A qualitative exploration of the psychological contents and dynamics of momentum in sport

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While studies on triggers and outcomes of Psychological Momentum (PM) exist, little is known about the dynamics by which PM emerges and develops over time. Based on video-assisted recalls of PM experiences in table tennis and swimming competitions, this study qualitatively explored the triggering processes, contents, and the development of PM over time. PM was found to be triggered by mechanisms of dissonance, consonance, or fear of not winning. During the PM experience, participants reported a variety of perceptions, affects and emotions, cognitions, and behaviors. PM was found to develop through processes of amplification that sometimes ended with a reduction of efforts when the victory or defeat was perceived as being inevitable. These findings are discussed in light of theories on self-regulation and reactance-helplessness. From a practical standpoint, achievement goal-based strategies are suggested, since mastery-approach goals were found to be endorsed to maintain positive PM and overcome negative PM.

KEY WORDS: Coasting, Dissonance, Helplessness, Performance, Qualitative method Reactance.

Psychological Momentum¹ (PM) is a kind of “added or gained psychological power, which changes interpersonal perceptions and influences an indi-

¹PM is sometimes used interchangeably with other phenomena, such as flow and hot/cold hand. Hot/cold hand refers to the belief in streaks, i.e., “the belief that successive attempts of an individual player are positively related, as well as the behavior influenced by such a belief” (Bar-Eli, Avugos, & Raab, 2006, p. 525). Flow corresponds to an experience of complete absorption in the task, including a loss of feeling of self-consciousness, and a distorted sense of time (Csikszentmihalyi, 1990). PM differs from hot/cold hand and flow in that

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individual’s mental and physical performance” (Iso-Ahola & Mobily, 1980, p. 392). This phenomenon has triggered the interest of sport psychologists ever since some pioneers have attempted to theorize it. The proposed conceptualizations of PM are similar with regard to a number of defining characteristics. In an achievement context, precipitating events or series of events (Taylor & Demick, 1994) can influence an individual’s perception of moving toward or away from his or her goal (Gernigon, Briki, & Eykens, 2010; Markman & Guenther, 2007; Vallerand, Colavecchio, & Pelletier, 1988). Such a perception elicits positive or negative changes in cognition, motivation, physiology, affect, and behavior (Gernigon et al., 2010; Taylor & Demick, 1994; Vallerand et al., 1988), which could influence performance (Perreault, Vallerand, Montgomery, & Provencher, 1998; Taylor & Demick, 1994; Vallerand et al., 1988).

Earlier research on PM mainly used experimental designs in which the PM experiences of participants were over-simplified for the sake of standardization of the experimental conditions. Moreover, such designs permit the examination of the cause-effect relationship between an independent variable and only one or a few dependent variables (e.g., Gernigon et al., 2010; Perreault et al., 1998; Shaw, Dzewaltowski, & McElroy, 1992; Vallerand et al., 1988). Recently, Crust and Nesti (2006) criticized this way of examining PM by arguing that quantitatively examining a limited number of dependent variables hardly allows the understanding of when PM takes place, what it actually is, and how it is experienced in natural environments. To better account for the intrinsic complexity of PM, Crust and Nesti (2006) pled for the development of qualitative studies to explore the phenomenology of athletes’ actual experience of PM.

One purpose of the rare qualitative studies on PM so far was to establish inventories of its determinants (Jones & Harwood, 2008) or categories of determinants (Taylor & Demick, 1994). Based on videos of basketball and tennis matches, Taylor and Demick (1994) asked players to list the events it originates from how individuals perceive they are moving toward or away from the goal to be reached (e.g., Markman & Guenther, 2007; Vallerand et al., 1988). In addition, PM depends on the strength of contextual variables, such as the importance of the situation (e.g., Markman & Guenther, 2007). As a result, whereas streaks are the necessary condition for believing that success breeds success (i.e., hot hand), they are neither sufficient (e.g., Vallerand et al., 1988) nor necessary (e.g., Taylor & Demick, 1994) for the emergence of the perception that one is progressing toward his or her goal. As for flow, this concerns a total immersion in the task, whereas PM reflects a force, or impetus, which is perceived by an actor or observer to influence the actor’s ability to reach a desired goal. A state of flow can, however, be a consequence of this perception (see Markman and Guenther, 2007, for a discussion about the contrast between PM and flow).
they believed would cause changes in PM. The events identified as potential PM triggers were then classed as internal (e.g., complacency, psychological states, fatigue), environmental (e.g., scoring configurations, dramatic actions, opponent’s behaviors, referees decisions), and social (e.g., team cohesion, staff influences, crowd influences) factors. More recently, Jones and Harwood (2008) asked professional soccer players to identify the causes and outcomes of their PM experiences. These authors listed a range of positive PM (PM+) triggers (e.g., negative body language of opponents, scoring goals) and outcomes (e.g., thinking ahead, feelings of invincibility), as well as a range of negative PM (PM-) triggers (e.g., conceding goals, nerves and anxiety) and outcomes (e.g., feelings of threat, frustration). Overall, these qualitative studies of PM evidenced the great diversity of determinants and psychological outcomes of a PM experience in sport.

According to the authors of the qualitative studies, caution should be exercised when interpreting the lists of the PM triggers they found, because it would depend on the individual athlete whether a particular event triggers PM or not (Jones & Harwood, 2008; Taylor & Demick, 1994). In other words, the same event may trigger PM for one athlete, but not for another. Moreover, the perception of momentum depends on the context in which a potential trigger occurs (Adler, 1981; Markman & Guenther, 2007; Vallerand et al., 1988). That is, a same event or series of events can precipitate PM (or not), depending on the extent to which the event(s) generate(s) the perception of moving toward or away from a targeted goal. Given these arguments, inventories of potential triggers and psychological outcomes of a PM experience do not sufficiently enable the understanding of the phenomenology of the experience. This means that there is still a need to qualitatively examine the dynamics by which PM emerges and further develops over time. Therefore, based on a retrospective video recall procedure, the present research consisted of a qualitative analysis of (a) the psychological processes involved in the triggering of PM (i.e., when and how PM starts), (b) the specific perceptual, cognitive, affective, and behavioral contents associated with a PM experience (i.e., what PM is made of), and (c) its development over time (i.e., how PM further develops until its termination).

Among the existing qualitative approaches, the course-of-action theory (Theureau, 1992, 2006) appears to be particularly suited to account for both the complexity and the dynamics of psychological processes. According to this theory, an activity takes place on a time line along which actions, cognitions, affects, and feelings emerge from the interaction between the actor and the situation (Kirshner & Whitson, 1997; Theureau, 1992, 2006). The meaningful elements and the changes in these elements from the actor’s point of
view can be captured by self-confrontation interviews (Theureau, 1992, 2006; von Cranach & Harré, 1982), whereby an actor is faced with the physical traces of his or her action (in most cases by showing videotapes). By reconstructing the natural and specific conditions of human activity, self-confrontation interviews can reveal the dynamics of an actor’s actions, emotions, cognitions, intentions, and perceptions in relation to the ongoing situation. To date, the course-of-action theory (Theureau, 1992, 2006) has been commonly used in sport psychology to investigate the relationships between actions and situations (e.g., Gernigon, d’Arripe-Longueville, Delignières, & Ninot, 2004; Hauw & Durand, 2006; Hauw, Renaud, & Durand, 2009).

The experience of PM is assumed to be dependent on the nature of the sport that is concerned (e.g., Higham, 2000). To identify both invariant and sport-specific characteristics of PM, it is relevant to examine PM experiences in sports with different characteristics (i.e., individual or collective; interpenetrated or separated opponent teams; conveying discrete or continuous feedback of performance; competing one opponent or several opponents, etc.). A comparison of various sports goes, however, beyond the scope of this study and should rather be addressed through the accumulation of sport-specific studies of PM. Therefore, we chose to limit the present research to two individual sports with different characteristics: table tennis and swimming. Table tennis involves competitions against one opponent, variation in players’ actions, discrete feedback of performance, and discontinuous efforts. Swimming, on the other hand, involves competitions against several opponents, repetitive movements, continuous feedback of performance in relation to nearby swimmers, and continuous effort. Therefore, although comparing only two sports is limited, the above-mentioned differences between table tennis and swimming do enable an exploration of possible context-dependent characteristics of PM. Moreover, given that table tennis sets and swimming races are often completed within a short time, in-depth interviews could be conducted without tiring the participants.

Methods

Participants

Four table tennis players and four swimmers volunteered to participate in this study. They were French men, recruited from several clubs in the south of France, and competing in national and international competitions. Their average age was 23.4 years (SD = 2.4), and on average they competed 3.9 years (SD = 1.45) at their current level. To ensure the anonymity of the participants, the four table tennis players are referred to as P1, P2, P3, and P4, and the four swimmers as S1, S2, S3, and S4.
DATA COLLECTION

The research protocol was approved by the Ethical Review Board of the university of the first author. The data were derived from the athletes’ verbalizations during self-confrontation interviews based on videos of their performance.

Because PM is an individual phenomenon (Jones & Harwood, 2008; Taylor & Demick, 1994), sequences of PM are not identifiable from a third person perspective. Given that competitions are usually videotaped at the level of the participants involved, participants were asked whether they had a video of a recent competition in which they experienced PM+ or PM-. For this aim, typical idiomatic French expressions, such as “spiraling up” and “having the wind in one’s sails” were used to explain PM+, whereas “spiraling down” and “collapsing” were used to explain PM-. By using general expressions to describe PM rather than specific psychological states, the researcher could not influence the participant’s later reports during the interview. The videotapes of the participants had to include clear views of their performance, as well as the performance of their opponent(s). Indeed, although PM can be experienced by one individual who is involved in the task (Markman & Guenther, 2007, studies 3 and 4), there is evidence that (changes in) the competitive situation surrounding the individual can trigger PM (e.g., Taylor & Demick, 1994; Vallerand et al., 1988).

From the video he brought, the participant was asked to select the specific game (table tennis) or race (swimming) in which he had identified a PM experience. He then took part in a self-confrontation interview (Theureau, 1992; von Cranach & Harré, 1982), based on the entire game or race including the PM experience. The interviews—with an average duration of 63 min—were conducted by the first author in separate rooms of the training centers of the participants. Each experience of PM had a different length, corresponding to 37 s for P₁, 72 s for P₂, 65 s for P₃, 80 s for P₄, 41 s for S₁ (during a 200 m race), 30 s for S₂ (during a 200 m race), and 38 s for S₄ (during a 100 m race). Experiences of PM+ were reported by P₁, P₂, S₁, and S₂, while experiences of PM- were reported by P₃, P₄, S₃, and S₄. To build trust and to prepare each participant to verbalize freely, the interviewer first asked the participant to speak about the overall context and the pre-competitive period of the match or race.

The INTERVIEWER was trained in self-confrontations interviews. During the interviews, the participant and the interviewer were able to control the video display, and to reverse the video when needed. The interviewer asked each participant to describe, indicate, and comment on any element of his course of action, including actions (e.g., what are you doing here?), intentions (e.g., what are you trying to do?), thoughts (e.g., what are you thinking about?), emotions (e.g., what do you feel?), perceptions (e.g., what personal and/or situational elements catch your attention?), and expectations (e.g., what do you expect to happen?). These questions were aimed to give a full account of the participant’s experience (Theureau, 2006), and were used to account for the different dimensions of existing PM models—perceptive, affective, cognitive, motivational, and behavioral (Taylor & Demick, 1994; Vallerand et al., 1988)—and to obtain descriptions of the contextual and temporal construction of the PM experience.

Furthermore, for the full duration of the interview, the role of the interviewer was to listen actively to the participant, to encourage him to describe his activity, and to avoid interpretations, generalizations, and self-analysis (von Cranach & Harré, 1982). After every description of an action, feeling, thought, or intention, the interviewer asked additional probe questions. In specific, the probe questions consisted of asking for more details about each described action, feeling, thought, or intention (e.g., what were you exactly thinking of at that
time?), as well as the context in which it occurred (e.g., when did that happen exactly?). In this way, a deepened understanding of what the participants actually experienced could be obtained, thereby also enhancing the accuracy of the data. The eight interviews were video-recorded and a full verbatim transcription of each interview was made.

**DATA ANALYSIS**

The data stemming from the entire game or race were taken into account. These data were analyzed separately by two researchers—including the interviewer—who were both aware of the research purposes and familiar with inductive research approaches. An inductive approach aims to develop categories into a model or a framework that summarizes the raw data and conveys key themes and processes. To arrive at a full description of the triggering, contents, and development of PM, the data analysis included three steps in the following order: (a) identify meaningful themes of PM, (b) identify mechanisms involved in the triggering of PM, and (c) identify mechanisms of development of PM over time.

**Identification of meaningful themes of PM.** The general inductive approach (Thomas, 2006) was used to identify themes from the transcripts of the participants’ reports during the PM phases. This approach is characterized by a focus on the core meanings of the participants’ reports with respect to the research objectives, and to extract the most important themes or categories. These themes, based on interpretations of the raw data by the researchers, summarized meaningful contents of the participants’ descriptions. Single contents could be ascribed to only one theme, which corresponded either to actions, intentions, thoughts, emotions, perceptions, or expectations associated with the PM experience. The themes were labeled by a word or a short expression, such as “Getting self-confidence”, “Collapsing”, “Increasing exertion”, “Dropping”, etc. Subsequently, the themes were ascribed to one of the dimensions composing PM—perceptions, cognitions, affects, and behaviors (Taylor & Demick, 1994)—and were arranged according to PM+ and PM-.

**Identification of the mechanisms of PM triggering.** The mechanisms triggering PM were derived from the nature and temporal organization of the themes that surrounded the beginning of the PM experience. The themes (i.e., actions, intentions, thoughts, emotions, perceptions, or expectations) that just preceded and followed the beginning of the PM experience were compared by the researchers to detect either consistencies or inconsistencies across them. Then, the consistencies or inconsistencies were labeled in terms of mechanisms triggering PM.

**Identification of the mechanisms of PM development.** The analysis of the development of PM over time was conducted in a similar way as the analysis of the triggering, except that only the series of themes that unfolded from the beginning to the termination of the PM experience were examined.

**Reliability of data analysis.** The reliability of the coding procedure was assessed using Bellack, Kliebard, Hyman, and Smith’s (1966) agreement rate [(number of same findings) / (number of same findings + number of divergent findings)]. Based on the transcripts of the participants’ descriptions, the two researchers in charge of the data analysis independently constructed meaningful themes, and identified mechanisms of PM triggering and development. Regarding the amount and labels of the meaningful themes, the initial agreement rate was 90%. With regard to the identification of the mechanisms of PM triggering and PM development, the agreement rate was 100%. The inter-coder reliability was above the minimal
percentage of 70%, as recommended by Van Someren, Barnard, and Sandleberg (1994). Any disagreement was settled by discussions between three of the researchers involved in this study, until a consensus was reached.

**Results**

Consistent with the order of analysis, the results are presented separately for the themes of PM, the triggering of PM, and the development of PM over time.

**PM Themes**

The participants mentioned different meaningful contents while they were remembering their experience of PM. These contents were ascribed to several themes referring to PM+ (see Table I) and PM- (see Table II).

**Experience of PM+.** Based on the analyses of the participants’ verbalizations, the coders agreed on 83 contents. These contents were indexed into 15 themes and further abstracted into four dimensions: perceptions, affects and emotions, cognitions, and behaviors.

The contents identified as pertaining to perceptions ($n = 26$) were divided into four themes: “PM-for opponent” ($n = 4$); “Control over situation” ($n = 5$); “Gaining psychological advantage” ($n = 11$); and “Efficiency” ($n = 6$). The contents relating to affects and emotions ($n = 20$) could be divided into three themes: “Getting self-confidence” ($n = 10$); “Elation and satisfaction” ($n = 8$); and “Worries about losing momentum” ($n = 2$). The contents pertaining to the cognitions ($n = 27$) were divided into five themes: “Anticipated negative scenario for the opponent” ($n = 2$); “Anticipation of positive scenario” ($n = 6$); “Adopting performance-approach goals” ($n = 6$); “Adopting mastery-approach goals to be effective” ($n = 8$); “Adopting mastery-avoidance goals to protect one’s advantage” ($n = 5$). A mastery-approach goal corresponds to a focus on performing a task well or improving in a task; a mastery-avoidance goal corresponds to a focus on not making mistakes; a performance-approach goal indicates a focus on outperforming others (e.g., Elliot & McGregor, 2001). The behaviors of PM+ ($n = 10$) could be divided in three themes: “Increasing exertion” ($n = 6$); “Checking positive momentum” ($n = 2$); and “Coasting” ($n = 2$). Coasting refers to self-regulation strategies, such as managing effort to save energy (swimming), and reducing the involvement in approach goals to ensure only the necessary control over the situation (table tennis). Checking positive momentum refers to checking one’s advantage, or position, in the competition.
<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Themes</th>
<th>TT</th>
<th>S</th>
<th>Examples of contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptions</td>
<td>1. PM- for opponent ((n = 4))</td>
<td></td>
<td></td>
<td>Perceiving the opponent’s doubt right after observing an opponent’s gross mistake.</td>
</tr>
<tr>
<td></td>
<td>2. Control over situation ((n = 5))</td>
<td></td>
<td></td>
<td>Perceiving that one’s predictions about the opponent’s intentions and actions are right.</td>
</tr>
<tr>
<td></td>
<td>3. Gaining psychological advantage ((n = 11))</td>
<td></td>
<td></td>
<td>Perceiving the advantage over one’s opponent after perceiving the opponent’s doubt.</td>
</tr>
<tr>
<td></td>
<td>4. efficiency ((n = 6))</td>
<td></td>
<td></td>
<td>Perceiving swimming faster without exerting more effort.</td>
</tr>
<tr>
<td>Affects and Emotions</td>
<td>1. Getting self-confidence ((n = 10))</td>
<td></td>
<td></td>
<td>Feeling self-confident right after having perceived to have the control over the game.</td>
</tr>
<tr>
<td></td>
<td>2. Elation and satisfaction ((n = 8))</td>
<td></td>
<td></td>
<td>Enjoying swimming when experiencing a good physiological state.</td>
</tr>
<tr>
<td></td>
<td>3. Worries about losing momentum ((n = 2))</td>
<td></td>
<td></td>
<td>Worry about the emergence of being tired.</td>
</tr>
<tr>
<td>Cognitions</td>
<td>1. Anticipated negative scenario for opponent ((n = 2))</td>
<td></td>
<td></td>
<td>Imagining a negative future scenario for the opponent while considering one’s PM+.</td>
</tr>
<tr>
<td></td>
<td>2. Anticipation of positive scenario ((n = 6))</td>
<td></td>
<td></td>
<td>Imagining one’s victory while perceiving having gained momentum.</td>
</tr>
<tr>
<td></td>
<td>3. Adopting PAp goals ((n = 6))</td>
<td></td>
<td></td>
<td>Wanting to win the race.</td>
</tr>
<tr>
<td></td>
<td>4. Adopting MAp goals to be effective ((n = 8))</td>
<td></td>
<td></td>
<td>Wanting to swim effectively.</td>
</tr>
<tr>
<td></td>
<td>5. Adopting MAv goals to protect one’s advantage ((n = 5))</td>
<td></td>
<td></td>
<td>Wanting to avoid making mistakes during the turn.</td>
</tr>
<tr>
<td>Behaviors</td>
<td>1. Increasing exertion ((n = 6))</td>
<td></td>
<td></td>
<td>Increasing one’s velocity to increase the gap with other opponents.</td>
</tr>
<tr>
<td></td>
<td>2. Checking positive momentum ((n = 2))</td>
<td></td>
<td></td>
<td>Confirming one’s positive momentum state and the position.</td>
</tr>
<tr>
<td></td>
<td>3. Coasting ((n = 2))</td>
<td></td>
<td></td>
<td>Keeping one’s velocity to avoid becoming tired.</td>
</tr>
</tbody>
</table>

*Note: TT = Table tennis; S = Swimming. MAp goals = Mastery-approach goals; MAv goals = Mastery-avoidance goals; and PAp goals = Performance-approach goals. The occurrence of a cross in the column TT or S means that the indicated theme at the same line was identified in table tennis (TT) or swimming (S).*
<table>
<thead>
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<th>TT</th>
<th>S</th>
<th>Examples of contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptions</td>
<td>1. Collapsing ($n = 5$)</td>
<td>×</td>
<td>×</td>
<td>Has the impression to swim in the semolina.</td>
</tr>
<tr>
<td></td>
<td>2. PM+ for opponent ($n = 3$)</td>
<td>×</td>
<td>×</td>
<td>Perceiving the opponent breakaway, and seeing oneself behind.</td>
</tr>
<tr>
<td></td>
<td>3. Inefficiency ($n = 8$)</td>
<td>×</td>
<td>×</td>
<td>Perceiving one’s leg movements as desynchronized.</td>
</tr>
<tr>
<td>Affects and Emotions</td>
<td>1. Getting self-doubt ($n = 3$)</td>
<td>×</td>
<td></td>
<td>Does not dare to execute the necessary actions by fear of failing.</td>
</tr>
<tr>
<td></td>
<td>2. Worries about being defeated ($n = 4$)</td>
<td>×</td>
<td></td>
<td>Being worried right after having failed two consecutive exchanges.</td>
</tr>
<tr>
<td></td>
<td>3. Displeasure and dissatisfaction ($n = 3$)</td>
<td>×</td>
<td></td>
<td>Being dissatisfied with oneself because of absence of pleasure.</td>
</tr>
<tr>
<td></td>
<td>4. Regrets ($n = 4$)</td>
<td>×</td>
<td></td>
<td>Regrets about not having taken enough risks when one had the lead.</td>
</tr>
<tr>
<td></td>
<td>5. Discouraged ($n = 3$)</td>
<td>×</td>
<td>×</td>
<td>Being fed up with swimming because of one’s exhaustion.</td>
</tr>
<tr>
<td>Cognitions</td>
<td>1. Adopting MAp goals to cope with PM- ($n = 7$)</td>
<td>×</td>
<td>×</td>
<td>Wanting to swim well despite the perceived difficulty.</td>
</tr>
<tr>
<td></td>
<td>2. Adopting MAv goals to resist PM- ($n = 6$)</td>
<td>×</td>
<td>×</td>
<td>Avoiding prolonging the exchange.</td>
</tr>
<tr>
<td></td>
<td>3. Adopting PAv goals ($n = 3$)</td>
<td>×</td>
<td>×</td>
<td>Not wanting to finish the race far behind the opponents</td>
</tr>
<tr>
<td></td>
<td>4. Anticipation of negative scenario ($n = 2$)</td>
<td>×</td>
<td></td>
<td>Imagining a difficult continuation due to negative momentum.</td>
</tr>
<tr>
<td>Behaviors</td>
<td>1. Resisting ($n = 5$)</td>
<td>×</td>
<td>×</td>
<td>Increasing efforts to catch up with the opponent.</td>
</tr>
<tr>
<td></td>
<td>2. Dropping ($n = 3$)</td>
<td>×</td>
<td>×</td>
<td>Giving up when being exhausted and convinced of the defeat.</td>
</tr>
</tbody>
</table>

*Note.* TT = Table tennis; S = Swimming. MAp goals = Mastery-approach goals; MAv goals = Mastery-avoidance goals; and PAv goals = Performance-avoidance goals. The occurrence of a cross in the column TT or S means that the indicated theme at the same line was identified in table tennis (TT) or swimming (S).
Experience of PM-. A total of 59 contents related to PM- were extracted from the transcripts. These contents were indexed into 14 themes and further abstracted into four main dimensions.

The contents \((n = 16)\) of the experience of PM- were divided into three themes: “Collapsing” \((n = 5)\); “PM+ for the opponent” \((n = 3)\); and “Inefficiency” \((n = 8)\). The contents relating to the affects and emotions of PM- \((n = 17)\) were divided into five themes: “Getting self-doubt” \((n = 3)\); “Worries about being defeated” \((n = 4)\); “Displeasure and dissatisfaction” \((n = 3)\); “Regrets” \((n = 4)\); and “Discouraged” \((n = 3)\). The contents pertaining to the cognitions of PM- \((n = 18)\) were divided into four themes: “Adopting mastery-approach goals to cope with PM-” \((n = 7)\); “Adopting mastery-avoidance goals to resist PM-” \((n = 6)\); “Adopting performance-avoidance goals” \((n = 3)\); and “Anticipation of negative scenario” \((n = 2)\). A performance-avoidance goal involves focusing on not being outperformed by others (e.g., Elliot & McGregor, 2001). The contents concerning behaviors of PM- \((n = 8)\) could be subdivided into two themes: “Resisting” \((n = 5)\) and “Dropping” \((n = 3)\). Dropping corresponds to a drop, or decrease, of effort exertion as soon as the defeat is perceived as inevitable.

PM Triggering

Three kinds of mechanisms appeared to be related to the triggering of PM: Dissonance, consonance, and fear of not winning. These mechanisms are illustrated in Table 3.

Dissonance. Several times \((n = 5)\), the triggering of PM was associated with perceiving a meaningful difference between a situation assumed to be established, and an unexpectedly occurring new event. Thus, when the ongoing performance was suddenly perceived as better (worse) than expected, PM+ (PM-) emerged. Four PM+ and one PM- experiences emerged as a result of this mechanism.

Consonance. The analysis of the participants’ verbalizations also revealed that PM, here only PM-, could emerge when a negative situation or expectation was reinforced during the competition by negative perceptions and feelings \((n = 2)\).

Fear of not winning. The triggering of one experience of PM- was found to be related to upcoming maladaptive thoughts when an athlete realized how close he was to the victory. He then became completely obsessed with the thought of letting the victory slip away and making mistakes \((n = 1)\).
<table>
<thead>
<tr>
<th>Mechanisms</th>
<th>Definitions</th>
<th>PM+</th>
<th>PM-</th>
<th>Examples of quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissonance (n = 5)</td>
<td>Conflict between an expectation and a novel situation</td>
<td>×</td>
<td>×</td>
<td>[Right before the beginning of S's race]: This was a race to qualify for the Olympic Games. It was the last day and all the races I participated in before turned out badly. I guessed from that that I was not super strong […] Qualifying for the Olympic Games was the aim for me, but given the previous three days of the competition and the shape I was in, I knew that that would be impossible. [At the beginning of his PM+]: In the butterfly, what we can see of others is generally their hand as it passes. That's all we can see. And here, I don’t see anyone’s hand passing. So, I say to myself: “I'm ahead, already!” I’m really comfortable. I feel that it’s going to be my race, in fact. I feel here that there is something different than usual. Here, I say to myself that there is something I can accomplish.</td>
</tr>
<tr>
<td>Consonance (n = 2)</td>
<td>Reinforcement of an expectation by a novel situation</td>
<td>×</td>
<td></td>
<td>[S, experiencing a PM-]: And here, I suddenly slow down. Here, I actually have the impression of being an inflatable dinghy that has just been punctured […]. I already had a first warning before, with prickles and pain. When it started I still forced myself to keep going and then, I overdid it, I overdid it and then, I snapped […]. Anyway, I’m not too surprised.</td>
</tr>
<tr>
<td>Fear of not Winning (n = 1)</td>
<td>Irruption of maladaptive thoughts when close to the victory</td>
<td></td>
<td>×</td>
<td>[Right before P’s PM-]: I make the right tactical choices. I have no negative thoughts, I only have positive thoughts. Here, my opponent is completely disoriented […]. I’m super super confident. [About disturbance of adaptive thoughts]: I say to myself: “Just a bit more effort and I will win”, […]. From here on, I only think of winning, I am no longer thinking from one point to the next. I say to myself that I absolutely must win, that I must not make one mistake. I no longer make the exchange last. [About perceived shift in momentum]: I wanted to finish; I didn’t want to continue the exchange because I felt that he was catching up. I change my objective, I change my perception. […] I try to convince myself that it's alright, but I start to doubt […] I know I’m not doing well.</td>
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*Note:* The occurrence of a cross in the column PM+ (or PM-) means that the mechanism which is indicated at its line has been identified in PM+ (or PM-).
PM Development

The analysis of the series of themes unfolding from the beginning to the termination of the PM experiences revealed that PM developed mainly by mechanisms of amplification, which sometimes ended with a reduction of effort when the win (PM+) or the defeat (PM-) were perceived as inevitable.

Amplification. Mechanisms of amplification were found for both PM+ \((n = 3)\) and PM- \((n = 3)\). In PM+, the amplification consisted of experiencing an increasingly positive achievement pattern. Athletes combined more and more features of PM+, where each one was perceived as more positive than the previous one. Such dynamics were observed for \(S_1, S_2,\) and \(P_2\), whose greater effort exertion was accompanied with more and more perceived efficiency, self-confidence, and feelings of gaining a psychological advantage, while their involvement in mastery-avoidance goals declined.

With respect to PM-, amplification took the form of a negative spiral \((n = 3)\), during which each negative experience served as a basis for the next one, which was more negative than the previous one, and so forth. For several athletes (i.e., \(S_3, S_4,\) and \(P_3\)), first doubts were followed by perceptions of ineffectiveness. This perception prompted a phase of resistance, which consisted of adopting avoidance goals (both mastery and performance), while attempting to regain control through mastery-approach goals and exerting more effort to avoid a further deterioration of the situation. Given that the deterioration continued in spite of this resistance, there was an increase in the perceptions of ineffectiveness, and an emergence of displeasure, anxiety, and perceptions of PM+ for the opponent.

Final effort reduction. PM+ sometimes ended with a reduction in effort \((n = 2)\). For some athletes, these dynamics resulted from high confidence about winning, prompting them to coast by reducing either their exerted efforts \((S_2)\) or their achievement goal endorsement \((P_1)\). PM- was also found to end in an effort reduction for some athletes \((n = 3)\). However, in this case the athletes found themselves in a very negative situation, and their negative feelings had developed up to the point that further effort was considered fruitless, causing them to drop both their efforts and goals.

Discussion

The present study aimed to qualitatively examine the psychological processes involved in the triggering of PM, the perceptual, cognitive, affective, and behavioral contents associated with PM, and its development over time.
Considering the first aim of the study, PM was found to be triggered by three kinds of mechanisms dissonance, consonance, and fear of not winning. While earlier qualitative research on PM showed what kind of triggers might cause PM, causal mechanisms like those emerged from our data have not been revealed, nor anticipated on in earlier PM research. The dissonance mechanism implies an unexpectedly occurring event or performance state, given the previously established situation or performance expectation. When the unanticipated situation was perceived as more (less) favorable than the previous one, PM+ (PM-) emerged. Though non-existent in the PM literature, such a mechanism is consistent with other theories that also account for psychological changes as a function of moving toward or away from a goal. To be more concrete, according to the theories of acceleration (Carver & Scheier, 1990) and quasi-acceleration (Hsee, Salovey, & Abelson, 1994), the more abrupt the change in the perceived rate of moving toward a goal, the bigger and more sudden the changes in affects, like a rush of exhilaration or a sinking feeling. Moreover, the dissonance mechanism supports Gernigon et al.’s (2010) findings that indices contrary to the current situation may have a considerable impact on the dynamics of PM.

The consonance mechanism also includes a comparison between the ongoing performance and one’s expectations. However, in this case the previously established situation or expectation is confirmed. This mechanism pertained to the PM- experience of one athlete, who had negative expectations about the upcoming swimming race, which were confirmed at the start of the race.

Fear of not winning, a mechanism also related to the triggering of one negative momentum experience, consists of upcoming maladaptive thoughts replacing previous adaptive thoughts. This disturbance was triggered by the perception of being very close to the victory, which caused the athlete to only think about not letting the victory slip away and avoiding mistakes. Earlier research already revealed that mastery-avoidance goals relate to fear of failure (Conroy & Elliot, 2004; Elliot & McGregor, 2001), a feeling close to anxiety which is known to have a deleterious effect on performance (e.g., Williams, Vickers, & Rodrigues, 2002). Such deleterious effects could be even worse when the victory is viewed as almost assured (e.g., Kahneman & Tversky, 1982; Medvec & Savitsky, 1997).

On the whole, several mechanisms were involved in the triggering of PM. However, PM+ emerged only as a result of the dissonance mechanism, whereas PM- was related to a greater variety of mechanisms (i.e., dissonance, consonance, and fear of not winning). Therefore, it appears that PM- can be triggered in more ways than PM+, which is in line with the
assumption that PM- is easier to trigger than PM+ (Adler, 1981; Gernigon et al., 2010).

The second purpose of this study was to explore the meaningful contents of PM. Results revealed a range of themes that were distributed across perceptual, affective, cognitive, and behavioral dimensions.

The perceptions associated with PM experiences concerned the psychological advantage or the collapse, the level of efficiency, and the amount of control over the situation. PM+ included positive themes on these perceptions, whereas PM- contained negative themes. Given that efficiency implies both power and coordination, these findings support Vallerand et al.’s (1988) assumption that PM+ (PM-) results in an increase (decrease) in perceptions of control, energy, and synchronism.

Athletes also experienced a large variety of affective themes during PM. Generally, PM+ and PM- were associated with pleasant (e.g., elation, satisfaction, self-confidence) and unpleasant (e.g., self-doubt, displeasure, anxiety) feelings, respectively. This is consistent with Taylor and Demick’s (1994) view that PM includes a positive or negative change in affect.

The cognitions athletes experienced during PM related to a projection into the future and goal involvement. PM+ was related to projecting oneself into a positive future, such as winning the competition, whereas PM- was associated with a projection into a negative future, such as losing the competition. Referring to Atance and O’Neill’s (2005) concept of episodic future thinking defined as a projection of oneself into the future to pre-experience an event, Gernigon et al. (2010) assumed that early shifts in goal involvement during the momentum period were due to such anticipations.

Considering goal involvement, mastery-approach and mastery-avoidance goals were endorsed during both PM+ and PM-. Performance-approach goals, on the other hand, were only endorsed during PM+, and performance-avoidance goals only during PM-. When athletes adopted a positive achievement pattern during PM+, they particularly endorsed mastery-approach and performance-approach goals, forsaking mastery-avoidance goals more and more. When athletes kept striving during PM-, mastery-approach, mastery-avoidance and performance-avoidance goals were endorsed simultaneously. The finding that mastery-approach goals were endorsed when fighting the negative effects of PM- is in line with Barron and Harackiewicz (2001) who found that endorsing a mastery orientation is an effective way to buffer the negative effects of low achievement. Furthermore, goal endorsement decreased when athletes were coasting near the end of PM+ or dropping near the end of PM-, which could be interpreted as a reduction in athletes’ interest when it appears as if the victory (PM+) or
defeat (PM-) is inevitable. Taken together, these findings concerning goal involvement confirm that achievement goals are implied in the process of PM (Gernigon et al., 2010), and that the different achievement goals may display different types of relationships (e.g., oppositional, concomitant, independent), depending on the ongoing situation (Gernigon et al., 2004).

Certain perceptions and cognitions specifically concerned the opponent. Athletes intuitively perceived a positive or negative momentum for their opponent, whereby the latter was sometimes accompanied by an anticipation of a negative future (a defeat) for the opponent. Hence, the participants developed empathic thoughts as if they were the spectators of a momentum experienced by another person. This finding supports the idea that momentum is a social phenomenon in the sense that people external to the action (e.g., spectators) can imagine the momentum of others (e.g., Markman & Guenther, 2007), but also that people within the action use behaviors of others (e.g., the opponents) to build their own feeling of momentum (e.g., Jones & Harwood, 2008; Shaw et al., 1992; Silva, Cornelius, & Finch, 1992).

Specific behaviors pertaining to PM+ and PM− were also revealed. Striving to succeed by increasing efforts was found during PM+, whereas attempts to escape negative momentum by increasing efforts or by giving up were observed during PM−. In addition, checking the gained momentum was a concern during PM+, which suggests the presence of a certain degree of worry at the start of positive momentum. This is in concordance with Adler’s (1981) view that PM+ is fragile or unstable at its start.

Overall, the PM themes found in the present study are consistent with the view that PM+ motivation, and behavior (Gernigon et al., 2010; Taylor & Demick, 1994; Vallerand et al., 1988). However, the negative tendency to coast when PM+ is well established or the positive tendency to struggle at the start of the PM− development are exceptions to this general trend, and are to be interpreted within the PM dynamics per se. or PM− corresponds to a positive or a negative change in perceptions, affects, thoughts.

The third purpose of the present study was to describe the development of PM from the start until the end. Concerning the development of PM+, athletes experienced an increasingly positive achievement pattern: Various contents (perceived PM+, efficiency, self-confidence, approach goals) increased in intensity over time. However, following this amplification phase PM+ sometimes ended with coasting, which has also been mentioned by Adler (1981) as being a typical consequence of PM+. Though this seemingly paradoxical behavior has not been reported in earlier research on PM, Carver (2003) provided an explanation from a self-regulation point of view. According to this author, coasting is activated by positive emotions—signs
that one is progressing toward the targeted goal more quickly than expected—and enables the individual both to deal with multiple goals, and to take advantage of unforeseen opportunities. In the present case, coasting might save physiological energy while maintaining a satisfactory standing with regard to a possible comeback of the opponent(s). However, it should be noted that such a relaxed attitude also carries the risk of harming performance (Adler, 1981).

During PM-, all athletes attempted to annihilate the deleterious effects of negative momentum by exerting more physiological and psychological efforts. For most athletes, however, the negative experience of PM- amplified up to the point that they ceased their efforts. This finding is consistent with Perreault et al. (1998), who also found resistance behavior during negative momentum, which is known as negative facilitation (Cornelius, Silva, Conroy, & Petersen, 1997; Silva, Hardy, & Crace, 1988). This concept means that athletes increase their efforts after a momentary failure that can still be overcome. Another plausible and more general explanation can be found in Wortman and Brehm’s (1975) integration of the reactance theory and learned helplessness model. According to the reactance theory (Brehm, 1972), a loss of control produces an attempt to regain it, as long as control is not viewed as impossible to regain. Learned helplessness (Seligman, 1975) can be characterized by a negative pattern of behavior, motivation, and emotions that stems from an acquired perception of uncontrollability (see also Gernigon, Fleurance, & Reine, 2000; Gernigon, Thill, & Fleurance, 1999 in the motor domain). Therefore, struggling followed by dropping might be explained by the succession of reactance and helplessness phases, respectively. Athletes may continue resisting their negative momentum as long as they expect that they could still win the competition or perform well. However, once such an expectation vanishes, a helplessness pattern emerges in the form of dropping.

It has been assumed that the experience of PM depends on the type of sport (e.g., Higham, 2000). Although the present study revealed an overlap in themes between table tennis and swimming, slight differences in PM experiences were also found. For example, coasting concerned the physiological aspect in swimming, but the motivational aspect (goal involvement) in table tennis. This is probably because physiological demands are more inherent to swimming than to table tennis. In yet another sport (soccer), several other PM themes than those reported in the present study have been identified (Jones & Harwood, 2008). Hence, in line with recent findings that meaningful experiences of athletes are dependent on the context (e.g., Hauw & Durand, 2006), it seems likely that the experience of PM includes both standard (e.g., self-confidence) and context-specific themes.
This study presents a first attempt to qualitatively account for the subjective experience of PM by showing how a PM experience is triggered, which contents are involved in PM, and how it develops over time. Results showed that PM is embedded in an ongoing history of events, involving the past (e.g., S2 experienced a bad season so far, and hence had negative expectations before, and right after the start of the race) and the future (e.g., S2 anticipated a positive outcome as soon as he realized he had the lead). This conclusion directly supports Gernigon et al.'s (2010) assumption that the perception of movement toward or away from either a desired or undesired goal might emerge from both feedback and feedforward that are provided by the specific ongoing history of events. Furthermore, several PM+ and PM- themes depended on the kind of sport, thereby showing that PM experiences are context dependent.

From a practical standpoint, findings from this study allow us to suggest some intervention strategies. Achievement goals were involved in the development of both PM+ and PM-. Mastery-approach goals were found to be endorsed to both maintain PM+ and fight PM-. Given that mastery-approach goals were adaptive during both PM+ and PM-, athletes should train to keep endorsing such goals to refrain from coasting, and to overcome their PM-. This suggestion also fits with the conclusion of Elliot and Church (1997) that in achievement contexts, such as the sport arena, mastery-approach goal endorsement needs to be promoted in combination with performance-approach goal endorsement (which is inherent in such contexts). These authors propose that this combination of goals carries the most adaptive self-regulatory properties regarding both motivation and performance.

The present study has some limitations. First, as for every retrospective interview-based investigation, memory biases might have entailed distortions and contamination of affective responses as a result of cognitive judgments. However, by preventing participants’ rationalizations and by letting them focus on real-life experiences during competitions, the methodology of this investigation, as advocated by the course-of-action theory, is well equipped to reduce such biases. Second, the sample size was small, which may explain why some themes did not occur often, and the sample included only men. Therefore, although we obtained a detailed picture of the psychological contents and dynamics of PM, the generalizability of the findings to a population level remains limited. Despite these limitations, being inherent in most qualitative studies, we did come to new insights about the elusive construct of PM. This meets the message of Crust and Nesti (2006) that applying a qualitative approach to increase insights in PM is necessary, because we are lacking a comprehensive understanding of this phenomenon.
To conclude, future research needs to examine the subjective experience of PM in other sport contexts, so that the identification of sport-dependent specificities of PM can be pursued. There is also a need to test strategies, such as directing athletes’ achievement goal endorsement, which could help athletes to benefit from PM+ and cope with PM-.

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