up was cut short by a few minutes. Evidently, these uncontrollable factors are the costs of having a more ecologically valid study.

Another issue is the possibility that the trampolinists' viewed their videos to please the lead researcher who was present at the competitions. To avoid this, the lead research informed the participants that whether they decided to view the video or not had no impact on the results. She also kept her distance from the trampolinists' after handing them their DVDs. Bearing in mind that one of the participants chose not to view the video at two of the competitions, it appears as though this message was clearly communicated. Furthermore, the athletes would likely not persist with using a tool that they thought was interfering with their competitive performance, thus it being used for three competitions suggests that it was not a response bias operating.

Another limitation of this study is that the locations of many of the FF-SM viewings were unknown, which may have caused slight discrepancies between the reported findings in Table 4 and the actual proportion of viewings that took place within each timeframe. Nonetheless,

alongside the logbook data, we also had an interview question asking the participants which timeframe they preferred viewing their video. Interestingly, when examining the interview data, stretch was most frequency reported as the favorite time for viewings, yet the quantitative data displayed a relatively equal proportion of viewings occurring in stretch and warm-up. Therefore, perhaps several of the viewings which occurred in miscellaneous locations took place in stretch-time.

Before concluding, it is important to note that although the trampolinists' reported the FF-SM video enhanced their competitive performance, this was merely their perceptions of its effectiveness. Evidently, to make performance enhancement conclusions, future research should examine whether self-controlled FF-SM video enhances competitive performance scores. In fact, the original goal of the research included examining the consequence of different frequencies of viewing the video among the participants on their physical performance outcomes in competition. With the exception of one participant, however, everyone used the video at a pretty similar frequency, thus this analysis was not possible. Consequently, future research should continue to examine whether performance differences in competition could be attributed to the self-control of a FF-SM video.

Conclusion

In sum, the primary purpose of this study was to gain insight into the trampolinists' use of a FF-SM video throughout the competitive season, while specifically examining why it was viewed and its potential benefits, as well as the frequency and timing of the viewings. Furthermore, we examined what the trampolinists would suggest as changes to the video to improve its effectiveness, and whether their use of psychological strategies changed as a result of the intervention. Overall, the trampolinists perceived the video intervention to be useful. As hypothesized, the trampolinists used the video for all three functions of observation, and obtained motor, cognitive and affective outcomes. The trampolinists perceived that the video improved their skill execution. The dominant themes regarding the perceived potential benefits of using the video related to increased motor execution, self-efficacy, task strategies and adaptive inferences. Interestingly, the athletes' reported changes in their use of imagery, self-talk and self-observation throughout the span of the intervention. With ever-advancing technologies, and the growing popularity of smartphones and iPads, it is not unrealistic for athletes to use these videos throughout their competitive season. Perhaps with a more controlled study and a greater sample size, we can determine whether a self-controlled FF-SM intervention would result in performance enhancement.

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Appendix A

Interview Guide

Competition Interview #1:

1. Did you view your self-modeling video today, in preparation for competing your compulsory routine? (If answer is yes, ask question number 2; If answer is no, ask question number 3)

2. Why did you view your video?

Probe: (if they don't provide any of the following): To aid your thoughts? Feelings? To provide you with information to aid your motor execution?

Probe: Anything else?: thoughts, feelings behaviors

3. Why did you chose not to view your video?

Probe: (if they don't provide any of the following): Due to its effect on your thoughts, feelings, or motor execution?

Probe: Anything else?

Competition Interview #2:

1. You viewed your video X number of time in preparation for competing your compulsory routine, why? (If answer is yes, ask question number 2 & 3; If answer is no, ask question number 4 & 5)

Probe: (if they don't provide any of the following): To aid your thoughts? Feelings? To provide you with information to aid your motor execution?

Probe: Anything else?: thoughts, feelings behaviors, did it make you do anything else differently?

3. If you could, would you view your self-modeling video outside of this research? Probe (if they don't specify): training, home, competitions ? Probe: Anywhere else

General Interview Questions- Post-intervention:

2. Do you feel your liking/dislike for the video-replay during training has changed since you've received the SM video in competition? If so why? (Probe thoughts feelings and behaviors)
3. Do you think your use of the video-replay in training has changed since you've received your self-modeling video in competition? Probe: frequency of viewing it, reasons why you use it, what you focus on in the video, speed, pausing, etc.
4. Did you like getting your video in competition? Why or why not? Probe thoughts feeling and behaviors
5. In competition, when did you like viewing your video the best?
6. Would you have preferred to have the video for longer?
7. In your interview, you mentioned that you use _____x_____ strategy, has your use of this strategy changed at all after using the self-modeling video in competition. If so, how? Anything else?
8. In your interview, you mentioned that you use/don't use imagery, has your use of this strategy changed at all after using the self-modeling video in competition. If so, how? Anything else?

Appendix B

Training logbook

NAME: _____

Training Logbook

1

Please use this log book to record the number of time you view yourself on video during training. Every time you choose to view yourself on video, please jot down a check mark ✓. You will do this for each of your 4 practices this week.

Example:

Practice 1: # of Video Viewings
✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓

2

Practice 1: # of Video Viewings

Practice 2: # of Video Viewings

3

Appendix D

Consent Forms

“The effects of a self-controlled self-modeling intervention on the performance, self-regulatory processes and self-beliefs of competitive athletes”

Information Letter and Consent Form: For Parents

The following people are conducting research on the project regarding the effects of a self-controlled self-modeling intervention examined within a self-regulatory framework

This letter is used to inform you of the activities involved in this study as well as to seek your consent for your child’s participation in this research. “The effects of a self-controlled self-modeling intervention on the performance, self-regulatory processes and self-beliefs of competitive athletes” is an experiment investigating whether an athlete who gets to decide when to view a video of themselves performing their routine to the best of their ability (i.e. a self-modeling video) prior to competitions will enhance their competitive performance. Constructing a self-modeling video involves the use of editing software to cut out all of the performance errors to reconstruct a routine that has the best performance potential yet to be achieved by the athlete. We are also examining self-regulatory processes (i.e., self-confidence and motivation) that may contribute to such performance enhancement. The study includes four short interview sessions with an English speaking researcher, and the completion of three questionnaires that are written in English. Given these tasks, participants must be able to read and understand the English language. Listed below is more information relating to this study. After having read this information, please indicate if you are willing to allow your child to participate.

Purpose of the study: The purpose of the study is to examine whether having control over the use of a self-modeling video in a competition setting influences performance outcomes. We are also interested in whether having control over such a video influences one’s self-regulatory processes. Thus, your child will be administered two questionnaires regarding their motivation and self-confidence to compete their compulsory routine.

Description of participation requirements: Prior to the second qualifier, your child will fill out a short questionnaire regarding his or her use of imagery. Next, he/she will undergo a short interview regarding his/her general use of video-replay and psychological skill use in training. Data collection will occur at a total of three competitions, beginning at the second provincial qualifier. Your child’s participation will involve filming several attempts of his/her compulsory

trampoline routine during regular practices in order to generate the self-modeling video. After the self-modeling video has been constructed, your child will be provided with a DVD and DVD player that will allow him/her to watch his/her self-modeling video whenever he/she wants at the competitions. Your child will be asked to record the number of times he/she chose to watch the video. Prior to your child's one-touch warm-up at each competition, he/she will fill out a questionnaire regarding his/her confidence to compete his/her compulsory routine well. Once your child has finished competing, he/she will fill out one questionnaire regarding his/her motivation to compete. In addition, your child will be asked three short questions regarding his use of the self-modeling video in competition. At the end of the competitive season, your child will undergo a short interview regarding his/her feelings towards the intervention, and well any changes in one's use of video replay and psychological skills.

Potential risks or discomforts: In any physical sport there is a potential risk for injury. This research does not produce a greater risk than the actual sport itself. Your child will perform his/her own competitive routine that they have been practicing in their regular daily training, and thus it is not anticipated that there is an increase in physical risk. There is a possible risk of psychological discomfort due to the interview questions asking him/her to reflect on the self-modeling intervention. The research, however, suggests that this will not occur. Every effort will be made in order to ensure that any chance of discomfort or distress is minimized. Participants are able to withdraw at any given time. If your child feels uncomfortable in the situation they may take a break, stop, or leave the situation at any time.

Potential benefits: As a participant of the experiment your child will receive his/her own self-modeling video. Studying self-modeling in a competitive environment is important because it could be an applied intervention that athletes use before their competition to prepare for their event. If an athlete is able to increase their performance due to the viewing of the video and the subsequent effects on the self-regulatory processes, this could be used as a tool to help competitive athletes perform better. Few researchers have examined the effects of self-modeling and the reason why it enhances performance. Therefore, this study will contribute to the understanding of the effects of self-modeling and performance enhancement.

Anonymity and confidentiality: Due to the nature of the research consisting of video tapings of your child performing his/her trampoline routine, there are limitations to anonymity. Note however, that the video tapes will only be accessible to the research team and two independent evaluators used to score the routines. Therefore, you need to be aware that maintaining full anonymity in this process will be difficult. However, your child's name will not be used in the videos and it is only the two evaluators, who will have signed a confidentiality pledge that will be viewing the videos. As well, your child's name will not be used on any paper documentations and instead participant numbers will be included. All questionnaires, forms, videos and data will be kept in a locked filing cabinet in Montpetit 205 at the University of Ottawa. This location is only accessible to the principle investigator and her research assistants. Five years post publication of the results, the videotapes and written information will be destroyed.

Voluntary Participation: Your child's participation in the study is strictly voluntary and she will be able to withdraw at any time. If your child chooses to withdraw in the middle of the study, all of their data that has been previously collected will be destroyed immediately.

Appendix E

Child Assent Form

We are asking you to take part in a research project that will help us know more about how children may do better at competitions by watching a video of themselves beforehand and how they think or feel when watching that. If you agree to take part in this study, you will be videotaped performing your compulsory routine during training hours. We will then take these multiple routines and, using editing software, we will splice together the best routine that you have the potential to do. This will be called your self-modeling video. You will be given your own personal DVD, along with a DVD player, to view your self-modeling video as many times as you would like at your competitions. If you choose to view your video, you will be asked to record the number of times you watched it. After one of your competitions we will ask you some interview questions about your thoughts and feelings about your video, and at another competition, we will ask you to fill out a short questionnaire about your confidence just before you compete and then a questionnaire about your motivations for competing the routine just after you finish competing.

Please talk about this with your parents before you decide. We have also talked to your parents about allowing you to take part in this project. If your parents say yes, it is up to you if you want to participate. You can still say no, even if your parents say yes. If you decide to participate and then you want to stop, you can do so for any reason. Feel free to ask any questions at any time.

The study has been explained to me. I had a chance to ask questions about the study and I understood the answers. I am signing my name to say yes, I want to be in the study.

Name of Child: _____ Date of birth: _____

Signature of Child: _____ Date: _____

Signature of Researcher: _____ Date: _____