JOURNAL OF SPORT & EXERCISE PSYCHOLOGY, 1988, 10, 92-108

Psychological Momentum and Performance Inferences: A Preliminary Test of the Antecedents-Consequences Psychological Momentum Model

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This paper introduces a model on psychological momentum (PM) in sport (Vallerand, 1985, 1987) and presents preliminary results supportive of the model. The antecedents-consequences PM model postulates that PM refers to perceptions that the actor is progressing toward his/her goal. The model emphasizes that PM perception must be distinguished from its antecedents and performance consequences. In addition, personal and situational variables are hypothesized to lead to perceptions of PM while personal and contextual variables are hypothesized to moderate the PM-performance relationship. This study tested hypotheses derived from the model with respect to the impact of antecedent variables on PM perceptions and attempted to ascertain the link between PM perceptions and performance inferences. Subjects with high and low tennis experience read scenarios depicting a match between two tennis players wherein the score was tied at 5 all in the first set. Two versions of the scenarios were prepared so that the momentum pattern as manipulated by the score configuration was either present or absent. Results revealed that the presence of a PM pattern led to enhanced PM perceptions. In addition, both the score configuration and the experience variables led to inferences that the player having PM should win the first set, and there were some limited indications that such inferences generalized to winning the match. Results are discussed in light of the PM model, and directions for future research are underscored.

For at least two decades, sport psychologists (e.g., Carron, 1980; Martens, 1975; Silva & Weinberg, 1984; Singer, 1972; Straub, 1980; Straub & Williams, 1984; Suinn, 1980) have commented on the effects of psychological factors on sport performance. In keeping with such a trend, several sport psychology books have recently appeared in the popular literature (e.g., Kauss, 1980; Nideffer, 1976; Orlick, 1980). One psychological factor often mentioned in the popular literature is that of momentum. Psychological momentum is generally thought of as enhanced psychological power that influences performance (e.g., Iso-Ahola & Mobily, 1980). Although psychological momentum has been a popular topic of discussion among lay people, it has, unfortunately, received scant scientific attention.

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Previous attempts to study psychological momentum (PM) (e.g., Hardy & Silva, 1985; Iso-Ahola & Blanchard, 1986; Iso-Ahola & Mobily, 1980; Silva & Hardy, 1985) have assumed that PM should be associated with improved performance. In fact, this is how PM is generally operationalized. PM is inferred to be present when a shift in performance improvement has taken place. However, PM is also hypothesized to be the *cause* of increased performance. Thus, this strategy leads to confusion wherein the psychological construct (PM) is inferred by the very consequence it is hypothesized to cause. In other words, the cause and the effects are confounded.

Recognizing this, Vallerand (1985, 1987) has recently presented a model that seeks to untangle this confusion by providing a separate status to PM and by tying it to both antecedents and consequences. It is believed that separating PM from its antecedents and consequences allows a better understanding of the concept and permits the investigation of interesting and novel hypotheses. Indeed, such an approach allows for testing of when various variables will produce PM increments and when enhanced PM will and will not produce performance enhancement. In addition, as we shall see, the present model addresses the issue of PM from the perspectives of both the actor and the observer. Although obvious differences exist between the actor's and observer's perspectives (e.g., the observer is limited to perceiving the event), it is believed that a complete account of PM must deal with these two perspectives. This model is depicted in Figure 1. Let us now briefly define the model.

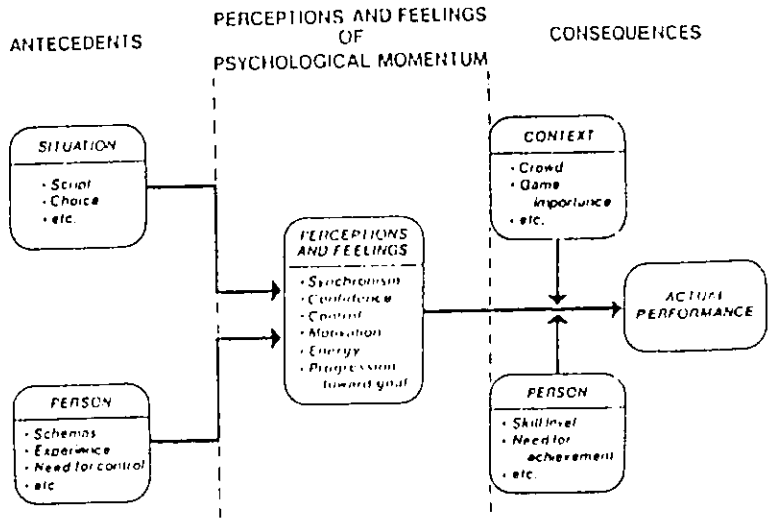

Figure 1 — The antecedents-consequences model of psychological momentum (adapted from Vallerand, 1987).

The Antecedents–Consequences Psychological Momentum Model

According to the model, PM refers to a perception that the actor is progressing toward his/her goal. Generally such a goal is winning, although performing up to and above one's capabilities may also represent a relevant goal. An important consideration from a conceptual perspective is that such a perception of progression toward the goal is associated with heightened levels of motivation and enhanced perceptions of control, confidence, optimism, energy, and synchronism. It should be noted that to the same extent one can perceive or experience an increase in perceptions (and feelings) of control, confidence, optimism, energy, and synchronism, one can also perceive a reduction in these same elements. This would amount to what some researchers have termed "negative momentum" (Adler, 1981; Adler & Adler, 1978; Silva & Hardy, 1985). In such instances, actors are being perceived or perceive themselves as not being able to control the situation at hand. It is as if they can do nothing to regain control over their "game." We will not discuss this other side of the PM state because it is acknowledged that such a negative state represents the opposite of the phenomenon discussed herein.

It should be underscored that PM can be perceived from both the actor's and the observer's perspective. The major difference between the two perspectives is that, in addition to the above perceptions, actors also experience related affects and motivations that may vary on the qualitative and quantitative dimensions. Thus, athletes in a PM state will experience various cognitions, affects, and motivations related to the elements of control, confidence, optimism, energy, and synchronism. Observers, on the other hand, can *perceive* that actors have improved on these latter dimensions without necessarily experiencing these affects or motivations. We do not wish to suggest here that spectators do not experience affects when watching sport events. Indeed, recent evidence clearly indicates that devoted fans do experience much affect while watching their favorite team play (e.g., Zillman, Sapolsky, & Bryant, 1979), especially fans highly involved and invested in their team (Howard-Pitney, Borgida, & Omoto, 1986). Thus, highly involved fans might also experience feelings of control and the like which characterize the PM state of actors as well as other types of affect (e.g., pride, see Cialdini et al., 1976). However, feelings related to the observers' perceptions of the momentum state should not be as intense as those experienced by actors.

An important point is that perceptions of PM need not be based on objectivity. Perceptions of PM are subjective, and as such may not be representative of the real world. However, whether based on objectivity or not, these perceptions have real consequences for the person who holds them.

The present model postulates that PM perceptions are produced by the interplay between situational and personal (intraindividual) variables. In certain instances, situational variables may be so salient that most individuals will perceive PM in that given situation. However, in other instances the situation may be such that only certain individuals will perceive PM in the situation, particularly when the situation is ambiguous enough to permit differential perceptions (see Deci, 1980). The model posits that the crucial psychological variable that will determine whether PM will be perceived is the degree of potential perceived

control inherent in the situation and/or the need for control of the individual. The belief in personal control is important because it is generally deemed essential to one's sense of competence and is basic to human functioning (e.g., deCharms, 1968; Deci, 1980; Langer, 1983; Taylor, 1983; White, 1959). The need for control is at the basis for searching the environment for information (Heider, 1958; Pittman & Pittman, 1980), and it has a profound effect on the interpretation we derive from this search for an understanding of ourselves (Kelley, 1967) and of others (Jones & Davis, 1965). Thus, the need for control has been found to play an important part in people's understanding of their world, and is expected to play an important role in the understanding of achievement domains deemed important by the individual, such as sport.

Several situational antecedent variables can affect the perceptions of PM. Such an effect will be induced to the extent that individuals perceive that the event or play allows them (or the actor) to gain or regain control over the sport situation. Thus, momentum starters (Adler & Adler, 1978) such as a steal or a dunk in basketball may lead to enhanced PM perceptions and feelings. Objective success such as winning the first set (Iso-Ahola & Blanchard, 1986) may also enhance PM perceptions. However, these effects should take place only to the extent that they enhance perceptions of control. In order for this to happen, it would appear important that these events or successes be attributed to the self and not to external causes (Weiner, 1985).

We should also underscore the fact that the world of sport is a prime environment for the illusion of control to take place. The illusion of control phenomenon occurs when individuals believe that events objectively beyond their control have occurred because their behavior has brought control over these events (Langer, 1975). The illusion of control is likely to occur when one can choose how to behave in the situation at hand (Langer, 1983). Postperformance explanation can then revert back to the choice, for example, of having called a time-out in a key situation as the turning point that brought the PM back. Thus, choice and other determinants of the illusion of control (see Langer, 1983) may enhance PM perceptions.

An additional important situational variable refers to the pattern of the behavior emitted within the context of the game. The overall context may lead to the perception that one (the actor) has the momentum. These situations, though not necessarily related to a successful act or behavior, seem to fit into a script (Abelson, 1981) wherein PM is inferred not by a single event but by the overall situation or context. Taken out of context, the same event may not be perceived as leading to PM. For instance, making three steals in a row in basketball while you are winning by 30 does not greatly affect the PM perceived in the situation. However, three steals in a row to tie the score is a different situation. Similarly, a time-out called at a crucial time may be perceived as an attempt to break the other team's momentum, and thus regain control, if one's team has lost ground over the past few minutes, but not if one is losing by 40 points. Thus, a certain pattern or script appears to represent an important determinant of PM. Although no research to date has ascertained the viability of the latter hypothesis with respect to PM, much research on the script concept supports the reasoning of this hypothesis (see Abelson, 1981; Schank & Abelson, 1977).

In addition, much research on perception in sport reveals there is a readiness to construe the sport environment in specific ways. For instance, research

by Starkes and Allard (1983) reveals that game information is perceived more quickly and accurately than nongame information by both players and nonplayers (although the latter are somewhat slower than athletes in their sport). Similarly, research by Brawley and his associates (Brawley, Landers, Miller, & Kearns, 1979; Brawley, Powers, & Phillips, 1980) reveals that both males and females hold task-specific expectancies of males being better than females on certain tasks, and these expectancies influence the performance evaluation of male and female observers. Thus, athletes and other types of sport participants are likely to perceive the sport environment in various biased ways. It is suggested that similar bias or readiness exists with respect to PM perceptions. However, in order for this readiness to operate, the right context must be present.

Personal antecedent variables related to the notion of perceived control are also hypothesized to affect PM perceptions. Thus, individuals who generally tend to perceive everyday situations as under their control (e.g., the internal controls, Rotter, 1966) or who need to perceive them as such (high desirability of control individuals [Burger & Cooper, 1979] and Type 'A's [Glass, 1977]) should be more likely to perceive more control in a given situation and therefore to display high levels of PM perceptions.

Another set of personal variables of interest deals with those outlined by Langer (1975, 1983) as having an impact on the illusion of control. Experience or stimulus familiarity concerning the activity at hand is such a variable. Much research in cognitive psychology (e.g., Charness, 1979; Chase & Simon, 1973) reveals that experts do not perceive game situations in the same way as nonexperts. Experts recognize patterns of play much better and much quicker than nonexperts. Such findings have been replicated by Allard and her colleagues in sports such as basketball (Allard, Graham, & Paarsalu, 1980) and volleyball (Allard & Starkes, 1980; see Allard & Burnett, 1985, for a review). It appears that enhanced recognition is due to better articulated schemas that allow for a deeper level of information encoding (Allard et al., 1980). It is believed that such schemas exist for PM and may be held by individuals with high levels of experience in their particular sport. One does not need to be an athlete for holding such cognitive structures. Rather, *experience* with the game as a fan or athlete is the key variable. Thus, because experienced actors and observers hold well-developed schemas regarding the game they play or watch, they should be more prone to interpret various situations as being PM-related. This should especially be the case if these situations fit into a script, as we have seen.

Finally, as mentioned earlier, it is hypothesized that PM can have important effects on the actor's actual performance. However, such effects are moderated by both contextual and personal variables. That is, whether PM will affect performance or not depends on the moderating influence of contextual and personal variables. Contextual variables such as the nature of the task to be performed when perceptions and feelings of PM are experienced (Oxendine, 1970), whether there is a crowd cheering the actor (Zajonc, 1965), and the criticality or importance of the outcome (Baumeister, 1984) should have important effects on the PM–performance relationship. For instance, high levels of momentum feelings may well facilitate performance on easy tasks such as rebounding but may prove disruptive on difficult tasks such as a last-second, game-breaking free throw (see Oxendine, 1970, on the role of emotional arousal in sport performance).

Similarly, personal variables such as the levels of sport competition anxiety (Martens, 1977) and achievement motivation (Yukelson, Weinberg, West, & Jackson, 1981), as well as the actor's skill level, should provide limits within which PM perceptions and feelings can affect performance. For instance, PM feelings and perceptions would not lead to enhanced performance if the performer is too anxious to perform the desired behavior or is physically unable to do so.

A final prediction from the model deals with the *belief* that PM produces increases in sport performance. It is posited that such a belief should be particularly strong in achievement domains such as sport. In line with past work on the illusion of control (Langer, 1975, 1983) and hypothesis testing (Snyder & Gangestad, 1981), it is postulated that individuals involved in sports either as participants or spectators are motivated to attend to, to encode, and to remember events wherein PM perceptions led to enhanced performance and to disregard, refute, and forget events wherein PM did not lead to better performance. These biased information-processing functions seem to reinforce the view that control can be gained over certain uncontrollable (random) events and that a meaningful interpretation of the sport environment is possible (Goldstein, 1979). Research by Gilovitch, Vallone, and Tversky (1985) on the "hot-hand phenomenon" in basketball supports this interpretation. In a series of studies, Gilovitch et al. found that spectators and amateur and professional basketball players alike believed that having made the previous shot would enhance the possibility of making the next one. However, a detailed analysis of the objective statistics regarding shooting did not support this. Thus, individuals involved in sport may be predisposed to construe an inflated relationship between some kind of momentum force and performance.[1] However, this has yet to be demonstrated with respect to PM in sport.

The Present Study

The purpose of this study was to test some of the hypotheses derived from the above model. As indicated previously, the present model holds both for the actor and the observer. For this initial test of the model, we decided to focus on the perspective of the observer. The study of such a perspective is important in its own right because it may lead to a better understanding of the social perception of sport events, thereby increasing our knowledge on the determinants of spectators' social perceptions. In addition, the study of PM perceptions from the observer's perspective may eventually help us understand the link between sport event perceptions and related behaviors such as betting and gambling (e.g., Gilovitch & Douglas, 1986).

Within the confines of the present study, two independent variables representing situational and personal antecedents of PM perceptions were manipulated in hypothetical scenarios. Specifically, the score configuration of two tennis players' first-set performance was the situational variable manipulated. In one configuration, one player came from behind to win four games in a row and to tie the score at 5 all in the first set. In the second configuration, players alternated in winning games up to 5 all. In line with recent research on the script concept (Abelson, 1981), coming from behind to tie the match was hypothesized to represent a situation producing PM perceptions. While objectively both players have equal chances of winning, subjectively the player who has come from behind should be perceived as having greater levels of PM. This constituted the first hypothesis.

The second variable manipulated represented a personal antecedent of PM perceptions, that is, the level of experience or stimulus (tennis) familiarity of the individual. In line with previous work by Langer (1975) on the role of stimulus experience in the illusion of control phenomenon and by Allard and Burnett (1985) on sport perception, it was hypothesized that subjects with high levels of tennis experience would perceive more PM than subjects with less experience. This is because these individuals have developed cognitive structures, or schemas, that enable them to recognize PM-inducing events. Since the score configuration in the momentum situation (coming from behind to tie the game) was such a stimulus, it was expected that the personal experience variable would be primarily in operation in this latter condition. This constituted the second hypothesis.

A final purpose of this study was to ascertain the effects of the score configuration and the experience variables on performance inferences. In line with the model's assumption concerning the inflated relationship between perceptions of PM and performance inferences, it was hypothesized that both variables would lead to enhanced performance inferences. In addition, it was hypothesized that the effects of these latter variables would be largely due to PM perceptions. This constituted the third and last hypothesis.

Method

Subjects and Design

Subjects of this study were 20 males and 24 females ranging in age from 14 to 44 years, with a mean age of 22.5 years. The design of this study was a 2 × 2 Score Configuration (momentum pattern–no momentum pattern) × Tennis Experience (high–low) mixed design. The first factor score configuration was repeated while the second one (tennis experience) was a between-subject factor. There were 20 subjects (10 males, 10 females) with a high degree of tennis experience and 24 (10 males, 14 females) with little or no experience in tennis.

Questionnaire

Subjects were provided with a questionnaire containing the independent and dependent variables of the study. The first page explained the goal of the study and appropriate procedures. Specifically, the instructions read,

> Thank you for accepting to participate in this survey about tennis. In this questionnaire you will find questions pertaining to game situations to be found in tennis. You are asked to answer all questions in the exact presented order. There are no right or wrong answers. You must indicate what you personally believe. All your answers will be kept confidential. Again please take note that we want your answers to be the reflection of your personal opinions. Thank you for your collaboration.

The questionnaire contained two hypothetical scenarios depicting tennis situations. These situations contained the same basic information except that one described one tennis player who came from behind to win four games in a row in the first set to equal games at 5 all (momentum pattern condition) while in the other condition no one player prevailed and it was also 5 all. Following each

condition, subjects were asked to fill out relevant dependent variables. These were the same for the two conditions. The basic information for both conditions was the following:

> An important match is under way between two players. Robert and Luc are playing a match for a purse of $5,000. To win this match one must win three out of five sets. Refer yourself to the score configuration that appears after this paragraph. It can be seen that games are 5 all. Either one of the two players must win 7 games in order to win the first set. Thus, in reference to the score configuration please indicate who will win the first set. Remember, the first player who wins 7 games will automatically win the first set. Here is Robert and Luc's score configuration:

The score configurations for the psychological momentum and no-momentum pattern conditions appear in Table 1. It can be seen that in both conditions the two players are at 5 all. The only difference lies in the pattern or configuration of scores.[2] Conditions were presented in a counterbalanced order.

Table 1

Score Configurations of the Psychological Momentum and No-Momentum Conditions

Momentum pattern condition										
Game	1	2	3	4	5	6	7	8	9	10
Robert	1	1	1	0	1	1	0	0	0	0
Luc	0	0	0	1	0	0	1	1	1	1
No-momentum pattern condition										
Game	1	2	3	4	5	6	7	8	9	10
Robert	1	0	1	1	0	0	1	0	1	0
Luc	0	1	0	0	1	1	0	1	0	1

Note. 1 = win, 0 = lose.

Following each condition, subjects rated 12 dependent variables. Nine of these variables served to measure the perception of psychological momentum. In line with the model and the PM definition presented earlier, the questions were the following: Who has the momentum? Who unfolds more energy? Who demonstrates more synchronism? Who seems to be more energetic? Who seems to be the most confident? Who demonstrates or manifests the most control? Who seems to be the most motivated? Who seems to be the most discouraged? (The score on this item was reversed.) And who seems to progress most toward victory? These questions were obtained from a pilot study with tennis players and a survey of the pertinent literature. Questions were rated on a 7-point scale ranging from 1 ("definitely Robert") to 7 ("definitely Luc") with a neutral midpoint 4 ("neither one of them").

In addition, three questions dealt with subjects' prediction of players' performance: According to you, who will win the first set? Who will win the second set? Who will win the match? These questions were answered on a 7-point scale ranging from 1 ("I'm certain that Robert will win") to 7 ("I'm certain that Luc will win") with a neutral midpoint 4 ("I can't predict who will win").

The last page of the questionnaire contained questions on age and gender. In addition, one question assessed subjects' knowledge about tennis on a 5-point scale ranging from 1 ("absolute no knowledge") to 5 ("great knowledge"), while another question asked subjects which sport was their primary sport activity. Finally, subjects were asked to indicate for how long they had been playing the game, if applicable. These last three questions served as manipulation checks for the "level of tennis experience" independent variable.

Procedures

Subjects were contacted on an individual basis and asked to participate in a survey about tennis. Subjects with high levels of experience were contacted at local tennis clubs while those with little experience were contacted informally at school or at home. When subjects agreed to participate in this study, the first page of the questionnaire was paraphrased and they were encouraged to ask any questions. Once questions were answered, subjects were given the questionnaire, which they answered on an individual basis. Answering the questionnaire took an average of 25 minutes, after which subjects were told the purpose of this study and any questions they had about it were answered. Finally, subjects were thanked for their participation and were dismissed.

Results

Preliminary Analyses

A first series of analyses assessed the internal consistency of the nine questions dealing with psychological momentum. Cronbach alpha values of .95 and .93 were obtained in the no-momentum and momentum pattern conditions, respectively. Thus, the Cronbach alphas revealed that the scale was quite homogeneous in content. A second series of analyses assessed whether gender had any effects on the dependent variables of this study. Thus, 2 × 2 × 2 (Gender × Score Configuration × Tennis Experience) ANOVAs were conducted on the three performance variables and the PM scale. Results revealed no significant gender main effects and no interactions (all $Fs < 1.20$). Thus, gender is not considered further in this paper. Third, other analyses assessed the order of presentation of the two conditions on all dependent variables of this study. Of all the analyses performed, only one proved to be significant. Thus it can be safely said that no pattern for order of presentation was obtained.

Finally, a series of analyses assessed the difference between high and low experience subjects. A t test was performed on the level of tennis knowledge reported by the experienced and inexperienced subjects. Results revealed that experienced subjects ($M=4.46$) reported having significantly more tennis knowledge than inexperienced subjects ($M=1.35$), $t(44) = 20.52$, $p < .001$. In addition, all experienced subjects reported that tennis was their primary sport whereas this was not the case for any of the inexperienced subjects. Finally, experienced tennis players reported having played more years of tennis ($M=$ 6.7 years) than did inexperienced players ($M=0$). These last three sets of results support the basic distinction between experienced and inexperienced subjects with respect to the game of tennis.

Effects of Experience and Score Configuration

In order to assess the effects of tennis experience and score configuration on PM perceptions, a 2 × 2 Score Configuration (momentum pattern/present-absent) × Tennis Experience (high-low) repeated measures analysis of variance was conducted on the sum of the nine items of the PM scale. Results yielded a significant main effect for score configuration, $F(1, 40) = 32.54$, $p < .0001$. Subjects perceived more PM when the momentum pattern was present ($M=46.52$) than when it was absent ($M=35.88$). The experience main effect as well as the Experience × Score Configuration interaction were not significant, $Fs < 1.39$. Means for the PM scale appear in Table 2.

Table 2

Psychological Momentum Perceptions and Performance Inferences as a Function of Tennis Experience and Momentum Pattern

	Experience			
	High		Low	
Momentum pattern				
	PM	48.63	PM	43.74
	Set 1	5.38	Set	4.20
	Set 2	4.48	Set 2	4.30
	Match	4.43	Match	4.15
Nonmomentum pattern				
	PM	36.30	PM	35.68
	Set 1	3.79	Set 1	3.70
	Set 2	4.39	Set 2	4.10
	Match	4.04	Match	3.55

Note. Scores on the PM variable ranged from 9 to 63 while scores on the other variables ranged from 1 to 7.

Similarly, the effects of tennis experience and score configuration on perceptions of performance inferences on the first and second sets and the match were analyzed via 2 × 2 (Experience × Score Configuration) repeated measures ANOVAs. Means for these three dependent variables appear in Table 2. Results on the first-set dependent variable revealed the presence of a main effect for score configuration, $F(1, 40) = 11.64$, $p < .001$. Subjects believed that Luc (the player who came from behind to tie the game at 5 all) would win the first set to a greater extent when he showed a momentum pattern ($M=4.84$) than when he showed no such pattern ($M=3.75$). In addition, a main effect for tennis experience showed

that subjects with high levels of experience (M=4.58) believed more strongly that the player with the momentum (Luc) would win the first set than did low-experience subjects (M= 3.95), $F(1, 40) = 4.51$, $p < .04$. Finally, the Experience × Score Configuration interaction was marginally significant, $F(1, 40) = 3.15$, $p < .08$. Further analyses revealed that although no differences were obtained between the high-experience (M=3.79) and low-experience (M=3.70) subjects in the nonmomentum pattern condition ($t < 1$), a significant difference emerged in the momentum pattern condition. Specifically, high-experience subjects (M = 5.38) believed more strongly that the player with the momentum would win the first set than did low-experience subjects (M=4.20), $t(42) = 2.37$, $p < .03$.

Analyses with the second-set variable revealed no significant effects, all Fs < 1. Results on the third performance variable, "who would win the match," revealed that the experience main effect $F(1, 40) = 2.04$, $p > .16$, and the Experience × Score Configuration interaction ($F < 1$) were not significant. The score configuration main effect, however, was found to be marginally significant, $F(1, 40) = 2.95$, $p < .10$. Subjects believed that Luc would win the match to a greater extent when he showed a momentum pattern (M=4.30) than when such a pattern had not been displayed (M=3.81).

Finally, in order to assess whether the performance inferences were attributable to PM perceptions, 2 × 2 (Tennis Experience × Score Configuration) repeated measures ANCOVAs with scores on the PM scale serving as covariate were conducted on the three performance inference variables. Results from this series of analyses revealed that the covariate was highly significant for the first-set and the match variables Fs (1, 39) > 13.44, $p < .001$, but not for the second-set variable, $F < 1.92$, $p < 18$. In addition, it was found that all other main effects and interactions were rendered nonsignificant (all Ps > .17) except for the experience main effect on the first-set variable which was reduced to only a marginally significant level, $F(1, 39) = 3.62$, $p < .07$.

Discussion

The purpose of this study was to test some of the hypotheses derived from the antecedents–consequences model of psychological momentum (Vallerand, 1985, 1987). Specifically, the effects of one situational and one personal antecedent of PM perceptions were assessed, namely configuration of scores inherent in the situation and the subject's level of experience in the sport in question. In addition, the relationship between these latter variables and performance inferences were ascertained. It was predicted that the score configuration and the level of tennis experience would influence PM perceptions and performance inferences, and that these latter effects would be largely attributable to PM perceptions. Results provided support for some of these hypotheses, as the score configuration was found to influence PM perceptions. In addition, score configuration, level of experience, and PM perceptions were found to influence performance inferences. Let us now discuss these findings in detail.

A first finding of interest deals with the effect of the score configuration on PM perceptions. The antecedents–consequences PM model suggests that various situational variables may lead to PM perceptions including those that, taken in their context, form a script (Abelson, 1981) suggesting that one player or team is gaining control over the game. The findings from this study reveal that coming from behind to tie the match at a crucial moment represents one such pattern or script that affects observers' perceptions of PM. Thus, the present findings provide support for the model's postulate regarding the influence of this particular situational variable on PM perceptions.

It should be noted that these findings are in agreement with previous studies which show that winning or performing well leads to enhanced perceptions and feelings of confidence (Iso-Ahola & Blanchard, 1986), competence (Vallerand, 1983; Vallerand & Reid, 1984, in press), and self-efficacy (Bandura & Schunk, 1981) as well as increased expectations of future success (Iso-Ahola & Blanchard, 1986; Scanlan & Passer, 1979) and heightened levels of motivation (Weiner, 1985). It would appear important to emphasize, however, that in the context of the present study no one player had won the match or even a set. Rather, one player came from behind to tie the games at 5 all in the first set. It is interesting that the present situation produced strong effects on various cognitions and affects that would not be warranted objectively (indeed, the score was tied at 5 all). These findings represent the first substantive empirical support for the model's postulate on the effects of situational antecedents on PM perceptions, and future research along these lines would therefore appear promising.

On the other hand, the effect of tennis experience on PM perceptions did not yield the predicted effects. While it was hypothesized that experienced observers would perceive more PM than inexperienced observers, especially in the momentum pattern condition, no main effect or interaction involving experience was obtained. Though these findings would appear disappointing at first, two points are in order. First, it should be reiterated that the model predicts that personal variables will influence PM perceptions most strongly in ambiguous situations. The situations used in this study were far from being ambiguous; in fact they were very salient. Thus, given the saliency of the situational (score configuration) manipulation, one should not be surprised by the lack of effect of the experience (personal) variable. Subjects reacted similarly to the powerful situational variable, leaving little room for the personal variable to operate. Future studies should investigate the impact of personal variables on PM perceptions in ambiguous situations. The presence of some elements, indicating that one player is gaining control over the other, amidst other less discriminating elements may be sufficient to lead experienced athletes to perceive PM, especially if such information is congruent with the athletes' schemas. This should not be the case for less experienced athletes, who may instead be puzzled by what appears to be incoherent information.

A second point related to the lack of significant effect of the experience variable on PM perceptions is that, even in the context of a very salient situational variable, the means were in the predicted direction. This was especially the case in the momentum pattern condition wherein high-experience subjects perceived more PM (M=48.83), $t(42) = 1.57$, $p < .07$ (one tail), than low-experience subjects (M=43.74). These findings are therefore encouraging and provide some support for the personal antecedents part of the model. In line with the model, it is expected that these differences should be magnified under more ambiguous situations.

A third finding of this study that deserves mention even though it was not the subject of hypotheses is the pattern of results obtained with the 9-item PM scale. The PM model posits that PM perceptions should be assessed indepen-

dently of their effects and that such perceptions deal with increased perceptions (and feelings) of control, confidence, optimism, energy, synchronism, motivation, and progression toward one's goal. Findings from this study reveal that indeed these variables represent a homogeneous set of items that are affected by variables postulated to affect PM in a predicted fashion. Thus, these items capture the essence of the construct of PM and as such provide preliminary construct validity to the PM perceptions part of the antecedents-consequences model. Additionally, from a more pragmatic perspective these findings hint that a scale similar to the one used in this study could be effectively employed to assess PM state levels in sport field situations.

A fourth set of findings worthy of mention deals with the results obtained on the performance inference variables. These results showed important effects of the situational personal variables on the first-set dependent variable wherein both the score configuration and the level of experience combined in influencing performance inferences. Indeed, the highest mean observed on this variable was obtained by the high-experience subjects in the momentum pattern condition. These findings are in direct accord with the present model which states that, because of their need for control, experienced individuals in momentum situations are likely to exaggerate the link between PM perceptions and performance. Such exaggeration is likely, especially in light of the importance for sport participants to make sense of, and thus control, events that may be random. Therefore subjects may perceive more control (and thus infer higher chances of winning) than warranted by the situation, and there are some limited indications that such perceptions generalize to winning the match. The present findings are congruent with recent work in social cognition which reveals that various needs such as the need for control may bias the perceived likelihood of a given event to occur (see Fiske & Taylor, 1984; see also Gilovitch & Douglas, 1986).

The results of the analyses of covariance were also quite revealing. It was found that much of the effects of the score configuration and the level of experience variables on the performance inference variables were attributable to PM perceptions. In line with the present model, these findings reinforce the view that there is a widely accepted belief that PM leads to enhanced performance. As intimated by the results of the Gilovitch et al. (1985) study, however, such a belief may not be objectively supported, although a true test on the actual effects of PM perceptions on performance has yet to be performed. It is interesting to speculate regarding the processes modulating this important *perceived* relationship between PM perceptions and sport performance. As discussed previously, it is posited that various information-processing functions may be biased toward attending, encoding, and retrieving information in line with the belief that PM leads to enhanced performance. Research by Snyder and Gangestad (1981) shows how people may behave in line with various hypotheses so as to validate rather than test these very hypotheses.

In addition, this PM-performance belief may represent an important part of the self-schemas (Markus & Sentis, 1982) of individuals involved in sports either as participants or spectators. Such schemas may then bias the various information-processing functions so that people perceive and remember events in light of the PM-performance relationship belief. Such a cycle ensures that the belief is nurtured and perpetuated. Finally, it is believed that the need to control,

master, and make sense of the sport environment represents a powerful motivational force behind the utilization and existence of the schemas. When presented from this perspective, it is not hard to understand why the PM-performance relationship belief is so firmly anchored in the sport domain.

In sum, results of the present study provide preliminary evidence for the antecedents-consequences PM model. However, much research remains to be done in order to fully test the viability of the model. For instance, there is a need to test the role of both personal and situational antecedents of PM perceptions and feelings from an actor's perspective in experimental and field settings alike. In addition, the consequences of PM perceptions and feelings on actual performance and how the PM-performance relationship is moderated by personal and contextual variables remain to be ascertained. It is believed that such research should eventually lead to a better understanding of variables that may initiate and sustain PM perceptions and beliefs in the sport domain, as well as provide scientific answers to important applied questions regarding the actual effects of PM on sport performance.

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Notes

[1]Research reveals that minimal hypotheses may be used to process incoming information in a biased way. The literature on hypothesis testing processes (Skov & Sherman, 1986; Snyder, 1984; Snyder & Gangestad, 1981) suggests that when individuals hypothesize about the cause of events, they are likely to ask questions and search the environment in ways such as to confirm the hypothesis while ignoring disconfirming information. It is therefore realistic to assume that there might exist an inflated *perceived* relationship between PM and enhanced performance in sport.

[2]A pilot study with professional tennis instructors revealed that coming from behind to tie the score at a crucial moment in the match should trigger a powerful perception of PM.

Acknowledgments

This manuscript was prepared while the first author was supported by grants from the Social Sciences and Humanities Research Council of Canada, le Conseil Québécois de la Recherche Sociale, le Fond pour la Formation des Chercheurs et l'Aide à la Recherche (FCAR-Québec), and the Université du Québec à Montréal, and while the third author was supported by a fellowship from le Fond pour la Formation des Chercheurs et l'Aide à la Recherche (FCAR-Québec). We would like to thank Marc Blais for his comments on a previous draft of this article. Finally, we would like to thank Claude Mongeau for his contribution to early discussions on this project.

Manuscript submitted: January 13, 1987
Revision received: July 6, 1987

COMMENTS

JOURNAL OF SPORT & EXERCISE PSYCHOLOGY, 1988, 10, 109-114

Social Loafing in Cheerleaders: Effects of Team Membership and Competition

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The group performance literature suggests that when individuals work together on a task, they tend to exert less effort than when they perform the same task individually (Jackson & Williams, 1985). This reduction of individual effort when individuals are collectively held responsible for a task has been termed *social loafing* (Latané, Williams, & Harkins, 1979). Social loafing has been demonstrated to occur in a variety of physically effortful tasks such as rope pulling (Ingham, Levinger, Graves, & Peckham, 1974), noise production (Latané et al., 1979), and force production (Kerr & Brunn, 1981). This effect has also been demonstrated for tasks requiring cognitive effort such as evaluation of essays (Petty, Harkins, Williams, & Latané, 1977), brainstorming, and vigilance (Harkins & Petty, 1982). Moreover, social loafing has been found to characterize the behavior of both males and females of all ages (Harkins, Latané, & Williams, 1980; Latané, 1986), in between- as well as within-subjects designs (Harkins et al., 1980; Kerr & Brunn, 1981), and in both individualistic and collective cultures (Latané, 1986). Thus, social loafing appears to be a rather robust phenomenon threatening effective collective endeavor.

However, several factors have been identified that appear to moderate the magnitude of this effect. Specifically, loafing was eliminated when individual efforts were identifiable (Williams, Harkins, & Latané, 1981), when individuals perceived that they made a unique contribution to the group effort or performed difficult tasks (Harkins & Petty, 1982), when individuals performed with friends versus strangers (Williams, 1981), when conjunctive and disjunctive tasks were employed (Kerr, 1983), and when the task was personally involving (Brickner, Harkins, & Ostrom, 1986). However, the research conditions of many of these investigations created motivational properties that appear to be in opposition to those associated with established teams performing a team-related task under competitive conditions. That is, social loafing may be restricted to tasks that are seen as unimportant, meaningless, or lacking in intrinsic motivation, performed by relative strangers in noncompetitive contexts. The purpose of this study, therefore, was to investigate social loafing among established teams performing an intrinsically motivating team-related task under competitive conditions.

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