INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

ProQuest Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600

UMI®

Université d'Ottawa · University of Ottawa

Peer Versus Coping Models: The Influence on Children's Self-Efficacy Beliefs, Perceived Task Difficulty and Diving Performance.

Shannon E. Clark

Thesis

Submitted to the School of Graduate Studies in partial fulfilment
of the Master of Arts Degree in Human Kinetics

School of Human Kinetics

University of Ottawa

2001

© Shannon E. Clark, Ottawa, Canada, 2001

National Library of Canada
Acquisitions and Bibliographic Services
395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale du Canada
Acquisitions et services bibliographiques
395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-66027-3

Canada

TABLE OF CONTENTS

Acknowledgements

I would like to take this opportunity to thank my family and my friends for their invaluable support throughout my academic pursuits. I would also like to thank the members of the lab group Amy Latimer, Leanne Findlay and Gina Bottamini for their comments and suggestions. Special thanks to Amy Latimer for all of her help with the data collection and scoring. As well, I am most appreciative of the cooperation I received from the Gee-Gee Summer Camp staff and for their help with participant recruitment.

I would also like to thank the Dr. Janis Deakin and Dr. Pierre Trudel for agreeing to be members of my thesis committee. Your suggestions and advice have been very helpful. Special thanks to Dr. Deakin for travelling from Kingston to be on the committee.

Most importantly, I wish to express my sincere gratitude to my thesis advisor, Diane Ste-Marie, for her exceptional guidance and support. Her time and effort has made completing my Master's thesis both an educational and rewarding experience.

Abstract

The purpose of this experiment was to examine the influence of peer mastery and peer coping models on children's self-efficacy beliefs, perceptions of task difficulty and diving performance. Thirty children (M age = 7.7, SD = 2.3) who did not yet know how to dive and who were identified as having low feelings of self-efficacy towards diving and high perceptions of diving task difficulty were randomly assigned to peer mastery, peer coping or control model conditions. The experiment took place over 4 days. On the first three days the participants were exposed to their assigned modeling condition and then received diving instruction. After the last intervention session there was an immediate-retention test and the following day there was a delayed-retention test. Prior to intervention and for both retention tests, two psychological dimensions and one physical performance measure were evaluated. As well, recognition performance was evaluated during the delayed-test only. Data were analyzed by four separate one way analyses of variance for Group. Results revealed that the peer coping group increased their self-efficacy beliefs more than the peer mastery group in the delayed-retention test $F = (2, 29) = 3.9$, $p = 0.03$. The small sample size and the large variance in each group resulted in the inability to find other statistical findings. Effect sizes were then calculated. This analysis revealed that there were no significant effects between groups in the recognition performance test. The analysis did show that the peer coping group was the better model group for increasing children's perceptions of task difficulty and self-efficacy beliefs towards diving. For diving performance, peer mastery group showed the greatest increases. These findings suggest that a peer mastery model provides more information to the learner about how to do the skill correctly, whereas a peer coping model benefits a learner's psychological responses to observational learning.

Chapter I

Revised Literature Review

Various strategies are employed by physical educators and coaches to teach motor skills. One of the most popular methods is teaching by observation. Observational learning consists of a demonstration by a model of the particular skill or task that is to be learned. This demonstration can be live or viewed from a videotape. As Schunk (1987) described "Observational learning through modeling occurs when observers display new patterns of behavior that prior to modeling had a zero probability of occurrence even with motivational inducements in effect" (p.150). Many researchers feel that this method of learning is extremely effective in teaching many different types of skills. Learning by observation, therefore, can be used to promote desired behaviours. These behaviours can include the learning of correct cognitive, social and/or physical skills.

With respect to motor skills, numerous studies have examined the effectiveness of models on motor skills acquisition (see McCullagh & Weiss, 2001 for a review). The findings of these studies generally agree that observing a model is more beneficial for learning a skill than not observing a model (Deakin & Proteau, 2000; Shea, Wright, Wulf & Whitacre, 2000). The benefits of observational learning on skill acquisition have been found for both children (e.g.,Weiss, 1983) and adults (e.g., McCullagh, 1986;1987). The focus of this study will be the comparison of two different types of models, peer mastery versus peer coping, on the acquisition and retention of the swimming skill of diving by children.

In the upcoming sections, Bandura's Social Cognitive Theory and how it relates to observational learning will be explained, along with a description of self-efficacy and the role that it plays in learning motor skills by observation. Further, a description of the research that has studied the optimal characteristics of the model will be reviewed, leading to the specific focus of this thesis, the peer coping and peer mastery models.

Social Cognitive Theory

Much of the research on modeling and observational learning has been driven by Bandura's (1977, 1986, 1997) Social Cognitive Theory. Bandura's theory on observational learning is described as a four-component process. The sub-components are: a) attention processes, b) retention processes, c) production processes, and d) motivation processes. These four processes interact to determine how well an individual learns a task through observation. It has been suggested by Bandura that the attention and retention processes are related to the learning of a behaviour or action and that production and motivation processes affect the performance of the observed behaviour.

Attention processes refer to the importance of the observer selectively attending to the demonstration. It is necessary for the learner to pay attention to the model in order to perceive the task correctly and select only the most relevant and important information from the model. An observer's attention is influenced by characteristics of modeled events, and observer characteristics such as the observer's level of arousal, cognitive capabilities, and expectations. In order for learners to extract the relevant information from the model it is necessary to attract their attention for long enough periods of time, because the longer one observes a model the more they will learn. Bandura (1977, 1986, 1997) has proposed that the attention of the learner will be enhanced by using a model that the observer finds similar to them. The following study by McCullagh (1987) has shown support for this proposition.

McCullagh (1987) used college women to assess model similarity effects on motor performance. All of the participants were unskilled at the task, as they had no previous exposure to climbing a Bachman ladder. The participants were in either one of two model groups, the model group or the no model control group. The participants in the model group were exposed to one of two conditions, they watched the same demonstration of the task by the same model, however, the researcher manipulated how the participants perceived the model. One model group was informed that the model was similar to them (no previous experience in climbing the ladder) and was, therefore, unskilled, whereas the other model group was told that the model was skilled at the task. The results indicated that the participants that were told that the model they observed was unskilled at the task performed better than the group that observed the skilled model. This was argued to occur because the observer perceived the unskilled model as more similar to them than the skilled model, leading to increased attention by that group.

Highlighting the key components of a skill with verbal cues has been identified as another way to keep the learner focussed on the task (Bandura, 1986,1997). Verbal cues are often used to focus the attention of the learner towards the relevant information of the skill that they are learning. Carroll and Bandura (1990), for example, examined the learning of a complex action pattern, with or without verbal cues to highlight the important components and the sequencing pattern of the skill. The results showed that the group that received the verbal cues had better performance and a more developed cognitive representation than the group that watched the model without receiving verbal cues. Again, supporting the notion that guiding an observer's attentional processes enhances observational learning benefits.

The second component of Bandura's (1977, 1986, 1997) theory, retention processes, refers to the extent to which learners retain the information and knowledge that was presented to them through observation. In order for observers to remember the skill when the model is no longer available, the information needs to be encoded in their memory in a symbolic form or cognitive representation, during or after, viewing the model. A cognitive representation is a mental picture of the skill that has just been viewed. Bandura (1977) describes the two representational systems, imaginal and verbal constructions, which are involved in the retention of a motor skill. These representations are said to help an individual so that they can eventually perform the skill automatically. Depending on the type of information to be retained the learner will either code it in an image or as a verbal representation.

A study by McCullagh, Stiehl, and Weiss (1990) examined what types of information would be coded either verbally or imaginally. In that study, children were either given verbal instructions or a demonstration of a sequence of movements. On the recall tests it was shown that the children who received only verbal instruction of the skill recalled the sequence of the skills better than the group with a only a demonstration. When the quality of the movements were analyzed, however, it was the group who received a demonstration of the skills that performed better than the verbal instruction group. Therefore, it is apparent that depending on the type of skill that is being learned, different types of instruction (with or without verbal cues) will be more beneficial. It is possible that a combination of both would be most effective for remembering both the sequence and the quality of the movement.

To further support the importance of the retention processes, Carroll and Bandura's (1985) study on the effects of cognitive rehearsal is useful. Cognitive rehearsal involves the observer imagining or visualizing themselves performing the skill without actually physically performing the skill. Carroll and Bandura (1985) showed that cognitive rehearsal is beneficial to the learning of motor skills. In that study, the participants learned a modeled action pattern.

One half of the participants were in the cognitive rehearsal group and were instructed to rehearse the sequence cognitively between each trial. Whereas, the non cognitive rehearsal group were told to count backwards during the time between each trial. Overall, the results indicated that the group that was instructed to cognitively rehearse the action pattern had better cognitive representations of the task, and performed better than the group that was not permitted to cognitively rehearse. As well, the cognitive rehearsal group continued to perform at the same level even when modeling was removed, indicating that their cognitive representation was important in retaining the appropriate action pattern.

The production process is the third component and involves the conversion of the retained cognitive representation into actions. Within this component, observers produce the action that was retained as a cognitive representation of the skill that they are observing. The learners can then compare their performance to their cognitive representation. If the produced action is not the same as that observed, changes will be made to their cognitive representation until it corresponds with the action that they are viewing (Bandura, 1977; 1986; 1997). The internal feedback that an observer receives can be visual, auditory, or kinesthetic information resulting from the performance of the skill. External feedback can also be provided by an instructor in the format of knowledge of results or performance feedback. Research has shown that performance feedback is necessary in order for the learner to compare their performance to their cognitive representation of the observed performance. A study by Carroll and Bandura (1990) showed that visually observing oneself perform a movement pattern was very important in improving the participants' performance of an action pattern. They proposed that the observers were able to compare their performance to their cognitive representation, and then adjust their performance of the action pattern accordingly. This process of being able to detect performance errors and then make corrections for the next trial has been termed the error detection and correction mechanism. Observing a model enhances the development of the error detection and correction mechanism because, through repeated performance observation trials, the model provides the necessary information for detecting errors and correcting the cognitive representation.

The final component of observational learning is motivational processes. Motivation refers to the fact that the observer has to desire to perform the observed skill in order to learn it. Bandura (1977, 1986, 1997) has categorized these positive incentives into three categories; external, vicarious and self-incentives. Generally, when the observer knows that positive outcomes will result from the performance of the skill they will be motivated to perform the action. This is illustrated in a study by Bandura and Barab (1973). In that study children observed different models that each exhibited different behaviours. The children chose to observe and replicate the models whose behaviour resulted in rewarding effects and refused to imitate the unrewarded behaviour.

Motivation is also involved at another level when learning by observation. This refers to the extent to which the observer is motivated by the model to perform the task. This is another cognitive process where model similarity and attractiveness are important (McCullagh, 1986;1987). The motivation process component is also present at the previous three levels (attention, retention and production) that are involved in observational learning process. For instance, the more the model is able to motivate the learner, the more likely it is that the learner will pay attention to the task, which will result in a better cognitive representation of the skill, leading to a more accurate reproduction of the skill. Therefore, it seems that the level of a learner's motivation is a strong determinant of how successful he or she will be at learning the new skill by observation.

In summary, it is apparent that these four processes: attention, retention, production, and motivation are all involved in the learning of motor skills through observation. It is important to note that observational learning not only has an impact on the learner's performance of physical skills, but it also has an effect on psychological aspects of motor skill performance. This includes the improvement of the learner's self-confidence, motivation and self-efficacy towards the performance of the motor skill. This present study is interested in how self-efficacy and perceptions of task difficulty can be influenced through observational learning.

Self-Efficacy Theory

According to Bandura (1977; 1986; 1997), self-efficacy is the degree to which one believes that he or she can successfully perform a particular action or behaviour. Bandura also indicates that self-efficacy is specific to the learning situation, and not a global factor. Therefore, an individual's strong self-efficacy beliefs for one skill does not transfer to the performance of another skill. There are three dimensions of self-efficacy which have been identified by Bandura: a) magnitude, b) strength, and c) generality. Magnitude refers to the circumstances under which one believes they can perform a certain task. Strength is the extent of one's belief or confidence in his or her ability to perform that task. Finally, generality refers to the degree that one can extend his or her expectancy beliefs to other similar actions or behaviors. Research has shown that self-efficacy can be a very strong determinant of successful performance. It is widely recognized that successful elite athletes tend to be more confident in their abilities and exhibit very high levels of self-efficacy regarding their sport performance. Feltz and Chase (1998) reviewed 11 studies on self-efficacy and sport performance and discovered that there is a relationship between self-efficacy and sport performance, meaning that the higher an athlete's self-efficacy, the more successful their performance. The literature generally agrees that self-efficacy can be modified and enhanced with the use of appropriate techniques.

The most influential sources of self-efficacy information have been identified as: a) performance experiences, b) vicarious experiences, c) imaginal experiences, d) verbal persuasion, e) physiological states, and f) emotional states (Bandura, 1977, 1986, 1997). These sources are often used as techniques for increasing the learners self-efficacy beliefs. Vicarious experiences are experienced when a learner is observing someone perform an action, he/she sees the results of the models performance and then construct his/her own expectations regarding their actions (Maddox, 1995). Thus, one of these identified techniques is the modification of self-efficacy through observational learning.

Model Characteristics and Their Influence on Performance and Psychological Dimensions

It has been suggested that the effects of observational learning on the learner's performance and psychological responses are dependent on the observer's perceived similarity to the model. Perceived similarity can be related to the following model characteristics: model's gender; status; ability level; and the similarity of the problems encountered by the observer and the model (Bandura, 1997; Schunk, 1987). Various studies have shown support for the suggestion that these model characteristics influence an observer's perceived similarity to the model.

Model Status and Skill Level

Gould and Weiss (1981), for example, compared the effect that similar and dissimilar models, making various self-efficacy statements, had on the observers' performance of a muscular endurance task, and their feelings of self-efficacy regarding their performance. The female participants observed a non-athletic female (similar model) or an athletic male (dissimilar model). The models made either positive self-efficacy statements, negative self-efficacy statements, irrelevant statements or no statements, creating four different observed model groups. Gould and Weiss (1981) reported that the groups that observed similar models performed the task better and showed higher self-efficacy beliefs than those in the dissimilar model group.

George, Feltz and Chase (1992) replicated and extended the Gould and Weiss (1981) study in order to determine exactly what model characteristics (model ability or model sex) were better at improving motor skill performance and self-efficacy. The participants were females with virtually no athletic experience. They used four modeling conditions in their study; an athletic female, an athletic male, a non-athletic female and a non-athletic male. Self-efficacy was measured by asking how certain the participants were that they could extend their leg for a certain amount of time. This was measured on a 10 point scale after first viewing the model and again after the third trial. The subjects were also asked to rate how important performing the task was to them. Only those participants that answered that it was moderately to highly important were included in the study. The results showed that the subjects in either the male or the female non-athletic groups performed better on the leg extension endurance task and had higher levels of self-efficacy, than the subjects in either the male or female athletic groups. This indicated that model ability was more important to observers than gender, which again provides support for the idea that performance can be enhanced when the observer perceives the model as similar (in this case referring to skill level). In addition, the observers who perceived the model as similar to them also indicated higher levels of self-efficacy than the other groups.

Similarly, Starek and McCullagh (1999) conducted a study comparing two modeling techniques, self-modeling and other modeling, on the learning of basic swimming skills with adult non-swimmers. Self-modeling refers to the participants watching a video tape of themselves perform swimming skills, whereas, other modeling refers to having the participants observe a peer perform the swimming skills. The measures consisted of swimming performance criteria, self-efficacy and state anxiety measures. In the first session, the participants completed a swimming self-efficacy questionnaire and the State Trait Anxiety Inventory (STAI) (Spielberger, 1972) which measures state anxiety. The participants then attempted to perform as many of the 64 swimming skills as possible, this was followed by a swimming lesson. After this first session all of the participants' swimming skills were rated and a 25 item swim performance checklist was developed in order to rate the swimmers for the remainder of the study.

During the second session of that study, the participants observed a video taped feedback of the swimming skills that they had performed the day before. They again completed the STAI and the self-efficacy questionnaires and then attempted the 25 swimming skills with instruction. For the third and fourth sessions the self-model group watched a three minute video of themselves performing the swimming skills and the other model group watched a video of a peer who was at the same level of ability as them. Following this, the participants again completed the two questionnaires. The results showed that the self-modeling group ended up with better swimming performance than the other modeling group, providing further support that the more similar the observer perceives the model the more effective the modeling will be. There were no differences between the modeling groups for self-efficacy and state anxiety, possibly due to the fact that the models were not appropriate for people who were fearful of the water. In summary, these studies all seem to suggest that similar models are more effective with adult learners.

The studies described so far have been with adults, but it is important to note that modeling has also been shown to be an effective teaching strategy with children. For example, Weiss (1983) compared the effectiveness of observational learning using a sequential motor task with children. The study consisted of children ranging in age from 4-11 years old. Their results indicated that the older children learned more from the model than the younger children. These results also support the notion that aspects such as attention, retention and verbal-cognitive abilities are important in the modeling process, because older children tend to be more developed in these areas. The older children learned more from observing a model than the younger children. All of the children, regardless of their age, improved their performance after observing a model. In addition, the study showed that the age of the observer and the type of model that is observed also seems to have an impact on a child's capability of learning through observation. Models giving verbal cues were found to be more effective for the younger children, likely because this age group needs to be directed more often towards the key elements of a movement pattern.

The research comparing similar and dissimilar models with children is not as conclusive as it is with adults. Landers and Landers (1973) conducted a study to compare a peer model versus a teacher model in the acquisition of a motor skill with young girls. They used climbing a

Bachman ladder as the skill to be learned. The models consisted of a skilled teacher, a skilled peer, an unskilled teacher and an unskilled peer. It was hypothesized that if similarity was the most salient modeling factor then, in terms of age level, the peer model would be most effective, and in terms of skill level the unskilled model would be the most beneficial. However, the results showed that those who observed a skilled teacher had the highest performance scores and the group that did not observe a model exhibited the lowest performance scores. Thus, the similarity predictions did not hold true for this study. Children that observed an unskilled peer, however, performed better than the children that observed an unskilled teacher.

A limitation of this study, is that there was no retention test. Not including a retention test is problematic because learning is defined as, "a change in the capability of a person to perform a skill that must be inferred from a relatively permanent improvement in performance as a result of practice or experience" (McGill, 1993, p. 44). Therefore, in Landers and Landers (1973) one cannot be sure of the amount of learning occurred in each group. In fact, most studies on observational learning now incorporate the idea of a retention phase into their methods. A retention test involves having the participants return to perform the observed skill again, after a given delay. The delay can range from 20 minutes to as long as a week. Doing this ensures that the observed information has actually been retained, which is a better measure of learning. A retention test, therefore, is a better measure of learning because it tests the permanence of the skill that was taught.

A study by Lirgg and Feltz (1991) replicated Landers and Landers' (1973) study. The same task was used along with the same procedures. However, Lirgg and Feltz, used video taped models instead of live models and incorporated a self-efficacy questionnaire into their study. The participants completed the self-efficacy questionnaire before viewing the model, after viewing the model, and after the 30 trials of the task. This study did not find any significant differences between peer and teacher models, however, they did find that the participants performed better and had higher self-efficacy ratings when they observed a skilled model (teacher or peer) as compared to an unskilled model. Once again, this study did not have a retention phase, so the impact of the different types of models on learning was not really tested. Despite this weakness, the two aforementioned studies demonstrated that observing a skilled teacher was most beneficial for skill performance in the short term.

Other research has shown that children were more likely to use children of the same age (peers) as models when given the choice between adults or children (Brody & Stoneman,1985; Davidson & Smith,1982; France-Kaatrude & Smith ,1985). Although, these studies also showed that when the children were made aware of the model's skill level, they were more likely to observe the skilled model regardless of their age. These findings then indicate that it may be more beneficial to have children observe a peer model that is skilled. Schunk's (1987) explanation for this is that "models who are dissimilar in competence to observers exert more powerful effects on child's behavior" (p.161). Perhaps, observing someone of a similar age perform a difficult skill is a motivating factor, and as a result the child begins thinking that "if they can do it, I can do it too."

To summarize, many of the studies with children demonstrated that a skilled peer or teacher is a more effective model. The studies mentioned so far included skills that are relatively simple and that the children were willing to perform. Different results, however, are evident for more difficult and fear invoking skills. It seems that when a child exhibits fearful and/or avoidance behaviours to the task, the dissimilar model is least effective. Kornhaber and Schroeder (1975) tested model similarity on attempting to modify female children's fearful behaviour towards snakes. The models consisted of a fearless child, a fearful child, a fearless adult and a fearful adult. Kornhaber and Schroeder (1975) anticipated that the fearful child model would result in the greatest behaviour change (overcome their fear of snakes) because the children themselves were fearful and would be more able to relate to the model who was most similar to them. The results of the study partly agreed with the hypothesis by showing that the groups viewing either the fearful or the fearless child had the greatest behaviour change and their level of fear decreased significantly when compared to the children viewing the adult models. This suggests that a similar model, in terms of age, may be more effective for individuals who exhibit avoidance behaviour towards performing a task.

Correct and Learning Models

Adams (1986) and Lee and White (1990) have challenged the notion that observing a skilled model is the better model to generate benefits. In these two studies, both Adams and Lee and White describe the benefits of hearing an unskilled model's knowledge of results and performance feedback. In these two studies there were two unskilled model observation groups, one group was able to hear the model's knowledge of results (KR) and performance feedback, while the other observation group only observed the unskilled model learn the computer task. In both studies, the group that was able to hear the feedback and knowledge of results given to the unskilled model during his or her learning process eventually performed the task better than the group that did not hear the model receive any type of KR. Adams' (1996) rationale for this was that when an observer is able to hear the feedback and knowledge of results given to the model regarding his or her performance, the observer can form his or her own cognitive representation of the task, and also be involved in other cognitive activities associated with learning. Eventually, when observers are provided with opportunities to produce and practice the skill they were observing they have a better idea of how to correct their own errors, which results in faster and more accurate skill learning.

In terms of the model's skill level and it's effect on skill performance, motor learning researchers have also compared correct versus learning models. More specifically, a correct model is identified as a model that continually performs the skill perfectly, whereas, a learning model is attempting to learn the skill and has not yet achieved a perfect performance of the skill (McCullagh & Meyer, 1997). Correct and learning models are very similar to skilled and unskilled models. The difference, however, lies in the fact that the observers are able to hear or see the feedback that is been given to the learning models, whereas unskilled model demonstrations do not always incorporate the feedback component. Research on correct and learning models has shown inconclusive results in terms of which model type is most effective.

In some experiments, the learning model has been shown to elicit better performance in learners when compared to a correct model. McCullagh and Caird (1990), for example, compared a correct model with a learning model on the learning of a timing task. When the observers were able to hear the feedback given to the learning model, this group performed the task better than the group that observed a correct model. This outcome has also been shown with more complex physical skills (Hebert & Landin, 1994). The rationale given in both of these experiments for why the learning model group learned better than the correct model group has two components. First, the model similarity issue is addressed. The fact that the learning model is just beginning to learn the skill gives this model more things in common with the learner, and may provide the learner with the motivation and confidence to learn the skill because they may feel that if the model can do it so can they. The second rationale for why the learning model was better, is the fact that the observers are able to hear all of the feedback being given to the model on his/her performance. This can encourage the development of a cognitive representation and the error detection and correction mechanism.

An experiment by McCullagh and Meyer (1997), however, has shown somewhat different results. In their study they used a free weight squat as the skill to be learned. There were four experimental groups. A control group that received feedback on their own performance, a learning model group that observed a model but did not receive any feedback, a learning model group that observed the model and could hear his/her feedback, and finally a correct model that gave correct demonstrations and heard feedback about the squats. The results indicated that the correct model group and the learning model group that received feedback performed the same, but had better performance scores than the control group and the learning model group with no feedback. Further supporting the importance of hearing model feedback.

Coping and Peer Mastery Models

Educational psychology research. This effect of observation on the learning of cognitive skills has also been examined in the area of educational psychology. For example, coping and mastery models, which are similar to learning and correct models, have been studied by Schunk and Hanson (1985) and Schunk, Hanson and Cox (1987). A difference however, is that not only do coping and mastery models differ in skill level, they also differ in their psychological dimensions. Schunk et al. (1985) identified two types of peer models, peer coping models and peer mastery models. A coping model demonstrates a progression in their learning from high perceptions of task difficulty to low perceptions of task difficulty, and from low feelings of self-efficacy to higher feelings of self-efficacy ("I cannot do it" towards "maybe I can do it"). In other words, the model indicates that they find performing the task very difficult, but as they try the task their statements gradually change and they begin indicating that they find the task easier to perform. In addition, their performance of the task is not perfect, thus, the coping model is akin to the unskilled model. In contrast, a mastery model shows no difficulty in performing the task throughout the observation, and continually verbalizes strong feelings of self-efficacy ("I can do it").

In a review article by Schunk (1987), he suggested that a peer coping model would only be effective with children who are having difficultly learning a skill and find it fearful and challenging. When a child does not find the new task difficult, the coping model is not likely to be effective because the observer would not find the model similar to themselves and self-efficacy would not be increased. When a child finds a task difficult and exhibits avoidance behaviours towards the task, observing a coping model is anticipated to be most effective. It is argued that children under these conditions see the coping model as someone similar to them, and they see that this model can improve their skills and overcome their fear of performing the task. Subsequently, the children begin to believe that they too can improve. This can raise a child's self-efficacy which is directly related to improving their skill acquisition.

A study was done by Schunk et al. (1985) with children who had difficulty learning the mathematical skill of subtraction. These children had been identified by standardized tests as working below their grade level on subtraction skills. This study used a same sex peer coping model, a same sex peer mastery model, a teacher model and no model groups. In a pretest, the participants self-efficacy and subtraction abilities were assessed. The children had two 45 minute observation sessions where they viewed a videotape of their respective model complete subtraction problems. After each time the children watched the video tape, they were asked to indicate on a scale how much they were like the model they had just observed. This was done in order to determine the observers perceived similarity to the models.

Forty minute training sessions took place for five consecutive days after the two days of video tape observation. During the training sessions, the children completed subtraction problems on their own with no feedback or instruction. The results of the study indicated that the children who observed one of the peer models had higher self-efficacy and better math skills on the post test than the children who observed a teacher or no model at all. No differences were found between the mastery and coping model groups.

This result was not exactly what Schunk et al. (1985) had predicted. They had proposed that children who were having difficulty learning a behaviour and were hesitant about performing the task would learn more and overcome this fear by observing someone who was similar to them, such as a peer who is also having difficulty (peer coping model). Schunk and Hanson (1985) reasoned that they did not get the results they predicted because, although the children found subtraction difficult, the task was not extremely anxiety provoking and it was not an unfamiliar task to the children.

Schunk et al. (1987) conducted a very similar study to again test the impact of peer models in the academic environment in terms of learning, self-efficacy and academic performance. This time the researchers used the mathematical skill of fractions as the skill that the participants had shown difficulty learning. This study followed a protocol very similar to the Schunk and Hanson (1985) study except this time the models were either the same sex or opposite sex as the participants and they were assigned to either a peer mastery model group or a peer coping model group. On the post test, the children in the peer coping group showed higher self-efficacy and fractions skills, than the peer mastery group. Thus, support was shown for using a coping model to increase feelings of self-efficacy and raising skill level, this study's results give support for the suggestion that self-efficacy can be modified through observation and that the more similar model was better.

Motor Learning Research. Similar to the learning of cognitive skills, many children find certain physical skills challenging and require persistence in order to master them. In addition to this, children can also be hesitant and often scared to try these physical skills, creating a great challenge for the individuals responsible for teaching these motor skills. Motor skill researchers, taking the lead from Schunk, have also predicted that the benefits from using a peer coping model may be greater for the learning of motor skills than a peer mastery model (Weiss, McCullagh, Smith & Berlant, 1998). The reason for this prediction is that the child will now be able to see another child having difficulties, which is similar to his or her situation, and also be able to observe the model eventually progress from low skill ability to higher skill ability through persistent practice. Upon observing this similar model attempt to perform the skill and improve, the child should have increased confidence in his or her abilities and make more of an attempt at performing the skill.

The research that has been done on the modeling of motor skills and the reduction of anxiety is limited to only two studies. Weiss et al. (1998) used a peer coping model, a peer mastery model, and a control group with children who were fearful of the water. Interestingly, this was the first study in more than 20 years to examine the effects of a coping model versus a mastery model on motor skill acquisition. Lewis (1974) also studied these models in the context of swimming, however, Weiss et al. (1998) noted a number of weaknesses in the Lewis study, and tested the same model types in the same swimming setting, but with a more controlled design.

Weiss et al. (1998) measured children's self-efficacy, fearfulness, and performance at three different times during the 9 days of the experiment: at the beginning of the study (Day 1); in the 24 hour retention (Day 5); and in the delayed- retention phases (Day 9). On Day 1, the children were assessed on their feelings of self-efficacy concerning 6 basic swimming skills. The participants were then tested on the 6 swimming skills and the swimming instructors rated the children's fear of swimming and swimming performance. During Days 2-4 the children were exposed to their experimental group, during which they observed a coping model, a mastery model or no model and then received a 20 minute swimming lesson. The retention phase of the experiment took place on Day 5 and Day 9, where they were assessed on their self-efficacy beliefs, fearfulness of swimming, and their performance of the swimming skills.

Weiss et al. (1998) had hypothesized that the peer coping model group would show the highest increase in self-efficacy and decreased fear towards swimming, and the highest performance improvement of the swimming skills when compared to the peer mastery model and the control groups. The results, however, did not support this hypothesis. Overall, this study did not find a large difference between the use of peer coping versus peer mastery models. Rather, the findings showed that the peer coping and peer mastery model groups were both better than the control group at improving self-efficacy and performance, and at reducing fearfulness, but the two modeling groups were not different from each other.

Despite improving upon the Lewis (1974) study, Weiss et al.'s (1998) investigation also had a number of limitations. First, the children who were the peer mastery and peer coping models were too similar in appearance, with little information provided by looking at them that they were competent or incompetent swimmers. In addition, the statements that the models gave during the modeling video were not different enough. Overall, the distinction between the peer coping model and the peer mastery model was rather weak. Second, Weiss et al. felt that the basic swimming skills were too elementary in nature and that these motor skills were not difficult or fearful enough to induce avoidance behaviour from the children. Another issue concerned an extraneous variable that they neglected to control. This was the fact that the children could watch each other perform the skills during the acquisition phase of the experiment. Thus, other observational learning experiences were available to the participants. The observational learning was not solely confined to the models seen in the experimental groups and this may have confounded the findings. The last point is that their study had a small sample size (n=17) which was partly due to the difficulty associated with finding participants to meet the specific criteria (fear of the water and low self-efficacy) of the study.

<u>The Current Research</u>

Given these limitations, the current research intends to further investigate the influences of coping vs mastery models on children's motor skill acquisition, self-efficacy beliefs, and perceptions of task difficulty. To do this, a motor skill that is perceived to be difficult and for which the children have feelings of low self-efficacy was chosen. With this in mind, the skill of diving has been chosen, as it is a moderately difficult task that many children avoid performing. Diving is considered a moderately difficulty skill because it is introduced after a learner has mastered basic swimming skills and is very comfortable swimming in deep water. As well, diving is usually learned in three progressions; therefore learning progress can be easily identified. To ensure that the children do have feelings of low self-efficacy and perceive the task as difficult, this study will consist of two stages. In stage 1, we will administer a self-efficacy measure and a task difficulty measure in order to determine whether or not the participants have low feelings of self-efficacy and find diving difficult. We will also evaluate their diving abilities to ensure that they do not already know how to dive. If the children do have low feelings of self-efficacy towards diving and find it a difficult task they will move to Stage 2. With reference to the models, a greater distinction between the coping and the mastery group will be created. This will be accomplished not only by the improved performance of the mastery models, but also by their appearance and their self-efficacy statements. In addition, to avoid the possibility of the children learning from other participants, children will be tested and given instruction on the diving skills individually, and not in a large group format.

Further, to ensure that learning and not just performance results are being tested this study will incorporate two retention tests. Weiss, Ebbeck, and Wiese-Bjornstal (1993) have identified the importance of distinguishing between motor recognition and recall. Recognition refers to being capable of distinguishing between correct and incorrect performances. Recall is the reproduction or performance (physically or verbally) of the observed information. In this study the participants' recall will be tested by their performance on the immediate-retention test (20 minutes after the last intervention), and the delayed- retention test (24 hours later). The delayed-retention test will also measure recognition. For this test, the participants will be shown four dives and will be asked to determine which dive they think was performed correctly. By incorporating a motor recognition test, it will be possible to determine whether or not the participants have learned the correct cognitive representation, even if their motor recall (diving performance) cannot be performed without errors.

In sum, the purpose of this study will be to determine whether or not a peer coping or a peer mastery model is more effective in enhancing children's diving skills and modifying their feelings of self-efficacy and perceptions of task difficulty in terms of the swimming skill of diving. It is hypothesized that the participants in the peer coping model group will show greater improvement in their performance and self-efficacy beliefs and task difficulty perceptions for the skill of diving than the peer mastery group and the control group. In addition, it is anticipated that the two peer modeling groups will be better than the no model control group on all measures.

This area of research is deemed important because observational learning is a common technique used by many physical educators and coaches to teach motor skills. By determining what type of model is most effective for a learner to observe, educators/coaches can optimize the use of this powerful teaching tool. In addition, self-efficacy is considered to be an important component involved in the learning of all skills. As such, it will be beneficial to discover which type of model is more effective at increasing children's self-efficacy. This is considered to be important because the greater the child's self-efficacy, the greater the likelihood that he or she will successfully perform a skill.

Chapter II

Presentation of Works to be Published

Presentation of the Works to be Published

The following congress paper will be presented at the 10th Congress on Sport Psychology and Exercise, Greece, 2001 and will be published in the conference proceedings. The article titled: "Peer Mastery Versus Peer Coping Models: The Influence on Children's Self-Efficacy Beliefs, Perceptions of Task Difficulty and Diving Performance" will be submitted to a reputable journal within the field of Psychomotor Learning entitled Research Quarterly for Exercise and Sport.

Presentation of the Congress Paper

Peer Mastery Versus Peer Coping Models: The Influence on Children's Perceptions of Task difficulty and Feelings of Self-Efficacy

Clark, S.E. & Ste-Marie, D.M.
University of Ottawa

Observational learning, Self-efficacy, Task difficulty, Motor skills

According to Bandura's (1977;1997) self-efficacy theory, a learner who has high feelings of self-efficacy towards an activity will eventually achieve a greater level of performance for a given task. Bandura defines self-efficacy as the degree to which one believes that he/she can successfully perform a particular behaviour in a specific situation. Bandura and Cervone (1983) argued that the most important time for individuals to have strong feelings of self-efficacy are when they are beginning to learn a challenging task. This is argued to be important because with strong feelings of self-efficacy, a child would invest more time and effort into learning the task.

Vicarious experiences are one of four sources of information identified by Bandura that could influence self-efficacy. Vicarious experiences take place when a learner is observing someone else perform an action. Bandura purported that by observing others experiences, the perceiver can construct their own expectations and representation regarding those observed actions. The observation process leads to higher feelings of self-efficacy, thus benefiting the learning of the skill. In motor learning, this has been shown to be the case with the effects of observational learning on self-efficacy and subsequent learning being dependent on various characteristics, such as the observer's perceived similarity to the model (Gould & Weiss, 1981, Weiss, Wiese & Klint, 1989). The research described here continues to investigate this relationship of observational learning and self-efficacy with skill acquisition and considers the characteristics of models' skill level, as well as the models' reported self-efficacy beliefs and perceptions of task difficulty.

To do this, peer coping models, peer mastery models, or no model at all (control group) were presented to children learning a diving skill. The coping models made statements initially communicating perceptions of high task difficulty and moved towards statements expressing perceptions of low task difficulty. Similarly, statements expressing low feelings of self-efficacy for diving, progressing to higher feelings of self-efficacy were provided by the models. In addition, the actual performance of the demonstrated diving skill was rarely executed well, and thus an unskilled level of performance was seen. In contrast, the mastery models demonstrated well-executed dives, continually verbalized strong feelings of self-efficacy, and perceptions of low task difficulty.

While motor skill researchers have compared peer coping models and peer mastery models in the past, this research has been limited (Lewis, 1974; Weiss, McCullagh, Smith, & Berlant, 1998). Weiss et al. (1998), compared these two models in the context of learning basic swimming skills. The prediction was that a coping model would yield greater performance benefits and greater changes in self-efficacy beliefs due to the greater similarity of this model's characteristics with a child just learning to swim. This prediction, however, was not supported as both models yielded the same level of benefits, albeit, they were both better than the control group who saw no model. Certain limitations, were identified in that research and our study sought to redress these limitations. For example, we obtained a larger sample size, we had greater control over the learning environment and constrained other potential observational learning experiences, and finally, the statements made by our coping and mastery models made our two model types more distinctive than that used by Weiss et al. (1998). Two specific hypotheses of the study will be addressed in this paper. The first was that the participants in the peer coping model group would show greater improvements in their feelings of self-efficacy towards diving when compared to the peer mastery group and that both these groups would show greater improvements in self-efficacy than the control group. The same pattern was expected for the three groups with respect to the expected decreases in the perceptions of task difficulty.

Methods and Procedure

Participants

Thirty participants with a mean age of 7.7 years (SD = 2.3) were recruited from a summer aquatic camp program. Parents provided signed consent, and children provided verbal consent, prior to participation.

Materials

Seven videotapes were used during the observation phase. Six of these were constructed to show one of three dives (kneeling, stride, or front), demonstrated eight times by either a peer coping model or a peer mastery model. In the peer mastery videos, the models performed the diving skills correctly and, on each dive demonstration, the model gave one statement indicating he/she had high feelings of self-efficacy or found the task easy. For the peer coping group, the same three types of videos were provided by the same models, however, seven of the demonstrated dives had one or more performance errors, with the last dive being performed correctly. As well, the model's self-efficacy and task difficulty statements progressed from perceiving the task as very difficult to finding it easier, as well as from low feelings to high feelings of self-efficacy. For all six videos, a swimming instructor was present who gave the peer coping models error performance feedback on their diving, and the peer mastery models were given corresponding correct performance feedback. The seventh videotape was constructed for the control group and contained information unrelated to diving (clips of the cartoon Franklin the Turtle was used).

Procedures

Dive selection and pre-test. All children were given one demonstration of each dive (kneeling, stride, and front dive) by a live model. After the demonstration, they attempted the dive and then immediately completed the self-efficacy and perceived task difficulty measures for that dive. These measures served as our pre-test scores. The measure used to rate their self-efficacy was borrowed from Chase (1997; as illustrated in Feltz & Chase, 1998) and consisted of five circles ranging in size from small, indicating low feelings of self-efficacy, to progressively larger circles, indicating greater and greater feelings of self-efficacy. A score of 1 to 5 was given according to the child's chosen circle. The children were then asked to rate their perceptions of task difficulty, with the options being "very hard" (scored as 1), "kind of hard " (scored as 2), or "easy" (scored as 3). The diving skill selected for use with that participant was the dive that they had difficulty performing, perceived as very hard or kind of hard, and was rated lower than three on self-efficacy. Children were then randomly assigned to one of three experimental groups.

Observation phase and Acquisition phase. All children watched a videotape that lasted approximately five min., with the control group watching Franklin the Turtle. Children in the modeling groups viewed either peer coping models or peer mastery models performing on videotape a total of eight demonstrations of the experimental dive. Immediately after observing the dives on video, children proceeded to the acquisition phase. This phase included three, fifteen minute, one-on-one instruction sessions with a certified lifeguard. The sessions were specific to the dive the child was learning and the sessions occurred over three consecutive days. The structure of the sessions involved having the child attempt eight dives, then practice unrelated swimming skills, and then eight more dive attempts. The same type and schedule of feedback were given for the three groups.

Immediate and delayed post-tests. On the third day, after the instruction session, children returned to their swimming activity groups and engaged in the practice of other swimming skills for a 20 min. interval. They were then brought back to the testing area and asked to perform two attempts of the experimental dive. Immediately following the dives the same measures for self-efficacy and perceived task difficulty that were used in the pre-test were administered again. These same procedures were conducted for the delayed post-test twenty-four hours later.

Results

Difference scores were calculated for both self-efficacy and perceived task difficulty by subtracting the pre-test score from the post test scores, for both the immediate and delayed conditions. These difference scores were entered into one-way analyses of variance. For perceived task difficulty, although a trend existed whereby the coping model showing the largest positive change, followed by the mastery and then the control group, no significant effects were found on either the immediate post-test , F (2, 29) = 0.57, p = 0.57, or delayed post-test, F (2, 29) = 2.13, p = 0.14. For self-efficacy, no differences were found among the groups in the immediate post-test, F (2, 29) = 0.57, p = 0.57, however, the delayed post-test analysis did show significant differences, F (2, 29) = 3.9, p = 0.03. Tukey post hoc testing revealed that the coping group's difference scores were greater than the mastery group's, but not different from the control group's. The coping and mastery groups were not different from each other either (see Figure 1).

Discussion and Conclusions

The purpose of this study was to examine the effects of peer mastery models and peer coping models on children's self-efficacy and task difficulty perceptions. The hypothesis concerning a greater decrease in perceptions of task difficulty for the coping model group was refuted because the perceived task difficulty scores did not vary among the three groups. The second proposition relating to the changes in self-efficacy was partially supported. Although, the results showed no differences in the immediate test phase, a significant difference existed between the coping group and the mastery group's self-efficacy scores for the delayed test phase, suggesting that a coping model is a superior form of model to use.

That the effects were only seen during the delayed post-test can be linked to other motor learning research that argues that performance tests may be contaminated by factors that are transient (e.g., Magill, 1993). It could be claimed, for example, that the immediate post-test, even though there was a 20 min. delay, was still contaminated by transient factors related to their experiences in the acquisition phase of practicing the diving skills, receiving feedback etc. Given this, the self-efficacy scores from the delayed post-test, may be more valid because if any transient factors were involved, they had the chance to dissipate. With this in mind, it is noted that research on self-efficacy often employ immediate tests (e.g., George, Feltz & Chase, 1992; Gould & Weiss, 1981), and thus it is recommended that longer delay intervals between an intervention and testing may be implemented.

Contrary to research on observational learning that typically shows that any model is better than no model at all for strengthening children's feelings of self-efficacy (e.g., Bandura, 1997; Schunk, 1987; Weiss et al, 1998), our peer mastery model group and the control groups' self-efficacy difference scores were similar. At this point, we are not sure how to explain this finding. The small sample size may have been a factor, but due to time and resources constraints we were not able to recruit more participants. Another surprising factor was that no differences were found for task difficulty among any of the groups, but differences were found for self-efficacy on the delayed test. This leads to the supposition that the mediating mechanisms effecting changes in self-efficacy may be different than those that would effect changes in perceived task difficulty on the part of the learner. Gaining a better understanding of both these influences is important if we want to effectively utilize modelling for the learning of challenging motor skills. This present research does lend support, however, to the notion that a coping model, along with instruction, may be most beneficial for increasing self-efficacy in young children.

References

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: W.H. Freeman.

Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. Journal of Personality and Social Psychology, 45(5), 1017-1028.

Feltz, D., & Chase, M. (1998). The measurement of self-efficacy and confidence in sport. In J.L. Duda (Ed.). Advances in sport and exercise psychology measurement (pp. 65-101). Morgantown, WV: Fitness Information Technology, Inc.

George, T., Feltz, D., & Chase, M. (1992). Effects of model similarity on self-efficacy and muscular endurance: A second look. Journal of Sport and Exercise Psychology, 14, 237-248.

Gould, D., & Weiss, M. (1981). The effects of model similarity and model task on self-efficacy and muscular endurance. Journal of Sport Psychology, 3, 17-29.

Lewis, S. (1974). A comparison of behavior therapy techniques in the reduction of fearful avoidance behavior. Journal of Behavior Therapy, 5, 648-655.

Magill, R.A. (1993). Motor learning: Concepts and applications. (4th ed.). Dubuque, IA: Brown &Benchmark.

Schunk, D. (1987). Peer models and children's behavioral change. Review of Educational Research, 57(2), 149-174.

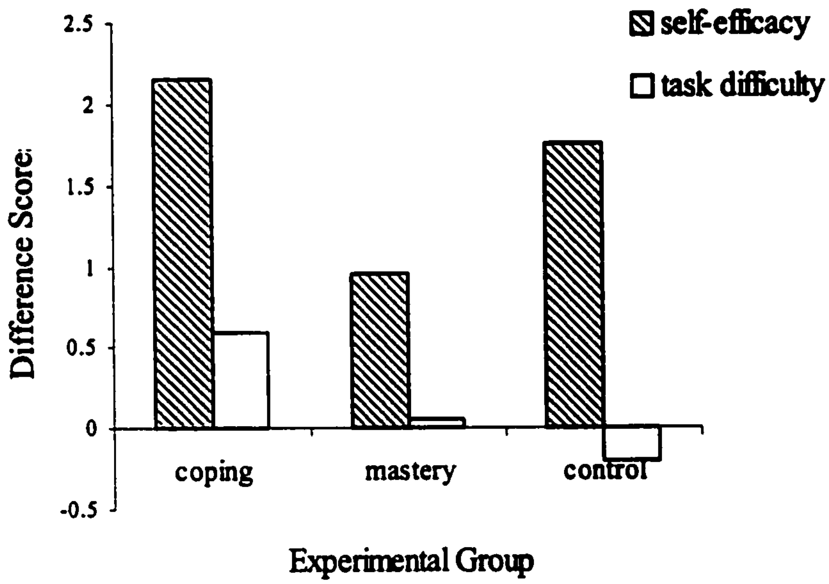
Schunk, D., & Hanson, A. (1985). Peer models: Influence on children's self-efficacy and achievement. Journal of Educational Psychology, 77, 313-322.

Weiss, M., McCullagh, P., Smith, A., & Berlant, A. (1998). Observational learning and the fearful child: Influence of peer models on swimming skill performance and psychological responses. Research Quarterly for Exercise and Sport, 63(1), 67-75.

Weiss, M. R., Wiese, D. M., & Klint, K. A. (1989). Head over heels with success: The relationship between self-efficacy and performance in competitive youth gymnastics. Journal of Sport and Exercise Psychology, 11, 444-451.

Figure Captions

Figure 1. Difference scores on the delayed post-test for both self-efficacy and perceived task difficulty.


self-efficacy
task difficulty
Difference Scores
2.5
2
1.5
1
0.5
0
-0.5
coping
mastery
control
Experimental Group

Presentation of the Article

Peer Mastery Versus Peer Coping Models: The Influence on Children's Self-Efficacy Beliefs, Task Difficulty Perceptions and Diving Performance

Shannon E. Clark

Diane M. Ste-Marie

University of Ottawa

Abstract

This experiment investigated how children's self-efficacy beliefs, perceptions of task difficulty and diving performance were influenced by observing either a peer coping model, a peer mastery model or no model. Thirty children, who exhibited low self-efficacy beliefs and high perceptions of task difficulty towards diving, participated. The experimental phases were conducted over four days. Day 1 included a pretest assessment on all the measures used in the immediate- and delayed-retention tests. As well, on day1- 3, the participants were exposed to their assigned modeling condition followed by a 15-min. diving lesson. Day 3 also included an immediate-retention test and the delayed-retention test was administered on day 4. Analysis of variance on all measures revealed that the peer coping group increased their self-efficacy beliefs more than the peer mastery group in the delayed-retention test, with no other significant effects. Given the small sample size and evident trends in the data, effect sizes were calculated. This analysis showed that the peer coping group was the better model group for decreasing children's perceptions of task difficulty and increasing self-efficacy beliefs towards diving. For diving performance, the peer mastery group showed the greatest improvements. These findings suggest that different model types have varied impact on psychological and physical performance measures of motor skill learning.

Peer Mastery Versus Peer Coping Models: Model Type has Differential Effects on Psychological and Physical Performance Measures

Physical educators, classroom teachers and coaches often use a technique known as observational learning to teach motor and/or cognitive skills to their students. Observational learning occurs when a learner views a model demonstrate a skill. The basic assumption in using this technique is that watching such a demonstration will facilitate the learning of that skill. Indeed, numerous studies have examined the effectiveness of this teaching method for the learning of both physical and cognitive skills, and it has proven to be an extremely beneficial method. The standard finding is that learners who observe a model learn the observed skill better than those who do not (e.g., Deakin & Proteau, 2000; Shea, Wright, Wulf & Whitacre, 2000).

According to Social Cognitive Theory (Bandura, 1977; 1986; 1997), this observational learning process operates through four components: attention, retention, behavior reproduction and motivation processes. Within these four components, Bandura proposed two components that can be linked to the effectiveness of observational learning. The first component involves the development of a cognitive representation of the movement pattern. Observing a model is argued to provide the learner with increased opportunities to attend to relevant information and retain that information in the form of a cognitive representation of the motor skill. This cognitive representation can then be used as a standard of reference for the task being learned. Through behavior reproduction and repeated observation trials, necessary information for detecting errors and correcting the cognitive representation is provided (Carroll & Bandura, 1990). Thus, observational learning enhances learning of a skill by assisting in the development of an error detection/correction mechanism, and a cognitive representation of the skill to be learned.

While numerous studies have highlighted the benefits that modeling has on the physical performance of motor skills (e.g., McCullagh, Weiss, & Ross, 1989; Meaney, 1994; Weiss, Ebbeck, & Weiss-Bjornstal, 1993), other studies have also shown that observational learning affects psychological responses in learners. These psychological responses to modeling can include improvement in the learner's self-efficacy beliefs (Bandura, 1997), and increased motivation to learn the skill (McCullagh, 1987). In fact, it would be difficult to describe observational learning without introducing Bandura's (1997) Theory of Self-efficacy because it is also an integral part of how observational learning functions to enhance skill acquisition.

Self-efficacy is defined as the degree to which one believes that he or she can perform a particular action or behavior. Bandura (1997) postulated that self-efficacy beliefs were a strong determinant of one's choice of activities and the amount of effort and persistence put forth towards learning a skill. One of the most influential sources of self-efficacy information identified by Bandura is vicarious experience, a term synonymous with observational learning. A foci of the present study concerns the effect that observational learning may have on an observer's feelings of self-efficacy. In addition, we were also interested in measuring the effects of observational learning on perceived task difficulty.

The effectiveness of observational learning has been shown to be influenced by many variables, such as, the observer's perceived similarity to the model (George, Feltz & Chase, 1992; Gould & Weiss, 1981), the perceived power of the model (Landers & Landers, 1973), and the similarity of the problems encountered by the observer and the model (Herbert & Landin, 1994). One variable, the model's skill level, has provided somewhat equivocal data in terms of its effect on skill performance. Motor learning researchers, for example, have compared correct versus learning models. A correct model is identified as a model that continually performs the skill perfectly, whereas, a learning model is attempting to learn the skill and has not yet achieved a perfect performance of the skill (McCullagh & Meyer, 1997). While some studies have shown the correct (skilled) model to be better (Landers & Landers, 1973), others have shown the learning model to be superior (e.g., McCullagh & Caird, 1990; Hebert & Landin, 1994). Thus, there is still some debate concerning which model is the best to use.

Similar to learning and correct models, are coping and mastery models that have been studied by Schunk and his colleagues (Schunk & Hanson, 1985; Schunk, Hanson, &Cox, 1987). A difference, however, is that coping and mastery models not only differ in skill level, they also differ in their psychological dimensions. Coping models can demonstrate a progression in their learning from perceptions of high task difficulty to low task difficulty ("I think this is hard" towards "I think that this is easy"), and from low feelings of self-efficacy to higher feelings of self-efficacy ("I cannot do it" towards "maybe I can do it"). In other words, the coping models indicate that they find performing the task very difficult, but, over trials of the task, their statements gradually change and they begin indicating that they find the task easier to perform. In addition, their initial performances of the task are not perfect, but they move towards better performances as the trials progress. Thus, the coping model can be likened to the learning model.

In contrast, a mastery model shows no difficulty in performing the task throughout the demonstrations, continually verbalizes strong feelings of self-efficacy ("I can do it") and, perceives the task to be easy, similar to the correct model. In a review article by Schunk (1987), he suggested that a peer coping model would be more effective than would a peer mastery model with children who are having difficulty learning cognitive skills for which they are hesitant or fearful to try. Indeed, his research has shown that using a coping model was better for increasing feelings of self-efficacy and improving mathematical skills that were deemed to be challenging skills for the participating children (Schunk et al., 1987).

Similar to the learning of cognitive skills, many children find certain physical skills challenging and require persistence in order to master them. As such, peer coping models, in comparison to peer mastery models, may also be the best model for motor skill learning. While motor skill researchers have compared peer coping models and peer mastery models in the past, this research has been limited (Lewis, 1974; Weiss, McCullagh, Smith, & Berlant, 1998). In fact, Weiss et al.'s (1998) experiment is the first in over 20 years to examine the effects of a coping model versus a mastery model on motor skill acquisition. In that experiment, they predicted as that a peer coping model would yield greater performance benefits and greater changes in self-efficacy beliefs, due to the greater similarity of this model's characteristics with a child just learning a particular motor skill.

They tested this prediction by teaching basic swimming skills to children who were fearful of the water. The children were assigned to a peer coping group, a peer mastery group or a no model control group. They measured self-efficacy, fearfulness and physical performance before intervention, during a 24 hour post test and a 72 hour post test. Their prediction was not supported. Both models yielded the same level of benefits, albeit, they were both better than the control group who saw no model. Certain limitations, however, were identified in that research.

First, the overall distinction between the coping model and the peer mastery model was too weak. Second, Weiss et al. (1998) suggested that the basic swimming skills may have been too elementary in nature. Third, because the intervention was done in a group format, they neglected to control for children watching each other perform the skills during the acquisition phase of the study. Thus, other observational learning experiences were available to the participants. Consequently, the observational learning was not solely confined to the models seen in the experimental group and this may have contaminated the findings. The last point is that their study had a small sample size (n=17) which was partly due to the difficulty associated with finding participants to meet the specific criteria of the study (fear of the water and low self-efficacy beliefs).

Our study sought to redress these limitations. Firstly, we obtained a larger sample size, and the statements made by our coping and mastery models made our two model types more distinctive than that used by Weiss et al. (1998). In addition, we had greater control over the learning environment by using one-on-one instruction and, thus, constrained other potential observational learning experiences. Finally, we chose the swimming skill of diving which has a greater task difficulty dimension. Beyond these differences, the current experiment did follow a similar experimental design as that of Weiss et al.. That is, we also measured self-efficacy, physical performance, recognition performance, but added task difficulty perceptions as a measure. In the current experiment, self-efficacy beliefs and task difficulty perceptions examined the psychological responses to observational learning, whereas, motor recall and recognition was examined through diving performance criteria and a recognition diving performance test.

McCullagh and Weiss (2001) and Weiss et al. (1993) have identified the importance of distinguishing between motor recognition and recall. Recognition refers to the capability of distinguishing between correct and incorrect performances. Recall is the reproduction or performance (physically or verbally) of the observed information. The rationale for introducing a recognition performance test is that in some situations a learner's physical performance might not show learning effects because of problems in the translation of the cognitive representation into action, despite the development of an accurate cognitive representation of the skill. McCullagh and Weiss (2001) suggest that introducing a recognition test is necessary to tap into whether or not the learners have been able to develop an accurate cognitive representation and an error detection and correction mechanism for the skill. In this experiment the participants' physical performance (recall) was tested in the immediate-retention test and in the delayed- retention test both physical recall and recognition performance were tested.

Based on Schunk's (1987) work, several specific hypotheses were proposed. The first two hypotheses were that the participants in the peer coping model group would show greater improvements in their diving performance and in their feelings of self-efficacy towards diving when compared to the peer mastery group, and that both these groups would show greater improvements than the control group. The third hypothesis was that the modeling groups would show greater decreases in their perceptions of task difficulty, than the control group, with the peer coping model having more impact than the mastery model. Finally, we also expected superior recognition performance from the peer coping group.

Method

Participants

Thirty children (10 male and 20 female), balanced similarly across the three experimental groups, were involved in the experiment. These participants had a mean age of 7.7 years (SD = 2.3) and were recruited from a summer aquatics camp program held at the University of Ottawa. The children were recruited from Canadian Red Cross Aquaquest levels that had not yet introduced diving as a skill. Prior to participation, parents provided informed signed consent and children provided informed verbal and signed consent.

Materials

Acquisition Phase. Seven videotapes were used for observation during the acquisition phase. Six of these were constructed to show one of three dives (kneeling, stride, or front), demonstrated eight times by either a peer coping model or a peer mastery model. The same models were used in both the peer coping and peer mastery videotapes. The models were one male and one female child, who were introduced to the participants as "Alie" and "J.P." For each videotape, the girl and the boy alternately demonstrated the eight dives (e.g., four were done by J.P. and four were done by Alie).

For the peer coping modeling videotape, seven of the demonstrated dives had one or more performance errors, with the last dive being performed correctly. As well, the model's self-efficacy and task difficulty statements progressed from perceiving the task as very difficult to finding it easier. Moreover, the models went from making statements indicating low feelings to high feelings of self-efficacy. The same structure was used for the peer mastery videotapes, however, the models performed the diving skills correctly and, on each dive demonstration, the model gave one statement indicating he/she had high feelings of self-efficacy or found the task easy (see Table 1 for statements used by models).

For all six videos, a swimming instructor was present. For the peer coping models, the swimming instructor gave error performance feedback on each dive, and the peer mastery models were given corresponding correct performance feedback. The seventh videotape was constructed for the control group and contained information unrelated to diving (clips of the cartoon Franklin the Turtle were used).

Recognition Phase. The remaining three videotapes were constructed for the recognition phase and contained clips of the models performing four dives, two dives by the male model and two dives by the female model, for each of the three dive types (kneeling, stride and front). One dive on each videotape was performed perfectly by the model and the remaining three dives were performed with errors.

Measures. The measure used to rate the children's self-efficacy was borrowed from Chase

(1997; as illustrated in Feltz & Chase, 1998) and consisted of five circles ranging in size from small, representative of low feelings of self-efficacy, to progressively larger circles, representing greater and greater feelings of self-efficacy. Each circle was given a score of 1 to 5, with the smallest circle accorded a 1 and the progressively larger circles were given higher numbers. For perceived task difficulty, the following question was on a sheet with three response options written under the question, "How difficult do you think performing a kneeling (stride or front) dive is? The response options were; very hard (scored as 1), kind of hard (scored as 2), or easy (scored as 3). In order to score the participants' diving performances, an adapted version of the Canadian Red Cross Water Safety Program's (1998) standards for the kneeling dive, stride dive and front dive were used (see Appendix A). The standards were adapted to include more aesthetic components of the dive, such as, legs straight and legs together.

Procedures

Pre-test. At the outset of the experiment, all children were given three live demonstrations, one per dive (kneeling, stride, and front dive), by a swimming instructor. After each live demonstration, the children attempted the dive and then immediately completed the self-efficacy and perceived task difficulty measures for that dive. The same order of dives was always followed, which was: the kneeling dive, the stride dive, and the front dive. Thus, the children would first see the kneeling dive, then perform the dive, and finally give their perceptions of task difficulty and self-efficacy. To obtain the task difficulty rating for the kneeling dive, the children were asked how difficult they found the dive, and then verbally given the three response choices of very hard, kind of hard or easy. Children stated out loud their response choice. For self-efficacy, the children were asked to point to one of the five circles on the self-efficacy measure that best represented how they felt about being able to do the kneeling dive. The same sequence was then followed for the other two dives. Dive attempts performed by the child were videotaped. The children's videotaped performances of each dive were later scored by two independent raters on the various predetermined physical performance criteria outlined in Appendix A. These performance ratings served as our pre-test scores.

The diving skill selected for use with each participant was the lowest level dive that they perceived as very hard or kind of hard, and gave a rating of lower than three on the self-efficacy scale. Thus, the same dive was not used for all children. Rather, dive selection was based on the reported perceptions of the child. In the end, 8 children performed the kneeling dive, 8 children performed the stride dive and 14 children performed the front dive. After the dive was selected, children were randomly assigned to one of three experimental groups and proceeded to day 1 of the observation and acquisition phase.

Observation and Acquisition phases. The observation and acquisition phases were conducted over three consecutive days and followed the same protocol on each day. First, all children watched a videotape that lasted approximately five minutes, with the control group watching a portion of an episode of Franklin the Turtle. Children in the modeling groups viewed either peer coping or peer mastery models on videotape. Each videotape consisted of eight demonstrations of the experimental dive. Immediately after observing the dives on video, children proceeded to the acquisition phase.

The acquisition phase included three 15-min., one-on-one instruction sessions with a certified swimming instructor (i.e., one 15-min. session per day). Each session was specific to the dive that had been selected during the pre-test phase. The structure of the sessions involved the children attempting eight dives, then practicing unrelated swimming skills, and then making eight more dive attempts. The same type and schedule of feedback were given for the three groups.

More specifically, the participants were given feedback by the instructor after each diving trial for the first eight trials, however, the participants did not receive any feedback during the last eight trials. The children were not videotaped during this phase.

Immediate- and delayed-retention tests. On the third day, after the instruction session, children returned to their swimming activity groups and engaged in the practice of other swimming skills for a 20 min. interval. During this time frame, the children did not practice any dives. They were then brought back to the testing area and were videotaped while performing two attempts of the experimental dive. Immediately following each of the dive attempts, the same measures for self-efficacy and perceived task difficulty that were used in the pre-test were administered again and in the same manner as before. These same procedures were conducted for the delayed-retention test, which was conducted twenty-four hours later. For the delayed-retention test, however, there was no observation and acquisition phase prior to the test.

Recognition Test and Post Experimental Questions. The recognition test was administered on the last day of testing after the delayed-retention test was completed. This test phase involved the participants viewing one of three recognition videotapes. The videotapes were constructed to contain clips of four varied performances of the same dive (kneeling, stride, front). The videotape shown to the participant was dependent on the dive they had been practicing (i.e., if the child had been working on the kneeling dive, he/she was shown a recognition tape with four performances of a kneeling dive). The participants were asked to indicate, after viewing each dive, whether or not the dive was performed perfectly or if it was performed with an error. If the child indicated that they felt that the dive was performed with an error, they were asked to describe the errors. Their responses were scored by giving the participants one point for each correct error that they described and removing a point for errors defined that did not in fact exist.

Each recognition tape contained a total of six errors.

The post experimental questions consisted of asking the participants two specific questions, one of which was, "How much did you think that the kids in the video were like you?" The choices of responses were: "a lot like me" (scored as 1), "kind of like me" (scored as 2) or "not at all like me" (scored as 3). As well, they were also asked; "How interesting did you think the videos that you watched were?" The choices of responses for this question were, "very interesting" (scored as 1), "kind of interesting" (scored as 2), or "not at all interesting" (scored as 3).

Results

Reliability Analyses. To calculate interrater reliability and intrarrater reliability, two methods were used. For interrater reliability, videotapes of three children were rated by raters who were blind to the participants' experimental groups. The raters' were certified Red Cross Water Safety instructors who were familiar with the Red Cross Water Safety Program's (1998) diving standards. Correlation analysis was done on the two raters' scores and interrater agreement was confirmed at 0.91. Thus, the recommendation made by Thomas and Nelson (1990) that correlation coefficients be greater than 0.8 between raters was easily met. To determine intrarater reliability, nine participants' dives (3 front, 3 stride and 3 kneeling) were re-evaluated six months following the end of the testing phase. The raters both replicated the initial diving performance scores that they had awarded 6 months earlier, 97.3% of the time. Again, this meets the standard recommended by Thomas and Nelson (1990).

Data Analysis for the Difference Scores. Difference scores were first calculated for the three dependent measures (self-efficacy, perceived task difficulty, physical performance measures). That is, the pre-test scores were subtracted from both the immediate-retention and the delayed-retention tests. The immediate-retention test produced one set of difference scores and the delayed-retention scores produced another set of difference scores. Three separate one way analysis of variances with Group as a between factor were conducted for each of the three measures. An alpha level of .05 was used to determine significance for all statistical tests.

Immediate-Retention Scores. No significant effects were found among the three experimental groups on any of the measures. The physical performance scores, however, did approach significance, $F(2, 29) = 3.0$, $p = 0.07$ (see Figure 1), with the peer mastery group showing the greatest improvement over the remaining two groups.

Delayed-Retention Scores. For perceived task difficulty, the coping model showed the best positive change, however, again there were no significant effects, $F(2, 29) = 2.13$, $p = 0.14$. For the self-efficacy measures, the delayed-retention scores did show significant differences among the experimental groups, $F(2, 29) = 3.9$, $p = 0.03$. Tukey post hoc testing revealed that the peer coping group's difference scores were greater than the mastery group's, but not different from the control group's. The control and mastery groups were also not different from each other. The diving performance difference scores also showed no significant effects on the delayed-retention test, however, the same trend as in the immediate-retention was apparent, where the peer mastery group performed the diving skills better than both the peer coping and the control group, $F(2, 29) = 1.3$, $p = 0.28$ (see Figure 2).

Effect Sizes. It is apparent when examining Figures 1 and 2 that there exist trends whereby the peer coping group shows the greatest increase in self-efficacy beliefs and associated decreases in task difficulty perceptions. The lack of statistical significance that was found between the experimental groups may be attributed to the small sample size and the large within-group variability on the scores in this study (Thomas, 1984). Various researchers have posited that when traditional significance tests do not show an effect, that practical significance should be determined by computing the effect sizes (ES) (Prentice & Miller, 1992; Thomas, Salazar & Landers, 1991). Thus, between group ES were calculated for the difference scores of all three measures, self-efficacy, task difficulty and diving performance for each of the three experimental groups. The effect sizes between each experimental group were computed using the following three formulae; ES = (coping - control)/ SD control, ES = (mastery - control)/ SD control and ES = (coping - mastery)/SD control. Using the guidelines indicated by Thomas et al. (1991) an ES of 0.41 was considered small, a moderate ES was between 0.41 and 0.69, and a large ES was larger than 0.7. The between group effect sizes are presented in Table 2.

Based on the effect sizes, practical significance levels can be noted and, more importantly, it is apparent that the group that yields the greatest difference scores varies depending on the measure used. For physical performance, the group that observed the peer mastery model was better than both the peer coping and the control groups at increasing the children's diving performance in both the immediate and the delayed-retention tests.

For perceptions of task difficulty, the effect sizes show that the participants in the peer coping model group decreased their perceptions of task difficulty more than the control group and the mastery group in the immediate-retention test. For the delayed retention test, however, task difficulty perceptions for the peer coping groups decreased more than the control group, but not more than the peer mastery group.

In both the immediate-retention and the delayed-retention tests, the self-efficacy effect sizes show that the children in the peer coping model group increased their self-efficacy beliefs towards diving more than the peer mastery model group, however, they were not better than the control group. In sum, the mastery model effected more change for the physical performance measure, whereas, the coping model revealed greater positive changes for the psychological response measures.

Recognition Scores. The percent correct for dives that the participants identified as being perfect and the scores awarded for error detection were submitted to separate one way ANOVAs. No differences were found across all three experimental groups. Regardless of the participants' experimental group the participants were correct 75% of the time when asked to judge whether a dive was either perfect or performed with an error. For the explanation that the participants gave when they indicated that a dive did have an error, the peer coping group was correct at stating the errors in the dives 25% of the time, while the peer mastery and the control group were correct only13% of the time. These differences, however, did not reach significance.

Post Experimental Questions. For the first post-experimental question that asked how interesting the children found the videos, the participants' responses did not differ among the three experimental groups. The peer coping (M = 2.1, SD = .7), peer mastery (M = 2.2, SD = .6) and control group (M = 2.2, SD = .8) responses basically indicated that the video was "kind of interesting". Similarly, the question used to determine how similar the participants' perceived the children in the videos again showed no differences amongst the groups (peer coping, M = 1.9, SD = .7; peer mastery, M = 2.0, SD = 0; and control group, M = 1.6, SD = .5).

Discussion

The purpose of this study was to examine the effects of peer mastery and peer coping models on children's self-efficacy beliefs, task difficulty perceptions and diving performance. The current study extended that of Weiss et al. (1998) by introducing a more difficult skill, a larger sample size, limiting other observational learning experiences, and increasing the differences between the peer coping model and the peer mastery model. Although, traditional significance tests showed limited results, clear trends were evident, leading us to test the practical significance of the results through effect size calculations. Effect sizes were deemed appropriate because of the small numbers in each group, as well as the large variance for each group. As such, the discussion will be based mainly on those comparisons that showed large effect sizes.

Self-Efficacy. The results partially support the hypothesis set forth for the self-efficacy measures, as the coping model was superior to both the mastery and the control group, but only on the delayed-retention test. This suggests that a coping model may be the superior form of model to use in order to increase children's feelings of self-efficacy. That the effects were more apparent during the delayed-retention test can be likened to other motor learning research that argues that performance tests may be contaminated by factors that are transient (e.g., Magill, 1993). It could be claimed, for example, that the immediate-retention test, even though there was a 20 min. delay, was still contaminated by transient factors related to their experiences in the acquisition phase of practicing the diving skills, such as receiving feedback etc.. Given this, the self-efficacy scores from the delayed-retention test, may be more valid, because if any transient factors were involved, they had the chance to dissipate by this point in time. With this in mind, it is noted that research on self-efficacy often employ immediate tests (e.g., George et al., 1992; Gould & Weiss, 1981), and thus it is recommended that longer delay intervals between an intervention and testing be implemented to ascertain longer term effects.

Why does a coping model lead to greater positive self-efficacy change? Researchers typically argue that this occurs because of the model similarity issue (McCullagh and Weiss, 2001). In our study, however, no differences were found between the two modeling groups in terms of the post experimental questions that queried the children on how similar they found the coping and the mastery models. Therefore, at this level, little support was given for this argument. Thus, another mechanism may be at work to explain this finding. We do acknowledge, however, that the information gained through the similarity measure was limited. It may be advantageous to have more specific similarity questions posed and to allow the children to elaborate on exactly why or why not they found the models to be similar to them. This would help to extract the model characteristics that learners look for when determining their perceived similarity to the model. Given this, future research should include similarity measures with greater response choice and more opportunity for elaboration.

Task Difficulty. As mentioned earlier, the delayed-retention test may be considered to be a more accurate representation of learning than the immediate-retention test. Consequently, the delayed-retention scores will be of concern here for our interpretations of how the intervention impacted the participants' perceptions of task difficulty. The large effect size between the coping and the control group on this test confirmed that observing a peer coping model was more effective at reducing perceptions of task difficulty than no model. The peer coping model, however, was not better than the mastery group at decreasing the participants' perceptions of task difficulty. Figure 2 shows that both of the peer models were better than the control group at decreasing perceptions of task difficulty, replicating much other research that has shown that any type of model is more effective than no model at all (e.g., Weiss et al. 1998) and supporting Bandura's theory. That no differences were seen between the two modeling groups, however, fails to support Schunk's propositions.

Physical Performance. For both the immediate and delayed tests, the mastery model group showed greater improvements in diving performance than both the coping model and the control groups. This finding is contrary to our initial hypothesis that argued that the peer coping group would show greater changes in their diving performance than both the peer mastery model and the control group. There exists two possible explanations for why this occurred.

The first explanation relates to one of Schunk's (1987) criteria for the effectiveness of a coping model. Specifically, Schunk argued that the coping model would work best in a therapeutic setting when the learner is afraid or hesitant about learning the new skill and perceives the new skill as being difficult. Although the participants had low feelings of self-efficacy towards diving and perceived the task as difficult, they did not appear overly hesitant about performing the diving tasks. Thus, perhaps there was a lack of hesitancy or fearfulness on behalf of the participants to gain the full benefits of the peer coping model. This argument may also be used to explain the perceptions of task difficulty findings.

The second explanation is derived from past experiments comparing correct versus learning models. These experiments have produced conflicting results and the reason may involve the use of feedback for these two model types. In research wherein the learning model has yielded superior results, the correct model group typically has not heard feedback related to the performance of the skill (e.g., McCullagh & Caird, 1990). When feedback has been provided to the correct model group, however, similar performance benefits resulted (McCullagh & Meyer, 1997). Thus, similar feedback being provided to both the learning and correct models may have an impact, such as to eliminate the advantages gained by the feedback provided to the learning model.

This feedback issue may have also been a factor in the current investigation as feedback was provided in both modeling conditions. For instance, the instructor would say on the coping model videotape "Good job, but next time make sure that you keep your legs straight when you dive in". Similarly, on the mastery model videotape, the instuctor would say "Good job keeping your legs straight when you dive." According to Adams (1986) receiving the model's feedback and corrections are very important information for the observer because it allows the observer to cognitively process the demands that are involved in performing the task. Thus, an advantage for the mastery group may have been gained as they received both the feedback information and viewed the dive being performed correctly, possibly developing the cognitive representation better than the peer coping models.

Recognition Performance. The first section of the recognition performance test showed that the three experimental groups were similar in their ability and quite efficient at determining whether a dive had been performed perfectly or with errors. Thus, physical practice alone was sufficient for the control group to enable the development of a cognitive representation of the diving skill that led to selection of perfect versus error dives. Despite this recognition performance level for this part of the test, when participants were asked to elaborate on errors that had been detected on the videotape, all groups did poorly. These results are intriguing because the peer mastery's physical performance improvement was better than both the coping and control groups, yet on this more declarative test, they do not outperform the other two groups. Taken together, the results suggest that the better physical performance did not transfer into the error detection capabilities tested in the recognition test.

Elaborated Discussion. Overall, the results of this experiment indicate that a peer mastery model is a better model for improving physical skill performance, whereas, the peer coping model is best for improving the psychological responses of self-efficacy and perceived task difficulty involved in skill acquisition. These findings lead us to propose that an observer can access different types of information from different types of models on various psychological and physical aspects of skill acquisition. Perhaps, observing a mastery model provides more information to the learner about how to physically do the skill correctly, whereas observing a coping model is best at increasing the learner's feelings of self-efficacy.

These findings appear to be contrary to the type of relationship that has been suggested between self-efficacy and observational learning in the literature. The common conception states that increased self-efficacy beliefs towards skill performance are positively related to improved skill acquisition (Bandura, 1997). Our study does not support this relationship; the group that showed the best skill acquisition did not show the greatest increases in self-efficacy. Why is this the case? One possibility is that this experiment did not provide a sufficient time period for this relationship to develop and that more longitudinal research, spanning a longer time interval than what was provided here, is needed.

Another possibility relates to the preceding argument that varied information is accessed with different models. For instance, the children viewing the peer coping model were viewing someone who was initially not very competent at diving but started to give more positive psychological responses. The children may have, thus, been able to increase their feelings of self-efficacy and decrease their perceptions of task difficulty towards diving by being able to relate to similar poor performance patterns that were nonetheless associated with a positive attitude. The children viewing the mastery model, however, were watching a child who always performed the skill perfectly, and they may have felt that they would never be able to perform the skill as well as the model, therefore, the psychological reinforcement was not available, but the information about how to do the skill correctly was.

Given the different benefits yielded from the two types of models, perhaps the most effective use of coping and mastery models is to employ a combination of the two model types. A peer mastery model could be introduced to provide information on how to physically perform the skill correctly, and a coping model to provide the learners with the opportunity to raise their self-efficacy beliefs and decrease their perceptions of task difficulty. Examining exactly how to introduce this combination issue would be a useful research question. A greater understanding of how to improve these psychological responses to skill performance is essential to ensure that children are enjoying their sport experience and are encouraged to continue with activities, even when they find them challenging.

It is important to note, that our discussion has been supported mainly through effect size comparisons. We do recognize the limits of the small sample size, as well as the short acquisition phase, and admit that this likely had an impact on the experiment. Future research should attempt to seek out a larger sample size, incorporate a longer acquisition phase, along with experimental measures that may serve to distinguish children's responses more effectively.

In sum, the current investigation leads to the supposition that the mediating mechanisms effecting changes in self-efficacy and task difficulty may be different than those that would effect changes in the physical performance on the part of the learner. Gaining a better understanding of both these influences is important if we wish to effectively utilize modeling for the learning of challenging motor skills. The practical implications of this experiment is that physical educators and coaches may need to think about what type of information they would like their students to gain from a model before choosing one model type over another.

References

Adams, J. (1986). Use of the model's knowledge of results to increase the observers performance. Journal of Human Movement Studies, 12, 89-98.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood cliffs, NJ: Prentice Hall.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: W.H. Freeman.

Carroll, W., & Bandura, A. (1990). Representational guidance of action production in observational learning: A causal analysis. Journal of Motor Behavior, 22(1), 85-97.

Deakin, J. M., & Proteau, L. (2000). The role of scheduling in learning through observation. Journal of Motor Behavior, 32(3) , 268-276.

Feltz, D., & Chase, M. (1998). The measurement of self-efficacy and confidence in sport. In J. L. Duda (Ed.). Advances in sport and exercise psychology measurement (pp. 65-101). Morgantown, WV: Fitness Information Technology, Inc.

George, T., Feltz, D., & Chase, M. (1992). Effects of model similarity on self-efficacy and muscular endurance: A second look. Journal of Sport and Exercise Psychology, 14, 237-248.

Gould, D., & Weiss, M. (1981). The effects of model similarity and model task on self-efficacy and muscular endurance. Journal of Sport Psychology, 3, 17-29.

Hebert, E. P., & Landin, D. (1994). Effects of a learning model and augmented feedback in tennis skill acquisition. Research Quarterly for Exercise and Sport, 65, 250-257.

Landers, D., & Landers, D. (1973). Teacher versus peer models: Effects of model's presence and performance level on motor behavior. Journal of Motor Behavior, 5(3), 129-139.

Lewis, S. (1974). A comparison of behavior therapy techniques in the reduction of fearful avoidance behavior. Journal of Behavior Therapy, 5, 648-655.

Magill, R. A. (1993). Motor learning: Concepts and applications. (4th ed.). Madison, Wisconsin: Brown and Benchmark.

McCullagh, P. (1987). Model similarity effects on motor performance. Journal of Sport Psychology, 9, 249-260.

McCullagh, P. & Caird, J. K. (1990). Correct and learning models and the use of model knowledge of results in the acquisition and retention of a motor skill. Journal of Human Movement, 18, 107-116.

McCullagh, P. & Meyer, K. N. (1997). Learning versus correct models: Influence of model type on the learning of a free-weight squat lift. Research Quarterly for Exercise and Sport, 68, 56-61.

McCullagh, P. & Weiss, M. R. (2001). Modeling: Considerations for motor skill performance and psychological responses. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.). Handbook of research on sport psychology. New York: Wiley.

McCullagh, P., Weiss, M. R., & Ross, D. (1989). Modeling consideration in motor skill acquisition and performance: An integrated approach. In K. B. Pandolf (Ed.). Exercise and sport science reviews (pp. 475-513). Baltimore: Williams & Wilkins.

Meany, K. S. (1994). Developmental modeling effects on the acquisition, retention, and transfer of a novel motor skill. Research Quarterly for Exercise and Sport, 65, 31-39.

Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. Psychological Bulletin, 112, 160-164.

Schunk, D., & Hanson, A. (1985). Peer models: Influence on children's self-efficacy and achievement. Journal of Educational Psychology, 77, 313-322.

Schunk, D. (1987). Peer models and children's behavioral change. Review of Educational Research, 57(2), 149-174.

Schuck, D., Hanson, A., & Cox, P. L. (1987). Peer-model attributes and children's achievement behaviors. Journal of Educational Psychology, 79(1), 54-61.

Shea, C., Wright, D. L., Wulf, G., & Whitacre, C. (2000). Physical and observational practice afford unique learning opportunities. Journal of Motor Behavior, 32(1), 27-36.

Thomas, J. R. (1984). Planning "kiddie" research: Little "kids" but big problems. In J. R. Thomas (Ed.), Motor development during childhood and adolescence (pp. 260-273). Minneapolis: Burgess.

Thomas, J. R., & Nelson, J. K. (1990). Research methods in physical activity. (2nd ed.). Champaign, IL.: Human Kinetics.

Thomas, J. R., Salazar, W., & Landers, D. M. (1991). What is missing in p < .05? Effect size. Research Quarterly for Exercise ans Sport, 62, 344-348.

Weiss, M., Ebbeck, V., & Wiese-Bjornstal, D. (1993). Development and psychological factors related to children's observational learning of physical skills. Pediatric Exercise Science, 5, 301-317.

Weiss, M., McCullagh, P., Smith, A., & Berlant, A. (1998). Observational learning and the fearful child: Influence of peer models on swimming skill performance and psychological responses. Research Quarterly for Exercise and Sport, 69(3), 380-394.

Author Note

Shannon Clark is a graduate student in the School of Human Kinetics, University of Ottawa. Diane M. Ste-Marie is an Associate Professor in the School of Human Kinetics, University of Ottawa. The first author completed this experiment in partial fulfillment of her Masters of Arts degree and wishes to thank the Ontario government for their support through an Ontario Graduate Scholarship. Support from a SSHRC grant to the second author is also acknowledged. We gratefully acknowledge the assistance of the Gee-Gee's Summer Camp Director, Michel Drapeau, for his help with participant recruitment. In addition, we thank Amy Latimer and Leanne Findlay for their help with the data collection.

Address for correspondence: Diane M. Ste-Marie, 125 University Avenue, School of Human Kinetics, University of Ottawa, ON, K1N 6N5, CANADA. dstmarie@uottawa.ca

Table 1

Peer Mastery and Peer Coping Model Verbalizations.

Model Type	Progression	Model	Verbalizations
Coping Model	Cannot do	Girl	"I don't think that I can dive "I am not very good at diving"
		Boy	"Diving is difficult for me" "I don't like diving"
	Coping	Girl	"I think that I am getting better at diving" "I will have to work hard to learn how to dive"
		Boy	"Diving isn't that hard" "I'll try my best to dive"
Mastery Model	Exemplary	Girl	"I think that I can dive" "I am good at diving"
		Boy	"I think that diving is easy" "I like diving"
	Exemplary	Girl	"Diving is not a problem" "I'm am pretty good at diving"
		Boy	"Diving is easy" "Diving is fun"

Table 2

Effect sizes for the immediate- and delayed-retention tests for self-efficacy, task difficulty and diving performance.

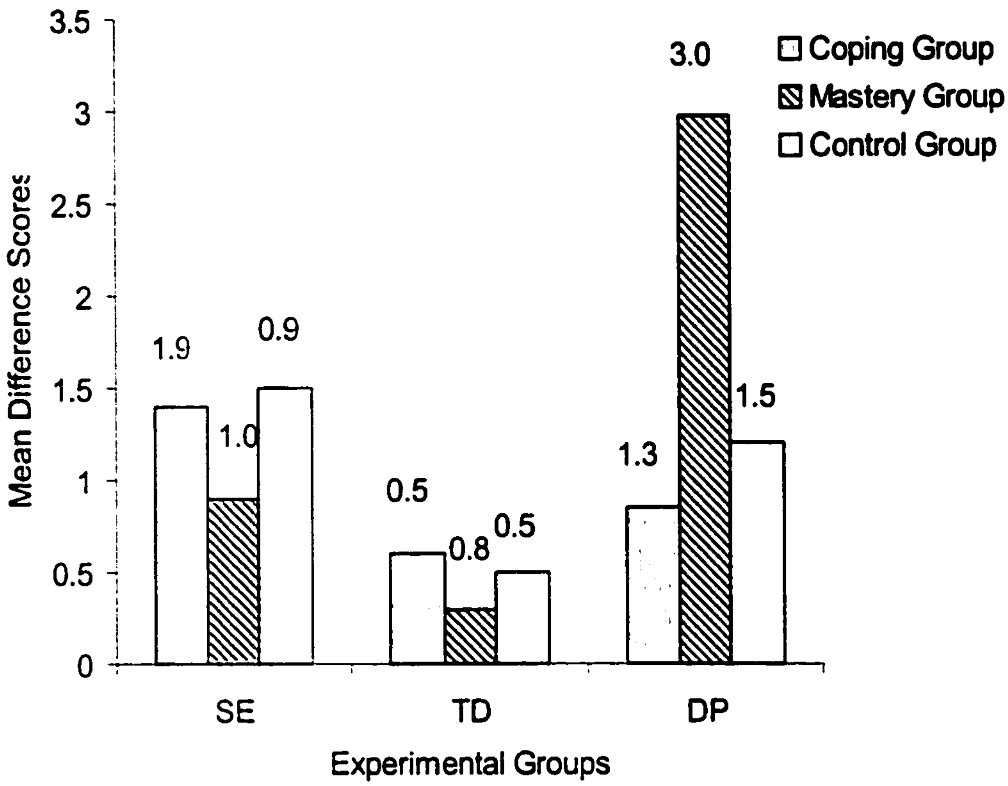
Model Type/ Experimental Group	Control vs Coping	Control vs Mastery	Mastery vs Coping
Self-efficacy- Immediate retention	.1	-.8	.7[a]
Self-efficacy- Delayed retention	.6	-1.2	1.7[a*]
Task Difficulty- Immediate retention	.9[a]	-.8	.7[a]
Task Difficulty- Delayed retention	1.1[a]	.5	.6
Diving Performance- Immediate retention	-.2	1.2[a]	1.4[a]
Diving Performance- Delayed retention	.3	1.0[a]	.7[a]

Note. [a] superscript indicates large effect sizes, [*] indicates statistical significance from ANOVA analysis.

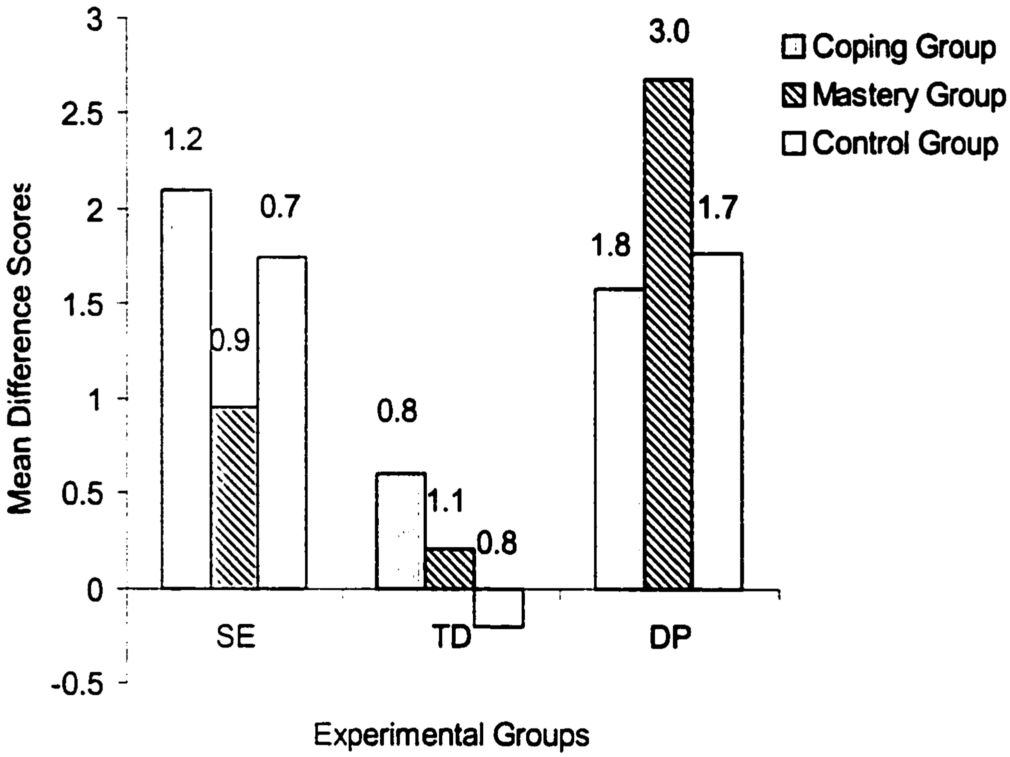
Figure Captions

Figure 1. Self-efficacy (SE), task difficulty (TD) and diving performance (DP) difference scores for the immediate-retention test.

Figure 2. Self-efficacy (SE), task difficulty (TD) and diving performance (DP) difference scores for the delayed-retention test.



Note. The standard deviation is indicated above each bar.



Note.

The standard deviation is indicated above each bar.

Appendix A

Diving Standards for the Kneeling Dive, Stride Dive and Front Dive

Dive	Components
Kneeling	Extends hands and arms above head
	Arms around ears
	Hands together
	Chin to chest
	Enters with arms first
	Then head
	Then body
	Then feet
	Keeps hands and arms above head throughout the dive path
	Legs together
Stride	One leg is lifted off the ground
	Extends hands and arms above head
	Arms around ears
	Hands together
	Chin to chest
	Enters with arms first
	Then head
	Then body
	Then feet
	Keeps hands and arms above head throughout the dive path
	Legs together
Front	Launches from both legs
	Arms around ears
	Hands together
	Chin to chest
	Enters just below the surface
	Streamlined entry
	Enters the water with arms first
	Then head
	Then body
	Then feet
	Keeps arms and hands extended in front of head
	Legs together
	Legs together

Note. Adapted from the Canadian Red Cross Water Safety Program (1998)

Chapter II

Elaborated Discussion

Elaborated Discussion

The next section contains results and discussion that were not included in the article. This section contains information on correlation analyses that were performed to compare the results of the two psychological measures. In addition other pertinent information that occurred during the data collection will be discussed. Finally, suggestions for further research will be highlighted.

Elaborated Discussion

A question that emerged after the completion of the study, was whether or not the two psychological variables of self-efficacy and task difficulty that were measured in this experiment were actually measuring separate psychological dimensions. The pre-test, immediate-retention and delayed-retention self-efficacy and task difficulty scores were submitted to a pearson correlation analysis and the results indicated, that for each of the three testing periods, the two psychological dimensions were not correlated (see Table 1). This ensures that the children were able to distinguish between the two psychological measures, and that these measures were able to extract different psychological information from the children. It is then suggested that the self-efficacy and task difficulty measures are accurately targeting changes in the learners' self-efficacy beliefs and perceptions of task difficulty. The self-efficacy changes provided information about the direction and the extent that the three experimental groups' feelings of competency towards diving were modified. Whereas, the changes seen in the participant's task difficulty perceptions provided an indication of how the level of difficulty they attributed to the diving skill had been modified after intervention.

There are several possible psychological responses to consider measuring when conducting an experiment on the influence of observational learning on psychological dimensions. This experiment chose to concentrate on self-efficacy beliefs and task difficulty perceptions, however, there are several other psychological dimensions that would provide useful information. Some of these additional psychological responses that merit consideration in future research will be discussed in the following section.

This experiment investigated task difficulty instead of fearfulness, because as it was seen in Weiss, McCullagh, Smith and Berlant's (1998) experiment, fearfulness can be a difficult and is a more extreme measure to evaluate. Yet, after completion of the present experiment, it was felt that if an accurate measure of fearfulness was available it would have been a very useful psychological response. This psychological dimension, may be best incorporated into experiments examining adults, as children in general tend to find very few tasks truly fearful (Schunk, 1987). Other similar psychological responses are hesitancy and anxiety. These may also be useful to evaluate because it has been suggested by Schunk (1987) that peer coping and mastery models are better compared when the learners are hesitant or anxious about performing a skill. As well, observational learning studies with adults have included anxiety measurements (Starek & McCullagh, 1999), but this dimension has not been examined with children.

Finally, it is suggested that future research should consider measuring the learners' levels of motivation. Motivation is suggested because it is an integral part of the observational learning experience and may dictate how well a learner acquires a new skill (Bandura, 1977; 1986; 1997). The involvement of motivation in observational learning has been looked at in terms the influence of external incentives and self incentives on a learner's level of motivation (Bandura & Barab, 1973), as well, the influence of a learner's pre-existing motivational orientation on observational learning has been examined (Little & McCullagh, 1989). Motivation has been overlooked as a potential psychological dimension that is influenced by observational learning. Experiments that examine the impact of observational learning on the psychological responses to skill acquisition commonly measure self-efficacy beliefs and anxiety, without including motivation measurements. This is interesting because motivation has been noted as one of the psychological dimensions that can be enhanced by observing a model (Weiss, Ebbeck, Wiese-Bjornstal, 1993). It would seem, then, that certain model characteristics, such as model similarity and model skill level, could influence a learner's level of motivation towards learning a new skill. This may occur because the more similar a learner perceives the model, the more likely it is that they will want to learn the skill and, therefore, direct more attention towards the demonstration. Since a learner's level of motivation has an impact on the processes necessary for effective observational learning, it would seem that the higher a learner's level of motivation towards skill acquisition would correspond positively with high performance results. Future research may be interested in introducing a measure to evaluate this relationship between motivation and physical performance. As well, introducing motivation as one of the psychological dimensions that are influenced by observational learning could provide insight into what model characteristics have the greatest influence on a learner's level of motivation.

As with many studies, the present one has provided more insight into how to improve upon the measurement instruments that were used. It is felt that improvements could be made to both the task difficulty and the perceived similarity measures. It is suggested that it would be more useful for future research to incorporate measures that delve more deeply into why the participants are giving the responses that they are. For example, the measure used for measuring task difficulty may not have been specific enough for the children. The measure used in this study consisted of one question asking: "How hard to you think doing the (front, stride or kneeling) dive is?" The children were asked to give a response of "very hard," "kind of hard" or "easy." This question may have been too vague as the researcher noticed that the children generally just picked the response "kind of hard" because it was in the middle, even though they may have been leaning more towards finding the skill "very hard" or "easy." A more effective measure of task difficulty would consist of a greater range in the possible responses from which the children could choose. This may result in a greater distinction between the coping model and the mastery model groups in terms of task difficulty perceptions. The same suggestion is forwarded for the similarity question, which was trying to discover how similar the learner's perceived the models. Again, future research would want to ask the children to elaborate on exactly what model characteristics they found dissimilar or similar, instead of simply asking how similar they found the models. From this information it would be easier to determine exactly what model characteristics children focus on when making similarity judgements.

Some interesting points were noticed by the researcher at the completion of the data collection period. Throughout the study the children frequently asked the researcher if and when they would be able to watch the videotape of themselves and their peers diving. Since this was not part of the research protocol, this was not permitted. Following the experiment, the children were given the opportunity to watch on videotape, their own performances, as well as the other children's performances of the diving skills. Two interesting points arose as a function of the events that consistently occurred after the testing had taken place. The first point involves the notion that peer models may be most effective when the children know the model and recognize the model as being similar to them. The results of the current study did not show any differences in similarity responses among the three experimental groups. Perhaps, for a child to truly find a model similar they need to have more information about the model. For example, the researcher noticed that after the completion of the study the children enjoyed viewing the videos of the other kids that had come to the pool at the same time as them. They watched very carefully as their peers appeared on video and commented intelligently on their peers' diving skills. It is possible that having a peer model that the children recognize as "one of them" would be even more motivating, as they would consider them more similar. Perhaps, future experiments should consider introducing models that are known to the children or simply provide the learners with more background information about the models. An application for this in the instructional setting would be to have a child from the class, who is also learning, demonstrate the skill.

The second point that emerged after the completion of the study as a function of the children wanting to watch their own performances, is the idea of self-modeling. Self-modeling is defined as "the behavioral change that results from the repeated observation of oneself on videotapes that show only desired target behavior" (Dowrick & Dove, 1980). In an experiment by Starek and McCullagh (1999), they compared the impact of self-modeling and peer modeling on the acquisition of swimming skills, self-efficacy beliefs and state anxiety with adults. The participants viewed either a peer model performing the skills correctly or a video of themselves performing the skills correctly. The results of their study indicated that the self-modeling group demonstrated better swimming performance than the peer modeling group, but there were no differences between the groups on the self-efficacy and anxiety measures. It was suggested that this occurred because of the greater level of motivation and attention that the participants in the self-modeling group exhibited.

Starek and McCullagh's (1999) results correspond with the results of the current experiment because our peer mastery group had the greatest performance improvement but it was the peer coping group that had the higher self-efficacy increases. Again, showing a relationship between self-efficacy and performance that was not reciprocal, thus, further supporting the idea that different model characteristics may be conveying different information to the learners. The events occurring after the completion of the current experiment have also shown some support for this increased attention and motivation that results from viewing one self on videotape.

For instance, when the children were permitted to view their peer's diving skills they were not only interested in watching their peers dive, they also wanted to view themselves perform the diving skills. The children watched themselves carefully and commented critically on their performances. It is obvious that in this situation, the children's attention was being focused very intently on the demonstration, which would enhance the amount of information that they are able to gain from the model, which in turn would benefit skill acquisition. Although, this particular situation is different from self-modeling, as both desirable and undesirable skill attempts were shown, it is still interesting to note that the attention and motivation processes of the children seemed to be enhanced by viewing themselves learning the diving skills, providing direction for future research. In fact, Starek and McCullagh (1999) have suggested that it would be interesting to make a comparison between peer coping models, peer peer mastery models and self-modeling.

Most of the literature on self-efficacy and performance indicate that they are dependent on one another. For example, Bandura (1997) has stated that although self-efficacy is independent of one's actual performance, as it has to do with one's feeling competency toward a skill, these feelings can be highly related to one's actual physical capability in performing the skill. Research comparing self-efficacy and cognitive performance has shown support for this. Schunk and Hanson's (1989) experiment showed that skill improvement was directly related to increases in self-efficacy beliefs. Our results, however, in addition to those of Starek & McCullagh (1999) show that this may not always be the case, as the participants in both these experiments did not have related increases in skill performance and self-efficacy beliefs. A pearson correlation analysis was performed on the current investigation's self-efficacy and performance scores and confirmed that these two measures were not related (see Table 2).

The fact that there was no relationship between self-efficacy and performance could be attributed to this experiment's short acquisition phase. Due to the fact that many of the children in the current study did not yet know how to dive at the end of the acquisition phase, a longer acquisition phase would have been beneficial. Diving can be a very challenging skill to learn and the swimming instructor felt that one or two more intervention session would have ensured adequate model exposure and learning time. Perhaps, the relationship between self-efficacy and performance does not develop until a later time.

One of the points made in the article discussion was that introducing a combination of both a peer mastery and a peer coping model may have greater impacts on enhancing skill acquisition. This was suggested because of the peer mastery group's greater diving performance improvements and peer coping group's greater improvement on the psychological measures of self-efficacy and task difficulty. A combination of a peer mastery model and a peer coping model could be designed in such a way that each model type alternately gives a demonstration of the skill. This may enhance both skill acquisition and psychological responses simultaneously. It would be fruitful to compare a peer mastery/peer coping model combination with a peer mastery only model and a peer coping only model.

Table 1

Correlations (r values) Between Self-efficacy Scores and Task Difficulty Scores

Psychological measures	Pre-test	Immediate-retention test	Delayed-retention test
Task difficulty and self-efficacy	.25	-.06	.08

Table 2

Correlations (r values) Between Self-efficacy Scores and Physical Performance Scores

Measures	Immediate-retention test	Delayed-retention test
Self-efficacy and diving performance	.17	.1

References Not Included in the Article

Brody, G., & Stoneman, Z. (1985). Peer imitation: An examination of status competence hypothesis. Journal of Genetic Psychology, 14(6), 161-170.

Bandura, A., & Barab, P. G. (1973). Processes governing disinhibitory effects through symbolic modeling. Journal of Abnormal Psychology, 81(1), 1-9.

Carroll, W., & Bandura, A. (1985). Role of timing of visual monitoring and motor rehearsal in observational learning of action patterns. Journal of Motor Behavior, 17(3), 269-281.

Davidson, E., & Smith, W. (1982). Imitation, social comparison, and self-reward. Child Development, 53, 928-932.

Dowrick, R. W., & Dove, C. (1980). The use of self-modeling to improve the swimming performance of spina bifida children. Journal of Applied Behavior Analysis, 13, 51-56.

France-Kaatrude, A., & Smith, W. (1985). Social comparison, task motivation, and the development of self-evaluative standards in children. Developmental Psychology, 69, 1080-1089.

Kornhaber, R., & Schroeder, H. (1975). Importance of model similarity on extinction of avoidance behaviour in children. Journal of Consulting and Clinical Psychology, 43, 601-607.

Lee, T., & White, M. (1990). Influence of an unskilled model's practice schedule on observational motor learning. Human Movement Science, 9, 349-367.

Lirgg, C., & Feltz, D. (1991). Teacher versus peer models revisited: Effects on motor performance and self-efficacy. Research Quarterly for Exercise and Sport, 62(2), 217-224.

Little, W. S., & McCullagh, P. (1989). Motivational orientation and instructional strategies: The effects on form and accuracy. Journal of Sport & Exercise Psychology, 11,41-53.

Maddox, J.E. (1995). Self-efficacy theory: An introduction. In Maddox, J.E. (Ed.) Self-efficacy and adjustment. Plenum Press: New York.

McCullagh, P., Stiehl, J., & Weiss, M. (1990). Developmental modeling effects on quantitative and qualitative aspects of motor performance. Research Quarterly for Exercise and Sport, 61(4), 344-350.

Schunk, D. H., & Hanson, A. R. (1989). Self-modelling and children's cognitive skill learning. Journal of Educational Psychology, 81, 155-63.

Spielberger, C.D. (1972). Anxiety as an emotional state. In C.D. Spielberger (Ed.). Anxiety: Current trends in theory and research. New York: Academic Press.

Starek, J., & McCullagh, P. (1999). The effect of self-modeling on the performance of beginning swimmers. The Sport Psychologist, 13, 269-287.

Weiss, M. (1983). Modeling and motor performance: A developmental perspective. Research Quarterly for Exercise and Sport, 54(2), 190-197.

Weise-Bjornstal, D., & Weiss, M. (1992). Modeling effects on children's form kinematics performance outcome and cognitive recognition of a sport skill: An integrated perspective. Research Quarterly for Exercise and Sport 63(1), 67-75.

Appendix A

Contribution of Collaborators

Contributions of Collaborators

Dr. Diane Ste-Marie suggested articles to review for the purpose of developing a research question for my master's thesis. After reading an article entitled Observational learning and the fearful child: Influence of peer models on swimming skill performance and psychological responses (Weiss, McCullagh, Smith & Berlant, 1998), it was determined that for my thesis I would replicate and extend this experiment. The specific focus would be on improving upon the limitations Weiss et al. (1998) discovered in their experiment. The purpose and hypotheses were then determined with the help of Diane and the other members of the lab group. Diane and I met on several occasions to further solidify the purpose of the study, the methodology, and the proposed analyses. I then began writing the thesis proposal and submitted drafts to Diane who made comments, suggestions and revisions. After the completion of the thesis proposal, minor changes were made to the literature review upon the suggestions of Dr. Deakin and Dr. Trudel. The methodology and data analysis sections were also changed according to the comments made by Dr. Deakin and Dr. Trudel.

Upon the completion of the data collection period, Diane Ste-Marie advised me on the appropriate statistical analysis in order to answer the research questions. The data was then entered and analyzed. Diane then assisted me with the interpretation of the results. All documents of the thesis were read and edited by Diane. The conference preceding was submitted on October 15, 2000 and the process of writing the article and the elaborated discussion began in December 2000 and was completed in March 2001.

Appendix B

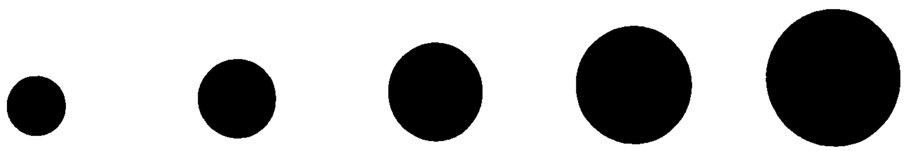
Self-Efficacy Measure

Self-Efficacy Measure (Chase, 1998).

The following was read to the children and their response was circled.

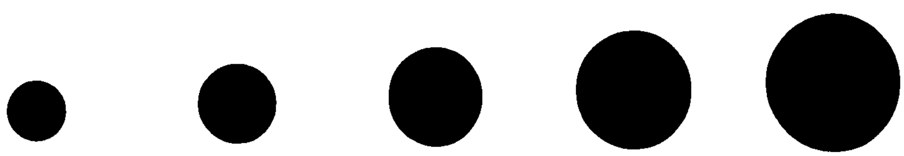
I want you to think about how you feel about being able to do a kneeling dive, and then point to the circle that best describes how you feel about being able to do a kneeling dive.

Don't feel very good		Feel okay		Feel very good
1	2	3	4	5



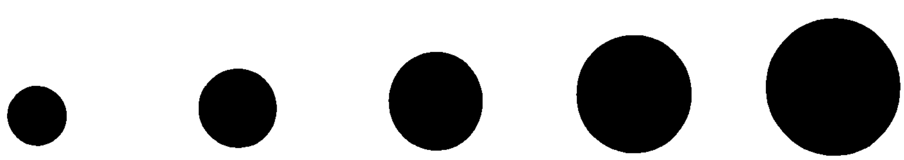
I want you to think about how you feel about being able to do a stride dive, and then point to the circle that best describes how you feel about being able to do a stride dive.

Don't feel very good		Feel okay		Feel very good
1	2	3	4	5



I want you to think about how you feel about being able to do a front dive, and then point to the circle that best describes how you feel about being able to do a front dive.

Don't feel very good		Feel okay		Feel very good
1	2	3	4	5



Appendix C

Task Difficulty Measure

Task Difficulty Measure

The following was read to the children and their response was circled.

How hard do you think doing a kneeling dive is?

Very hard Kind of hard Easy

How hard do you think doing a stride dive is?

Very hard Kind of hard Easy

How difficult do you think doing a front dive is?

Very hard Kind of hard Easy

Appendix D

Information Sheet

INFORMATION SHEET

Hello, my name is Shannon Clark and I am conducting a study for my Master's thesis at the University of Ottawa, Faculty of Health Sciences, Department of Human Kinetics, under the supervision of Dr. Diane Ste-Marie. The purpose of this information package is to provide you with information about the study that I will be doing and to determine if you will allow your child to contribute to my study. The study requires the participation of children who do not yet know how to dive properly into a swimming pool, children in Aquaquest levels 2-7. Your child is being asked to participate in this study because they will be attending the Gee Gee's summer aquatic camp and the study will take place at the University of Ottawa swimming pool during their swimming lesson times. The study will take place over 4 days that your child attends the camp, and will require only 10 -20 minutes of your child's time, depending on the day. It will take place just before and on one day for a few minutes during their swimming lessons, and will not interfere with any other of the camp's activities.

The purpose of my research is to learn which type of demonstration is the most effective for teaching children motor skills that they find difficult and for which they feel that they may not be able to accomplish. It is anticipated that by determining which type of model is most effective for a learner to observe, it will be possible to enhance and improve the teaching of motor skills that children find difficult.

The benefit of participating in this study is that your child will receive individual instruction with a certified lifeguard and swimming instructor in diving skills and other swimming skills. Through this one on one instruction, it is possible that your child's diving and swimming skills will improve.

We are asking that you read the consent form provided and indicate whether or not you will allow your child to participate in this study, and then to have your child bring back these forms on the first day of camp, as we need to receive them by the Tuesday morning of your child's week at camp because the study requires 4 days of participation. **Please be advised that returning the consent form does not guarantee that your child will be needed to participate in the study.**

If you have any questions or require further information please refer to the names and numbers found on the consent form. Your time and cooperation are greatly appreciated.

Sincerely,

Shannon Clark
Graduate Student

Diane Ste-Marie, Ph.D.
Supervisor

LETTRE D' INFORMATION

Bonjour, je m'appelle Shannon Clark et je fais présentement une étude pour ma thèse de Maîtrise à l'Université d'Ottawa, Faculté des Sciences de la Santé, École des Sciences de l'Activité Physique, sous la direction de Diane Ste-Marie. Le but de ce document est de vous donnez de l'information sur mon étude et solliciter la participation de votre enfant. Cette étude à besoin de la participation d'enfants qui ne savent pas plonger adéquatement dans une piscine, particulièrement les enfants dans les niveaux AquaAventure 2 à 7. Votre enfant est invité à participer à cette étude lors de son séjour au camp d'été des Gee-Gees. L'étude consiste à quatre sessions d'enseignement, qui vont se passer durant quatre jours consecutifs du camp, et prendra un maximum de 10 à 20 minutes chaque jour. L'étude se passe juste avant et une fois pour quelques minutes durant leur cours de natation.

Le but de cette recherche est de connaître quelle sorte de démonstration est la plus efficace pour enseigner à des enfants des activités physiques qu'ils/elles trouvent difficiles. En déterminant quel type de modèle est le plus efficace pour établir la compétence à plonger, il sera possible d'améliorer les activités que les jeunes trouvent parfois trop difficiles.

En participant à ce programme votre enfant recevra une attention individuelle, ce qui lui permettra de mieux développer ses talents et habilités en natation et en plongeon.

Nous vous demandons de lire attentivement le formulaire de consentement et indiquer si vous acceptez que votre enfant participe à ce projet. S'il vous plaît remettre le formulaire à votre enfant et ensuite il/elle peut l'amener à la première journée de camp. Il est nécessaire de les recevoir avant mardi matin de la semaine où votre enfant sera au camp, car cette étude nécessite quatre jours de participation. **S'il vous plaît noter que retourner le formulaire de consentement n'assure pas que votre enfant participera à l'étude.**

Si vous avez des questions ou avez besoin de renseignements additionnels, veuillez contacter une des personnes dont le nom apparaît sur le formulaire de consentement.

Votre temps et votre coopération sont vraiment appréciés.

Sincèrement,

Shannon Clark
Étudiante de la deuxième siècle

Diane Ste-Marie
Superviseur

Appendix E

Parental Consent Form

CONSENT FORM

This research is being conducted by the following persons. If for any reason you would like to contact one of us, the following information should provide you with the means to do so:

Dr. Diane Ste-Marie
Associate Professor
School of Human Kinetics
University of Ottawa
Phone Number: 562-5800 ext. 4255
dstmarie@uottawa.ca

Shannon Clark
Graduate Student
School of Human Kinetics
University of Ottawa
Phone number: 562-5800 ext. 4248
shanclark@hotmail.com

Whenever a research project involves humans, the written consent of the research subjects must be obtained. This does not imply that the project necessarily involves a risk. In view of the respect owed to the research subjects, the University of Ottawa and the research funding agencies have made this type of agreement mandatory.

I understand that my child's participation will consist essentially of attending an introductory session in which he/she will receive a demonstration of three diving skills (the kneeling dive, the stride dive and the front dive) and then will be asked to perform the skills to the best of their ability. If it is determined that my child cannot do at least one of the three diving skills he/she will be asked to participate in stage 2 of the study. If not then he/she will not be required to participate in the remainder of the study. Stage 2 will consist of four additional one on one teaching sessions each lasting approximately 10-20 minutes, during which my child will be asked to observe a two to three minute video consisting of either peer models doing the diving skills or unrelated educational information. They will then receive a session of diving instruction with a certified lifeguard and swimming instructor. The sessions have been scheduled for the week that my child is registered in camp. My child will also be video taped on the first and last day, for the purpose of recording the improvements in his/her child's diving skills. I understand that the information gathered will be used only for the researcher's Master's thesis and any related publications. My child's confidentiality will be respected as the name of my child will not be printed on any of the data collection materials. In addition, any data that is published will only be in a group format.

I understand that since this activity deals with the performance of physical skills, there is a minimal potential for physical harm, as with the learning of many new motor skills. In diving the entry into the water may vary during the learning process and there is a small possibility of injury, such as a belly flop. I have received assurance from the researchers that every effort will be made to minimize these occurrences. A certified lifeguard by the Lifesaving Society and a certified Red Cross swimming instructor will always be present during all components of the study. To maximize safety and minimize injury the lifeguard/instructor will remain within arms reach of my child at all times and the diving will only take place in an area of the pool that is deep enough to dive. I know that the researcher is aware that my child may have feelings of anxiety when it comes to performing the diving skills, this will be minimized by having my child working one on one with the instructor. In addition, the instructor will provide encouraging statements to my child. The researcher will also ensure that my child is aware that he/she can stop at any time he/she wishes.

I understand that my child will be read a consent form and asked to sign it when he/she first arrives at the pool to ensure that he/she still wishes to participate in the study. My child will be reminded that they are free to withdraw from the project at any time and refuse to participate or refuse to answer questions without prejudice.

I have received assurance from the researchers that the information I will share will remain strictly confidential. Anonymity will be assured in the following manner: Only the graduate student, the professor, and associated research assistants will have access to the video tapes and the data collection sheets. As, well, no names will be placed on the data sheets.

I understand that the video taped recordings of the sessions will be kept for three years following the study and then destroyed.

Any information requests or complaints about the ethical conduct of the project may be addressed to the relevant University Research Ethics Board, The Health Sciences and Science Research Board of Ethics or by calling the Protocol Officer for Ethics in Research: Lise Frigault
Room 302, Tabaret Hall, 562-5800 ext. 1787.

You are encouraged to keep the top portion of this consent form and have your child return the bottom portion to his/her camp counsellor indicating whether or not you wish for your child to participate.

✂---

PLEASE RETURN ONLY THIS PORTION OF THE SLIP TO YOUR CHILD'S CAMP COUNSELLOR

I have discussed this study with my child and...

❑ I do **ALLOW** my child to participate in this study.

❑ I do **NOT ALLOW** my child to participate in this study.

Child's Name: ______________________________ Date of birth:_______________

Parent/Guardian signature: ____________________ Date: ______________________

FORMULAIRE DE CONSENTEMENT

Cette recherche est réalisée sous la responsabilité des personnes suivantes. Si vous désirez obtenir de l'information supplémentaire, vous pouvez contacter l'une ou l'autre de ces personnes aux adresses suivantes :

Dr. Diane Ste-Marie
Professeure Associée
École des Sciences de l'Activité Physique
L'Université d'Ottawa
Numéro de téléphone: 562-5800 ext. 4255
dstmarie@uottawa.ca

Shannon Clark
Étudiante de la deuxième siècle
École des Science de l'activité Physique
L'Université d'Ottawa
Numéro de téléphone: 562-5800 ext. 4248
shanclark@hotmail.com

Les recherches avec des sujets humains requièrent le consentement écrit des sujets de recherche. Cette exigence ne signifie pas que le projet dont il est question comporte nécessairement un risque. En raison du respect auquel ont droit les personnes qui participent à la recherche, l'Université d'Ottawa et les organismes de subvention de la recherche ont rendu obligatoire ce type d'accord.

Je comprends que la participation de mon enfant à ce projet de recherche consistera d'abord à des sessions d'observation d'un vidéo où il/elle regardera des démonstrations de trois mouvements de plongeon. Par la suite, il/elle devra démontrer ses capacités à plonger en exécutant les mouvements observés. Si mon enfant ne peut pas compléter au moins un des trois mouvements de plongeon, on va lui demander de participer à la deuxième étape de l'étude. Toutefois, si mon enfant parvient à réaliser plus d'un des trois mouvements de plongeon, il/elle ne participera pas à la deuxième étape de l'étude. La deuxième étape sera composée de quatre sessions d'enseignement d'une durée d'environ 10 à 20 minutes chacune. Lors de chaque session, mon enfant va observer un vidéo de 3 minutes où deux jeunes enfants démontrent des plongeons ou d'autres matériels éducatifs. Ensuite, il/elle recevra une période d'enseignement de plongeon de 12 minutes avec un sauveteur et une monitrice de natation qualifiée. Les sessions d'enseignement ont été planifiée pour avoir lieu durant la semaine de camp de l'Université d'Ottawa.

Je comprends que la chercheure va enregistrer les sessions d'enseignement de mon enfant sur magnétoscope dans le but de noter l'amélioration de ses capacités à plonger. Je comprends que les vidéos seront uniquement utilisés pour des fins de recherche et la confidentialité sera respectée en ne mentionnant pas le nom de mon enfant sur les matériaux produits. De plus, les renseignements recueillis qui serviront à la rédaction de la thèse de maîtrise de la chercheure regrouperont l'ensemble des enfants qui ont participés à l'étude.

Étant donné que la participation de mon enfant à cette recherche implique la performance d'activités physiques, il y a la possibilité qu'il/elle se blesse très légèrement, comme un «belly flop». Afin de minimiser ce risque de blessure, j'ai reçu l'assurance de la chercheure qu'une monitrice sera présente en tout temps lors des sessions d'enseignement et qu'elle restera toujours à proximité de mon enfant. De plus, étant donné que les activités de plongeon se feront dans l'eau profonde, il est aussi possible que l'enfant expérimente de léger malaise tel avoir peur de plonger. Afin de minimiser ce risque de malaise, j'ai reçu l'assurance de la chercheure que les sessions d'enseignement se feront toujours qu'avec un seul enfant à la fois. Ainsi, la monitrice sera en mesure d'être entièrement attentive à mon enfant afin de l'encadrer et de l'encourager. En aucun temps mon enfant sera laissé seul/e à lui/elle même sur le bord de la piscine.

Je comprends que quand mon enfant arrivera à la piscine, la chercheure lui demandera de lire le formulaire de consentement afin de s'assurer qu'il/elle veut vraiment participer à l'étude. Mon enfant est libre de se retirer de la recherche en tout temps, avant ou pendant les session d'enseignement, refuser d'y participer ou de répondre à des questions sans encourir de préjudice sous aucune forme.

J'ai l'assurance de la chercheure que l'information que je partagerai avec elle restera strictement confidentielle, seuls la chercheure, sa professeure et les assistantes de recherche auront accès aux vidéos et aux matériels produits. Les vidéos seront gardés pour une période de trois ans pour fin d'analyse et seront détruits par la suite. L'anonymat sera préservé en s'assurant que le nom de mon enfant ne sera pas mentionné sur les vidéos et les matériels produits.

Pour tout renseignement ou toute plainte concernant la conduite éthique du projet de recherche, je peux m'adresser au Comité d'éthique de la recherche en sciences de la santé et sciences, aux soins de la Responsable de la déontologie en recherche Mme Lise Frigault, Pavillon Tabaret, pièce 302, 562-5800 poste 1787.

S' il vous plaît garder cette partie du formulaire et retourner la partie en dessous.

✂---

S IL VOUS PLAÎT, RETOURNER LA PARTIE DE LA FEUILLE EN DESSOUS

S'il vous plaît, encerclez une des réponses suivantes :

(1) Mon enfant PEUT participer à cette étude

(2) Mon enfant NE PEUT PAS participer à cette etude

Signature du parent : ______________________ Date : ________________

Nom de l'enfant : ________________________ Date de naissance : ____________

Appendix F

Children's Consent Form

CHILDREN'S CONSENT FORM

If the child is unable to read, the following will be read to them.

A study is being done at the University of Ottawa and we need children around your age to participate in the study that involves learning how to dive. The study will take place at your summer camp in the swimming pool during your swimming lessons. The first day will begin with you watching someone do three different diving skills and then you will be asked to try and do the diving skills on your own. We will then ask you some questions about how you feel about the diving skills that you did. There is a chance that we will need you to come back to the pool 4 more times, for about 10 minutes each time.

As with the learning of any new sport, there is a small chance that you may get hurt. For example; you could enter the water in a way that might cause you to do a belly flop at first. The chance of getting hurt is very small because there will always be a swimming teacher working one on one with you and giving you lots of help. There is also the chance that, since you may find diving hard, you may be a little bit nervous to try diving. This is why you will start with learning the easiest type of dive.

If you decide to participate in this study, we want you to know that you can decide to stop participating whenever you want, and that you will not get in trouble by anyone if you decide to stop.

Please tell us whether or not you want to be in the study by circling yes or no.

YES, I would like to participate.

NO, I would not like to participate.

Child's Signature: ________________________________

Date: ____________

Appendix G

Model's Consent Form

MODEL'S CONSENT FORM

I give consent for my child to participate in the production of a video that will be used in a study being conducted by Shannon Clark (Graduate student), under the supervision of Diane Ste-Marie, Ph.D. I am aware that my child will be videotaped while performing a series of diving skills. The videos that are produced will only be shown to the participants of the study and only the above researchers will have access to them.

I have read the above and agree to allow my child, ______________________, to participate in the videotaping process.

Signature of Parent/Guardian: ______________________________

Possible dates for the video taping are Saturday, May 6 or Saturday, May 13 at 4:00 pm at the Walter Baker Pool. The videotaping will take approximately 2 hours. To determine if any of these times are convenient please telephone Diane Ste-Marie at 831-2108.

Thank you in advance for your cooperation.

Shannon Clark
Graduate Student

Appendix H

Dive Scoring Sheets

DIVING SCORE SHEET

Participant number:

Day #:

Kneeling Dive

	Dive 1		Dive 2	
Component	**0**	**1**	**0**	**1**
Extends hands and arms above head				
Enters with arms first				
Then head				
Then body				
Then feet				
Keeps hands and arms above head throughout the dive path				
Chin to chest				
Legs together				
Arms around ears				
Hands together				
Total				

0 - Not Completed
1 - Completed

DIVING SCORE SHEET

Participant number:

Day #:

Stride Dive

	Day 1		Day 2	
Component	**0**	**1**	**0**	**1**
One leg is lifted off the ground				
Extends hands and arms above head				
Enters with arms first				
Then head				
Then body				
Then feet				
Keeps hands and arms above head throughout the dive path				
Chin to chest				
Legs together				
Arms around ears				
Hands together				
Total				

0 - Not Completed
1 - Completed

DIVE SCORE SHEET

Participant number:

Day #:

Front dive

Component	Day 1 **0**	Day 1 **1**	Day 2 **0**	Day 2 **1**
Launches from both legs				
Enters just below the surface				
Streamlined entry				
Enters the water with arms first				
Then head				
Then body				
Then feet				
Keeps arms and hands extended in front of head				
Chin to chest				
Legs together				
Arms around ears				
Hands together				
Total				

0 - Not Completed
1 - Completed

Appendix I

Ethics Approval

Université d'Ottawa • University of Ottawa

Cabinet du vice-recteur à la recherche   Office of the Vice-Rector, Research

HEALTH SCIENCES AND SCIENCE RESEARCH ETHICS BOARD

CERTIFICATION OF ETHICAL APPROVAL

This is to certify that the University of Ottawa Health Sciences and Science Research Ethics Board has examined the Application for Ethical Approval for the research project Observational learning: A comparison of two types of peer models on the swimming skill of diving (File H02-00-03) submitted by Shannon Clark. The REB found that this project meets appropriate ethical standards as outlined in the Tri-Council Policy Statement and in the Procedures of the University of Ottawa Research Ethics Boards and accordingly gave it a Category Ia (Approval). This certification is valid for one year from the date indicated below.

Lise Frigault
Protocol Officer for Ethics in Research,
for the Chairperson of the Health Sciences and Science REB
Valerie Whiffen

APRIL 18th, 2000
Date

FILE NUMBER: H02-00-03