Exploring athletes' perceptions of the relationship between mental toughness and dispositional flow in sport

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Abstract

Objectives: Despite considerable scholarly attention over the last two decades, little is known about the influence of dispositional attributes on flow in sport. In achievement settings, mental toughness (MT) is a personal capacity supporting the process of high performance. Based on common overlaps with peak performance, confidence, control, concentration, and thriving in demanding situations, the present research aimed to explore the relationship between MT and dispositional flow and elucidate the psychological variables underlying dispositional flow.

Design: A mixed method explanatory participant-selection design was adopted, whereby a quantitative approach was used to identify individuals for a qualitative follow-up phase to explore the relationship between MT and dispositional flow.

Method: An intensity sampling strategy was used to identify individuals with higher / lower MT and dispositional flow. Semi-structured interviews were conducted with 16 athletes (*M* age = 25, *SD* = 3.24; female *n* = 10; male *n* = 6). An inductive content analysis was undertaken to interpret data.

Results: Seven general dimensions describing the psychological attributes related to dispositional flow in athletes with higher and lower MT emerged. Specifically, differences in confidence, perfectionism, goal orientation, coping mechanism selection, locus of control, optimism and concentration were apparent and could account for differences in dispositional flow.

Conclusion: While all athletes experienced flow, there were differences in dispositional flow and the processes involved in entering, maintaining and restoring flow between higher and lower MT subgroups. Findings are discussed in relation to the existing literature, and recommendations for future research into the MT-flow relationship are outlined.

Keywords: optimal experience; confidence; the zone; autotelic personality; mixed method.

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Introduction

Positive psychology promotes human flourishing and concerns the study of subjective experiences, institutions and individual characteristics supporting optimal human functioning (Seligman & Csikszentmihalyi, 2000). In terms of optimal functioning in sport, scholars have recently investigated superior performance from the perspective of mental toughness (MT; Anthony, Gucciardi, & Gordon, 2016) and flow states (Swann, Keegan, Crust, & Piggott, 2016). When athletes achieve superior performances, they commonly refer to the importance of their psychological state (e.g., Jackson & Kimiecik, 2008). Within sport psychology, flow is a psychological state which has been linked to superior – and even peak – performance (e.g., Swann et al., 2016). Likewise, MT is a personal attribute supporting the process of performance excellence and sustained achievement in sport (e.g., Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015). The common intersection between flow and MT concerning optimal functioning highlights the importance of understanding the MT-flow relationship.

Flow occurs when individuals are challenged to their limits, but perceive their resources to be in proportion with task demands, resulting in a psychological state characterised by intense concentration, automaticity and a sense of control (Csikszentmihalyi, 2002). The most common conceptualisation of flow includes nine dimensions (Csikszentmihalyi, 2002; Jackson & Csikszentmihalyi, 1999). Three of these dimensions are posited to be proximal conditions leading to the occurrence of flow (Nakamura & Csikszentmihalyi, 2002), namely: *challenge-skills balance* (balance between high perceived demands and skills), *clear goals* (know exactly what to do during the task), and *unambiguous feedback* (instant feedback about performance progression). The remaining six dimensions are proposed to be experiential characteristics of flow (Nakamura & Csikszentmihalyi, 2002),

including: *action-awareness merging* (performing automatically), *concentration on the task at hand* (narrow focus on task), *sense of control* (feeling of control over performance), *loss of self-consciousness* (absence of concern for self), *transformation of time* (alteration in passing of time), and *autotelic experience* (the task is enjoyable and intrinsically rewarding).

Although flow is often considered to be elusive (e.g., Aherne, Moran, & Lonsdale, 2011), Jackson and Kimiecik (2008) stated that some athletes are "better psychologically equipped, whatever the situation, to experience flow" (p. 391). Indeed, researchers have proposed the idea of an *autotelic personality* which encompasses psychological attributes that increase the propensity to experience flow states (e.g., Nakamura & Csikszentmihalyi, 2002). Despite the appeal of this idea, a clear understanding of the autotelic personality has yet to emerge in sport (Swann et al., 2012). For example, in reviewing the psychological attributes connected to dispositional flow in sport, Jackson and Kimiecik (2008) vaguely suggested that goal orientation, competitive trait anxiety, perceived sport ability and intrinsic motivation "could make up something resembling an autotelic personality in sport" (p. 392). As a result, there have been calls for a more refined understanding of the influence of individual differences on flow experiences in sport (Jackson, 2014; Swann et al., 2012). Furthermore, combining existing knowledge of situational factors which influence flow (e.g., Jackson, 1995) with such understanding of individual differences could enable the development of more specific and robust intervention strategies. In turn, these interventions may have a greater chance of helping athletes experience flow more regularly, which is a key aim for researchers and practitioners in this area (Swann et al., 2012).

Since the turn of the millennium, researchers have systematically investigated performance excellence in sport from the perspective of MT (Anthony et al., 2016). Mental toughness is related to success and progression in sport and is described as a personal capacity to consistently produce good performances despite varying situational demand levels

(Gucciardi et al., 2015). While the debate concerning the nature of the construct continues, most researchers concur that MT is a reasonably stable and enduring disposition that is unlikely to change rapidly (e.g., Hardy, Bell, & Beattie, 2014). A range of MT models have been proposed (e.g., Clough, Earle, & Sewell, 2002; Cook, Crust, Littlewood, Nesti, & Allen-Collinson, 2014; Gucciardi, Gordon, & Dimmock, 2008) and although novel attributes have emerged in qualitative studies, the majority of MT characteristics have been consistently reported, including confidence, perseverance, emotional control, focus, and thriving under pressure. Notably, the majority of commonly reported MT attributes have emerged as antecedents or characteristics of flow (see Swann et al., 2012 for review), demonstrating the theoretical overlaps between MT and flow. For example, confidence is a fundamental element of MT (e.g., Clough et al., 2002) which has shown positive relations with dispositional flow (Koehn et al., 2013). As a positive subjective appraisal of skills (Csikszentmihalyi, 2002) and the development of confidence is essential for flow occurrence (Swann et al., 2016), it is possible that confidence increases dispositional flow. Moreover, while some activities incorporate predefined challenges, there are occasions when the challenge provided by the situation is ambiguous or insufficient for flow, elevating the need for the self-creation of challenges (Jackson & Csikszentmihalyi, 1999). The MT characteristics of high motivation to achieve (e.g., Cook et al., 2014) and ability to handle pressurised situations (e.g., Jones, Hanton, & Connaughton, 2007) could assist performers to reach and manage suitable levels of challenge to increase dispositional flow. Finally, resilience and perseverance are attributes of MT (e.g., Cook et al., 2014) which could help athletes to prolong flow when exposed to potential disruptors regarding performance progression, such as performance errors (e.g., Chavez, 2008).

As well as theoretical intersections, empirical studies reported significant and positive associations between MT and dispositional flow in sport. Crust and Swann (2013) found a

significant and positive correlation ($r = 0.66$) between MT and dispositional flow in university athletes. In addition, the subscales of MT significantly predicted 50% of the variance in dispositional flow, with confidence ($\beta = 0.44$, $p < 0.001$), commitment ($\beta = 0.20$, $p < 0.05$) and challenge ($\beta = 0.20$, $p < 0.05$) emerging as significant predictor variables. Building upon these initial findings, a multiple mediation analysis in sport performers ($n = 256$) established that while the proximal conditions of flow mediated the significant positive relationship between MT and the characteristics of flow, MT maintained a unique significant direct effect on the flow dimensions of concentration on the task at hand and sense of control (Author 1 et al., under review). As such, MT could be particularly beneficial to achieving these characteristics of flow, although findings do not fully elucidate the influence of MT on athlete flow experiences, primarily due to the limitations of quantitative approaches to investigate flow (Jackson & Kimiecik, 2008).

From a methodological standpoint, issues surrounding previous quantitative and qualitative approaches to the study of flow in sport have been outlined (Swann et al., 2012), and mixed method designs have been advocated to advance understanding (Jackson, 2014). While there is debate concerning the use of this approach (e.g., Sparkes, 2015), mixed method designs can overcome the limitations of quantitative or qualitative approaches and provide researchers with richer evidence than could have been attained using a single method (Moran, Matthews, & Kirby, 2011). As flow is a subjective state, open-ended interviews can enrich phenomenological understanding (Jackson & Kimiecik, 2008), and purposefully sampling athletes with higher[1] / lower MT and dispositional flow could permit an exploration of the MT-flow relationship from the perspective of information-rich cases. Therefore, to build upon initial quantitative research (Author 1 et al., under review; Crust & Swann, 2013) and gain a richer understanding of the relationship between MT and dispositional flow, we

[1] Mental toughness is proposed to be a continuous variable whereby individuals have higher or lower levels of MT, rather than being mentally tough or not (Gucciardi et al., 2015).

aimed to purposefully sample athletes with higher / lower MT and dispositional flow to explore their experiences of flow in sport. Theoretically, understanding the relationship could offer an important insight into the process of optimal performance in sport. In addition, findings could provide athletes, coaches, and practitioners with applied recommendations to increase dispositional flow. In turn, this study attempted to address limitations of previous approaches, and answer calls to understand the dispositional attributes underlying flow in sport (Jackson, 2014; Swann et al., 2012).

Method

Design and Approach

An explanatory sequential participant-selection design (quan → QUAL) (Creswell & Plano-Clark, 2011) was employed, which consisted of a quantitative phase to purposefully select participants for a qualitative follow-up phase. Specifically, the first phase of this study involved a quantitative assessment to identify participants with higher / lower MT and dispositional flow. Once suitable participants were identified, the second, and primary phase, employed interviews to understand their perceptions of factors related to dispositional flow.

Participants

To understand the experiences of athletes with higher / lower MT and dispositional flow, intensity sampling (Patton, 2015) was used to purposefully select information-rich cases on the phenomenon of interest (i.e., factors related to dispositional flow in athletes with higher / lower MT). A quantitative assessment of MT and dispositional flow acted as a prelude for the qualitative phase by identifying individuals with higher / lower MT and dispositional flow. In phase one, 256 athletes (*M* age = 23.65, *SD* = 5.43; female *n* = 128, male *n* = 128) completed the Mental Toughness Questionnaire-48 (MTQ48; Clough et al., 2002) and the Dispositional Flow Scale-2 (DFS-2; Jackson & Eklund, 2002), the findings of which are reported elsewhere (Author 1 et al., under review). In phase two, 16 interviews

were conducted with eight higher MT-flow (HMTF) and eight lower MT-flow (LMTF) athletes. The criterion for inclusion in the qualitative phase was that an individual's MT and dispositional flow scores were ranked within the upper (i.e., MTQ48 sten score ≥ 7; DFS-2 ≥ 3.9) and lower (i.e., MTQ48 sten score ≤ 4; DFS-2 ≤ 3.4) range of results as measured by the respective scales[2]. Based on the inclusion criterion, a total of 54 (32 HMTF and 22 LMTF) participants were eligible to participate. Participants in the interview sample were 16 Irish athletes (*M* age = 25, *SD* = 3.24; female *n* = 10; male *n* = 6) participating in team (*n* = 12; Gaelic games, soccer, basketball) and individual (*n* = 4; athletics, triathlon, weightlifting) sports. These athletes competed at international (*n* = 4), national (*n* = 8) and club (*n* = 4) levels, and therefore ranged from semi-elite to competitive elite (Swann, Moran & Piggott, 2015).

Procedure

Ethical approval for the study was granted by a research ethics committee at a British university. In the quantitative phase, participants (*n* = 145) agreed to be contacted to participate in a follow-up interview by providing their email address. A total of 18 participants meeting the selection criteria were randomly selected and invited to partake in an interview regarding their experiences of flow. Upon agreement, interviews were organised with 16 participants (88% response rate) and conducted in a neutral location (most took place in meeting rooms). All participants provided written consent following an explanation of the purpose of the study and a request to digitally record the interview. By sequentially analysing each transcript following interviews, the researchers were able to recognise when data

[2] A sten score signifies an individual's approximate position with respect to population norms, ranging on a scale from 1-10 (midpoint = 5.5). Scores of 1-4 and 7-10 indicate that individuals are within the upper and lower 23rd percentiles of population norms for the MTQ48, respectively. To identify contrasting dispositional flow subgroups, higher flow (3-9-4.4) and lower flow (2.8 - 3.4) cohorts were identified, accounting for the upper and lower quartile of dispositional flow scores respectively. Based on the instrument labels within the DFS-2 (Jackson & Eklund, 2002), lower flow scores were located close to the scale midpoint, indicating that individuals experienced flow "sometimes" within their sport, while individuals in the higher flow group reported flow "frequently" or "always." Although quantifying the point at which individuals are "autotelic" is difficult, a rating of 4 "frequently" or 5 "always" may be indicative of the autotelic personality (Jackson & Eklund, 2004).

saturation (Sparkes & Smith, 2014) was becoming apparent. Following the twelfth interview, a notable reduction in the emergence of new information was observed and, in accordance with good practice (Guetterman, 2015), four further interviews were undertaken. No new or additional themes emerged in these interviews, at which point data saturation was deemed to have occurred. Interviews were conducted face to face and lasted, on average, 63 minutes (*SD* ± 15.80). All interviews were digitally recorded and transcribed verbatim in preparation for data analysis, while brief notes were also taken throughout to aid theme generation.

Interview Guide

The interview guide included a series of open-ended questions and began by asking participants if they had heard of the term "flow". If not, a series of alternative terms (e.g., "when everything clicked") featured in previous research (e.g., Swann, Crust et al., 2015) were utilised to assist conceptual understanding. To ensure that a clear interpretation of flow was understood, participants were asked to describe a prominent flow experience in their career. The interviewer assessed if the interviewee described the requisite state and all descriptions were judged to be congruent with previous descriptions of flow (e.g., Swann, Crust et al., 2015). The interview then explored the participant's typical experiences of flow in sport. Additional questions concerned factors that affected dispositional flow (e.g., can you tell me about factors which influence how often you experience flow?). To ensure a thorough account of flow was conveyed, participants were asked if they had anything further to add prior to concluding the interview (Patton, 2015). The guide was piloted with two athletes and led to the use of more specific and direct probes. Pilot data were not included in the final study.

Data Analysis

An inductive content analysis approach was selected as it enables the emergence of themes from the data (Sparkes & Smith, 2014), which was appropriate given the exploratory

nature of this study. To guide the analytical procedure, a process resembling that specified by Braun and Clarke (2006) was utilised to individually analyse the flow experiences of both subgroups. Initially, the first author (i.e., principal investigator) enhanced her familiarity with the data through multiple readings of the transcripts in a process known as "indwelling" (Maykut & Morehouse, 2002). This enhanced the capacity of the researcher to understand flow from different perspectives. Initial codes generated in the data were paraphrased to form lower-order themes which were then combined to create higher-order themes. The same process was used to collate higher-order themes into general dimensions which described the psychological attributes influencing dispositional flow in HMTF and LMTF athletes.

Establishing Trustworthiness

The term trustworthiness describes strategies adopted by the researcher to enhance quality in their work (Sparkes & Smith, 2014). A series of measures were undertaken to enhance the trustworthiness of participant accounts and data analysis. *Peer debriefing* was conducted throughout between the first author and second and third authors who provided constant guidance on the research process, critical evaluation of the data and challenged the researcher's assumptions to ensure that the interpretation resonated with people other than the researcher (Creswell, 2014). This took place during formal meetings of the research team and regular informal discussions with each member individually.

Although peer debriefing was principally concerned with processes of collecting and analysing data, "critical friends" were asked to critique and offer additional insight regarding the results of these processes (Smith & Caddick, 2012). We returned the transcripts and a copy of the results to all participants, and asked them if the themes and categories made sense, and whether the overall account was realistic and resonant with their experiences. This dialogue was viewed as an opportunity for clarification, affirmation, disagreement, and elaboration to enhance the fairness, appropriateness and believability of the researchers'

interpretation of the data (Smith & Caddick, 2012; Smith, Sparkes, & Caddick, 2014). Strong agreement with findings was expressed by participants and no alterations were suggested as a result.

Results and Discussion

This section provides an overview of the relationship between MT and dispositional flow. Seven general dimensions are presented from the perspective of the HMTF (Table 1) and LMTF (Table 2) subgroups to allow differences to be highlighted. Each general dimension is outlined in terms of higher order themes (italicized in text) and direct quotes from the raw data are used throughout to illustrate. This section also makes comparisons between present findings and existing literature to offer potential explanations for the results.

[INSERT TABLE 1 ABOUT HERE]

[INSERT TABLE 2 ABOUT HERE]

Concentration

Concentration is a characteristic of MT (e.g., Cook et al., 2014) and a fundamental element of flow experiences (Swann et al., 2012). Previous research found that MT had a significant direct effect on concentration on the task at hand irrespective of the positive effect of the proximal conditions of flow on this dimension (Author 1 et al., under review). A consistent finding across both subgroups was the importance of focussing on the task and evading cognitive anxiety to initiate, prolong and regain flow states, although establishing appropriate concentration and overcoming anxiety was more difficult for LMTF participants.

HMTF. Parallels were discussed between concentration and flow and the capacity to *focus on the task* and *narrow concentration* were vital, particularly during task adversity:

> It would be very difficult if I wasn't focussed to enter flow and believe that I can do anything. You need to be mentally strong to counteract their [opposition] dominance and concentrate your attention on the processes that help you to enter flow. (James)

This ability to maintain focus during challenging situations could reflect the enhanced decision-making skills associated with MT (Bull, Shambrook, James & Brooks, 2005). *Rapid refocus* and *clearing the mind* helped athletes to combat negativity arising during the performance and cultivated appropriate internal conditions to restore flow:

> When they scored, I felt fatigue in my body, so a non-flow state…in those moments you have to overcome that and see the bigger picture. I had to forget about what had just happened. You say "right, it's time to get back to my job, back to winning the ball." When I did win the next ball, I was back in flow. (Jenny)

Focus on the present helped performers to avoid dwelling on performance feedback and the associated affective responses, thus prolonging flow:

> If you make a good save, you need to come down from that buzz and ensure that you are going to stop the next one…when you make a mistake, you cannot dwell on that. It is the same if you have a positive play. The next play is the most important. (James)

This substantiates that MT is a valuable resource assisting performers in situations of performance adversity and success (Gucciardi et al., 2008), and enables performers to manage their psychological state to initiate and sustain flow states.

LMTF. While *focus on the task* and *absence of worry* assisted performers to optimise concentration, *anxiety* was widely discussed as a barrier to flow and apparent in most situations for some (i.e., trait), and in certain situations for others (i.e., state): "If the game is more important you might be more tense and these is probably a lesser chance of flow happening" (Jack). With respect to the challenge-skill appraisal, it is proposed that anxiety emerges when perceptions of skill are inferior to task demands (Csikszentmihalyi, 2002). Present findings corroborate trait anxiety as negatively related to dispositional flow, particularly the cognitive aspects (i.e., concentration disruption, worry) (Jackson, Kimiecik, Ford, & Marsh, 1998). *Ruminative thoughts* and *over-thinking* were evident and the struggle

to overcome cognitive perseveration impaired flow: "I'm definitely an over-thinker…there is a certain balance that you need…you can't perform when you are constantly thinking. You have to draw the line somewhere, but someone who over-thinks can't" (Helen). Cognitive perseveration contrasts with the action-awareness merging quality of flow (Csikszentmihalyi, 2002), and appears to be adversative to dispositional flow in LMTF performers.

Confidence

Confidence is a cornerstone of MT (e.g., Cook et al., 2014) and was reported as a key concept of flow in quantitative (Koehn et al., 2013) and qualitative (e.g., Swann et al., 2016) research. Although participants agreed that confidence in ability and growth in confidence were necessary for flow, differences in resilience, the robustness of perceived ability, and the need to build confidence and momentum were apparent between both subgroups.

HMTF. Performers referred to the multi-faceted nature of confidence and the importance of several types of confidence to enhance dispositional flow. *Resilience* safeguarded confidence during adversity and enabled athletes to manage inhibitors and disruptors of flow. The protective function of "resilient confidence" was a characteristic of MT in elite cricketers (Bull et al., 2005) and this quality enhanced the likelihood of entering flow during or following adversity, creating strongly underpinned flow states that were resistant, although not impenetrable, to performance setbacks:

> If my player [direct opponent] scored a goal when I was in flow, I still think that I would have the confidence to put that out of my mind. If that happened two or three times though, then flow would begin to dip. (Jenny)

Confidence in ability was primarily sourced from knowledge of effective preparation and this rational evaluation of proficiency formed a strong base of belief which encouraged flow

> For me it is this fact-based confidence you get from knowing that you have prepared [which facilitates flow]. That validation makes it [confidence] real. Knowing that you

> are good enough will ensure you are able to perform at that level. Then you don't even have to think about that. It's out of your mind. This allows you to think less about the decisions that you make on the court. (Marie)

Growth of confidence during the activity was necessary to enter flow, and was triggered in response to positive performance feedback, thus reflecting the confidence increases elicited by *in-situ* performance accomplishments during the process of flow occurrence reported by elite golfers (Swann et al., 2016). The confidence types identified within HMTF participants appear to have different functions with respect to flow experiences. Accordingly, *resilience, confidence in ability,* and *growth of confidence* protected confidence against inhibitors and disruptors, facilitated flow, and encouraged the transition to flow respectively.

LMTF. Rather than adequately developing *confidence in ability* prior to performances through logical assessments of competence, LMTF participants sought to develop self-efficacy during the activity, increasing the importance of *in-situ* confidence sources, including performance accomplishments and encouragement from coaches and teammates. A lack or loss of confidence is adversative to flow (e.g., Jackson, 1995) and *lower resilience* amplified the negative impact of errors on confidence and reduced dispositional flow: "If I don't start well, my head tends to go down and I start eating myself up" (Jane). Lower initial confidence levels underlined the importance of building confidence, thus lengthening the transition to flow for some: "I don't experience flow early in races…it takes time to build your confidence and impress yourself" (Louise). Performance accomplishments stimulated a *growth in confidence* which counteracted doubt:

> You can feel it (confidence) building up. If you have four positive possessions in a row, you will be thinking after the first one that "yeah that was good" but you can still have a tinge of negativity in the back of your head. But if the second one goes well, you are accumulating confidence. (Helen)

During the process of flow occurrence in elite golf, building momentum and confidence helped players to move towards a state of total confidence leading to flow (Swann et al., 2016). The multidimensional model of momentum (Taylor & Demick, 1994) proposes that a precipitating event or series of events can enact change on cognition (i.e., self-efficacy) and affect. In-keeping with this model, greater positive momentum might be required during performances to counteract initial confidence deficiencies in LMTF performers.

Coping Mechanisms

Task analysis and developing solutions are among the behaviours advocated to encourage flow (Baumann, 2012). Previous research found a positive relationship between MT and task-oriented coping strategies, including effort expenditure and logical analysis (Nicholls, Polman, Levy, & Backhouse, 2008). While both subgroups utilised a variety of coping strategies in response to stress, differences in coping strategy flexibility, the level of independence sought, and congruity between the selected strategies and flow were apparent.

HMTF. In challenging situations, *problem-focussed coping* was utilised to manage task demands. Planning and preparation fostered a feeling of relaxation conducive to flow, and a preference for autonomy was conveyed: “I feel like the coaches should help you prepare and train…but sometimes they just need to leave you go and play because you are ready” (Marie). Independence was previously reported as a feature of MT (Bull et al., 2005; Cook et al., 2014) and is proposed to encourage behaviours promoting flow, including solution identification (Baumann, 2012). *Emotion-focussed coping* was also used to directly target negative affect and the identification and acceptance of a “negativity lapse” accelerated the coping response: “You notice when your shoulders are slouched and certain things about your body language…you recognise that and say “yeah that is my negative mind set right there” and that allows you to change certain things more quickly” (Marie). This substantiates the inverse relationship found between MT and negative thinking (Crust & Azadi, 2010).

LMTF. The coping mechanisms adopted were often directed towards alleviating the affective consequences of the stressor rather than the stressor itself. Performers also relied on particular coping mechanisms and revealed lower levels of adaptability. *Emotion-focussed coping* primarily included seeking support from others: "When you are struggling, you need to find enthusiasm...if your management and your teammates are positive, you can become more enthusiastic" (Stephanie). Coping mechanisms which alter affect through external means are inconsistent with the proposition that affective changes associated with experiencing flow (i.e., negative to positive) are best achieved through independent problem-solving (Baumann, 2012). Although the importance of foreseeing stressors and using *problem-focussed coping* prior to performances was recognised, the search for a solution during pressurised moments was not always rapid or effective, supporting the reliance on external support: "When things aren't going well and the game is moving quickly, sometimes I struggle to figure out what I need to do to change the outcome" (Jill). *Avoidance coping,* was occasionally used in the event of incongruence between task progression and normative measures of competence (i.e., losing). As flow is a state of task absorption (Swann, Crust et al., 2015), avoidance coping is theoretically adversative to flow.

Goal Orientation

Achievement goal theory posits that an individual's goal orientation depends on their definition of competence and success (Nicholls, 1989). Specifically, self-referenced appraisals of competence and success (e.g., personal improvement) represent task orientation, while defining success in normative terms (e.g., winning) symbolises ego orientation. Goal orientations are considered to be orthogonal rather than bipolar and an examination of their relationship to state flow found that high task – high ego and high task – low ego athletes experienced significantly higher flow characteristics than low task – low ego and low task – high ego athletes (Stavrou, Psychountaki, Georgiadis, Karteroliotis, & Zervas, 2015).

Consistent with the process of flow occurrence in elite golf (Swann et al., 2016), open-goals helped HMTF and LMTF performers to experience flow. While both subgroups exhibited an ego orientation, the level of task orientation contrasted and altered the point at which athletes felt competent enough to formulate open-goals, thus impacting on dispositional flow.

HMTF. In-keeping with the orthogonal model of achievement goal theory, athletes in the HMTF group displayed a high task – high ego orientations which increased dispositional flow. A *high ego orientation* encompassed the measurement of success by outcomes and performance progression: "You always have a plan to win the race but you want to run certain splits during that time. When you're in flow, you will hit those times" (Joseph). While performers were extremely competitive, a concurrent *high task orientation* was salient and this appetite for mastery in an array of situations created a plethora of flow opportunities:

> Often I train on my own and do specific drills to improve in certain areas. But sometimes I just freestyle and do skills that I did when I was a child, just for the sake of doing a skill, for the pure enjoyment of it, and without any concern for the consequences. I can definitely experience flow states then. (Alex)

This finding is consistent with research in elite sport (Jones et al., 2007) and youth academy soccer (Cook et al., 2014) which reported desire to improve and a commitment to learning as characteristics of MT. Task orientation increased the inclination to take risks and set open-goals, liberating performers to reach for superior levels of performance and experience flow: "I didn't know that flow would happen. I was just thinking "here I am, I'm on the last repetition of the day and I'm feeling good, why not have a crack at it and see what happens?" (Alan). Mental toughness is associated with a positive attitude towards risk-taking (Crust & Keegan, 2010), and this inclination to stretch oneself enables athletes to exit their comfort zone more often, thus increasing dispositional flow (Jackson & Csikszentmihalyi, 1999).

Overall, it appeared that task orientation increased dispositional flow by facilitating the formation of open-goals during competitive and non-competitive situations.

LMTF. A primarily low task – high ego orientation was salient in the LMTF athletes which reduced dispositional flow. A *low task orientation* reduced flow in non-competitive situations as less satisfaction was derived from achievement in that domain:

> I don't think that I would experience flow in training unless it was really competitive training. In my head I always have that bit of negativity that "it's only training" and if things are going well for me I say to myself "it's training, not a match." (Jill)

A *high ego orientation* largely limited flow to competitive situations in which athletes were demonstrating competence relative to others, such as winning or, more specifically, bettering their opponent: "I knew that I was playing well because I usually have a good battle with the player that I was marking, but I was getting the better of her on that day and I was really happy with that." (Jane). This increased reliance on normative success often provided a caveat for the formation of open-goals and restricted flow to periods in which performers recognised normative competence: "It [flow] started with seven or eight minutes left …when we got the goal, the game was over…it was time to enjoy ourselves" (David). Arguably, this weakens the relationship between ego orientation and flow as evaluations of competence are contingent on situational factors (e.g., opposition standard and performance), and contrasts with the self-referenced appraisal of competence associated with task orientation.

Locus of Control

Research has indicated that the majority of elite athletes perceive flow as being controllable or partially controllable (Chavez, 2008; Jackson, 1995; Sugiyama & Inomata, 2005), although Swann et al. (2012) stated that findings concerning the perceived controllability of flow are equivocal and could be indicative of individual differences. While

there was consensual agreement that flow could not be consciously entered, present findings suggest varying perceptions of control over the factors responsible for flow experiences.

HMTF. Participants conveyed perceptions of control over preparation, developing skills and confidence, and levels of task engagement. As a result, these factors reconcile with the challenge-skills balance proposition central to flow (Jackson & Csikszentmihalyi, 1999). *Internal control of skill* represented the considerable efforts undertaken to improve skills and confidence: "The parts [of flow] I can control are the preparation and the confidence that I get from that…you know you are prepared to the extent that you have given yourself that opportunity to play well" (Marie). While investing effort in the controllable aspects of preparation and performance created a "platform" for flow, performers also acknowledged control over the level of challenge pursued, representing the *internal control of actions*:

> I controlled making that aggressive statement of attacking the last 400 metres and putting myself in that position. To get there, you have to physically do it. You basically get the baton to it [flow], and then you let it do what it wants to do. (Alan)

Although flow is considered to be rare and unpredictable (e.g., Aherne et al., 2011; Chavez, 2008), this analogy illustrates that decisions (i.e., extending the challenge) taken during the activity are perceived as controllable determinants increasing dispositional flow. Nevertheless, *external factors* were also considered to be influential: "It's a choice (to work hard), but just because it's a choice doesn't mean that it (flow) will happen. The choice needs to be supported from the switch being clicked, which could be winning the ball" (Sarah).

LMTF. Greater ambivalence regarding the controllability of flow was apparent in LMTF participants, and attributions frequently included *external factors* and *unstable-internal factors*, such as a positive feeling coinciding with performances:

> On the first day I didn't hit a ball, the (weather) conditions were atrocious. The next two days were my best two games of the league, but the work that I was putting in wasn't changing. It is just about how I am feeling about a game or performance. (Jill)

Rather than self-creating challenges, performers referred to the importance of a *suitably demanding activity*, which centred on the presence of competition or a suitable opponent: "Flow is more likely to happen when you are slightly better than your opponent" (David). This finding corroborates research which found that perceptions of skill are more important for flow than perceptions of challenge (Jackson et al., 1998; Stavrou, Jackson, Zerkas, & Karteroliotis, 2007) and could be an important individual difference influencing dispositional flow. Moreover, an *unsuitably demanding activity* made it difficult for performers to experience flow when the demands of the activity were excessive (e.g., superior opponent) or insufficient (e.g., training), which suggests that LMTF performers are more dependent on being provided with an optimal level of challenge within the activity to experience flow.

Optimism

Previous research reported that optimism was positively associated with MT (Nicholls et al., 2008), and significantly predicted dispositional flow (Vealey & Perritt, 2015). Consistent with the extant literature, being optimistic enabled performers to attain a positive psychological state conducive to flow, but the stability, consistency and controllability of this attribute appeared to distinguish LMTF and HMTF performers.

HMTF. A *positive attitude* in life and sport enhanced other psychological attributes linked to flow and performance: "If your outlook is positive, this will positively affect your confidence and stress levels which are very important" (Jenny). An *optimistic view* enabled athletes to persist in difficult situations, contributing to the initiation and sustainment of flow:

> I wasn't in flow in the first-half because I wasn't on the ball but I was still positive in my mind and believed I would play well. At half–time, I said to myself "you're not

> having a bad day, the ball just isn't coming to you in the right way." In the second-half, I got on the ball and gave a great pass [that started flow]. (Sarah)

A stable level of optimism could be beneficial for dispositional flow as positive thinking supports the initiation and restoration of flow (Chavez, 2008; Jackson, 1995).

LMTF. *Positive thinking* encouraged flow, but it was acknowledged that the presence of this optimistic outlook was not always consistent. Specifically, participants referred to a feeling of positivity "on the day" which derived from positive psychological momentum built in preparation for the event or in response to *in-situ* performance accomplishments. Participants also stated that optimism coincided with situational positivity within their team or personal lives:

> It [flow] goes back to different things that were happening in my life at that point and things that were affecting me as a person rather than me as a player. My whole mind was thinking positivity and no negative thoughts were coming into my mind. (Helen)

The transient nature of optimism and dependence on external sources of positivity increased the likelihood of *negative thoughts*, and could reflect research in college athletes which found that while 69% of participants perceived control over positive thinking, 31% of athletes expressed limited or no control over a negative attitude (Sugiyama & Inomata, 2005).

Perfectionism

Adaptive perfectionism consists of high perfectionistic strivings and medium or low perfectionistic concerns, while maladaptive perfectionism comprises high perfectionistic strivings and high perfectionistic concerns (Stoeber & Otto, 2006). Dietrich and Stoll (2010) posit that maladaptive perfectionists are more likely to be concerned with outcomes and consequences of a task rather than the task itself, leading to inferior skill execution, whereas adaptive perfectionists focus on the quality of the activity rather than on processes within the task, thus increasing congruency between cognition and the characteristics of flow. Both

subgroups emphasised the importance of high standards, but the magnitude of expectation and response to discrepancies between expectations and performance outcomes differentiated both subgroups and impacted on dispositional flow.

HMTF. Indicators of adaptive perfectionism were apparent in the HMTF subgroup and this attribute appeared to increase dispositional flow. The desire to *strive for excellence* symbolised high personal performance standards: "You want to win every ball and distribute it in the right way. So you become a perfectionist because you want to do everything right" (Jenny). In addition to this pursuit of excellence during performances, *meticulous preparation* fostered feelings of performance readiness connected to dispositional flow:

> I have a mantra that the "one-percent's" are the cornerstone of everything I do. So your four-mile run in the morning or 30 minutes of stretching is another "one-percent." Flow goes back to "one-percent's" and I was just one-percent away. (Alan)

Commitment to excellence (Cook et al., 2014) and meticulous preparation (Gucciardi et al., 2008) were previously reported features of MT. While performers engaged in post-performance reflection to identify developmental areas, *lower perfectionistic concerns* during performances coincided with a realistic perspective that allowed participants to recover from errors to enter and prolong flow: "Mental toughness on game day is recognising that things didn't go well in the first five minutes but that there are five minutes to go. You put things into perspective to help you perform" (Marie). Performance errors have previously been identified as inhibitory to flow (e.g., Chavez, 2008) and the MT ability to cope with setbacks (e.g., Cook et al., 2014) could prolong flow when threatened with such disruptors.

LMTF. Signs of maladaptive perfectionism were evident and reduced dispositional flow in LMTF participants. Rather than an absence of high standards, *excessive expectations* reduced opportunities for performance satisfaction: "I pick up on tiny mistakes and I have such high standards…I always place a certain amount of pressure on myself. Regardless of

how I am doing in a match, I never feel fully satisfied" (Jill). Although flow is proposed to occur when challenge and skills are above normal levels (Jackson & Csikszentmihalyi, 1999), unrealistic expectations could narrow the flow threshold (i.e., high challenge and skills required) and reduce dispositional flow. *Higher perfectionistic concerns* created fragile flow states and denoted that mistakes or, in some instances, a solitary mistake could prevent or disrupt flow. Arguably, the adverse impact of negative feedback opposes the idea that flow can occur while receiving negative feedback (Jackson & Csikszentmihalyi, 1999) and suggests a greater need for positive feedback in LMTF athletes.

Concluding Remarks

The aim of this study was to explore perceptions regarding the psychological variables underlying dispositional flow from the perspective of HMTF and LMTF athletes to advance understanding of the relationship between MT and dispositional flow. The primary contribution of this study is the identification of an amalgam of psychological attributes which could, at least partially, be responsible for individual differences in dispositional flow. While individuals with HMTF and LMTF experienced flow, it appeared that flow occurred more consistently and in a wider range of situations for HMTF athletes. This finding suggests that the relatively stable nature of MT (e.g., Hardy et al., 2014) enhances individual's capacity to experience flow in different situations, particularly when the challenge posed by the situation is excessive or below the level conducive to flow. The psychological variables linked to dispositional flow which emerged included confidence, locus of control, concentration, goal orientation, coping mechanisms, optimism and perfectionism, many of which are included in models of MT (e.g., Cook et al., 2014) or have demonstrated positive associations with MT (e.g., optimism). The present study builds upon previous quantitative investigations of the MT-flow relationship (Crust & Swann, 2013; Author 1 et al., under review), and a mixed method approach offered a deeper insight into the influence of MT on

dispositional flow. As such, findings begin to answer calls to understand the influence of dispositional attributes on flow in sport (Jackson, 2014; Swann et al., 2012).

A noteworthy finding concerned the temporality of flow states and the process of entering flow. In some instances, lower initial levels of confidence in LMTF athletes appeared to increase the amount of momentum required to enter flow. Arguably, this protracted transition could increase exposure to inhibitory conditions and reduce dispositional flow. In addition, an internal locus of control assisted individuals to interact optimally with activity conditions to experience flow. Both subgroups acknowledged that flow was not entirely controllable and that external factors were also influential, supporting previous work (e.g., Chavez, 2008; Jackson, 1995). The HMTF athletes conveyed a deeper sense of control over flow than LMTF participants, and emphasised the importance of preparation, developing confidence, and extending challenges to create a "platform" for flow. Findings add clarity to the uncertainty regarding controllability of flow states (Swann et al., 2012), and suggest that individual differences could partly explain reported disparities regarding controllability of flow in sport (Chavez, 2008; Jackson, 1995).

From an applied perspective, a number of these strategies could be adopted to increase dispositional flow. With respect to the performance context, primarily sourcing confidence from rational assessments of ability (e.g., preparation) rather than depending on *in-situ* performance accomplishments could strengthen self-efficacy. This logically-based confidence could increase dispositional flow by helping performers to cope more proficiently with task adversity and reduce the level of momentum required to reach a state of total confidence fostering the creation of open-goals conducive to flow (Swann et al., 2016).

Limitations and Recommendations for Future Research

As with any study, there are limitations. While cross-sectional assessments of dispositional flow were used in this study, the difficulties in measuring subjective experience

presents a challenge to flow researchers (Jackson & Kimiecik, 2008). Future research could track athletes longitudinally with situational assessments of flow to evaluate congruency between the DFS-2 scores and state measures of flow. Recently, the use of event-focussed interviews (e.g., Swann et al, 2016) has enriched understanding of flow in sport and this approach could be important to ascertain a more detailed understanding of present findings. Future studies could explore individual differences with respect to the initiation (e.g., Swann et al., 2016), management/maintenance (Swann, Crust et al., 2015), prevention/disruption (Jackson, 1995) and restoration (e.g., Chavez, 2008) of flow states. While the research team's interpretation of the data is presented, others may have coded the data differently and reached alternative conclusions. Further research will assist understanding of these findings and could help to inform applied recommendations for coaches, athletes and practitioners, with respect to the initiation, maintenance and restoration of flow states.

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Tables

Table 1: Factors connected to dispositional flow in athletes with higher mental toughness-flow

Lower-order theme	Higher-order theme	General dimension
Accept your thoughts and move on	Clearing the mind	Concentration
Clear your mind		
Forget the past		
Focus on the next action	Focus on the task	
Focus on the task		
Focus on your role		
Focus on yourself	Narrow concentration	
Get “in the zone”		
Narrow your focus		
Refocus quickly	Rapid refocus	
Refocus yourself		
Focus on next action	Focus on the present	
Be in the moment		
Confidence growth	Growth in confidence	Confidence
Trust in yourself		
Believe in yourself	Confidence in ability	
Belief to better your opponent		
No limit to ability		
Task within capabilities		
Maintain belief during preparation	Resilience	
Maintain belief during task adversity		
Mindful acceptance	Emotion-focussed coping	Coping mechanisms
Positive reinforcement		
Relaxation exercises		
Effective preparation	Problem-focussed coping	
Find a solution /change your behaviour		
Planning pre-performance logistics/strategy		
Desire to beat opponents	High ego orientation	Goal orientation
Desire to defeat others		
Desire to win		
Desire to improve/explore capabilities	High task orientation	
Desire to have fun/enjoy the activity		
Willing to take a take a risk		
Control challenge pursued	Internal control of actions	Locus of control
Control effort in task (training/competition)		
Control level of task engagement		
Control gaining confidence	Internal control of skill	
Perform actions to build confidence		
Factors outside of your control	External factors	
Influence of others		
Believe next action/performance will be better	Optimistic view	Optimism
Flexible thinking/approach		
Optimistic view		
Focus on your strengths	Positive attitude	
Positive attitude		
Positive outlook		
Accept performance cannot be perfect	Lower perfectionistic concerns	Perfectionism
Cope with performance error		
Realistic		
Conscientious	Meticulous preparation	
Attention to detail		
Practice everything correctly	Strive for excellence	
Exert maximal effort		
Expect high standards		

Table 2: Factors connected to dispositional flow in athletes with lower mental toughness-flow

Lower-order theme	Higher-order theme	General dimension
Lack of prior negative experience	Absence of worry	Concentration
Reduced pressure/worry		
Nervous	Anxiety	
Stress		
Worry		
Cannot stop thinking	Over-thinking	
Multiple thoughts in head		
Over-thinking		
Cannot move on	Ruminative thoughts	
Dwell on the past		
Preoccupied with past failings		
Keep things simple	Focus on the task	
Focus on the task		
Struggle to deal with setbacks	Lower resilience	Confidence
Struggle to deal with adversity		
Confidence in ability	Confidence in ability	
Confidence in *that* situation		
Confident on *that* day		
Build confidence	Growth in confidence	
Confidence lifted		
Confidence reassurance		
Recognise you can achieve goals		
Avoidance of situation	Avoidance coping	Coping mechanisms
Emotional dismissal		
Emotional venting		
Reduce performance effort		
Encouragement from others	Emotion-focussed coping	
Support from others		
Effective preparation	Problem-focussed coping	
Finding a solution		
Planning		
Need to be winning	High ego orientation	Goal orientation
Need to be bettering opponent		
Not stimulated in training	Low task orientation	
Need competition/competitor		
Environmental conditions	External factors	Locus of control
Positive team environment/Coach interaction		
Positive atmosphere		
Optimal challenge presented by activity	Suitably demanding activity	
Competitive situation		
Absence of sufficient challenge	Unsuitably demanding activity	
Contingent on performance compared to others		
Positive situation in life	Unstable-internal factors	
Good “feeling”/preparation for *that* performance		
Thinking/feeling positive	Positive thinking	Optimism
Positive team environment		
Building positivity		
Negative thoughts	Negative thoughts	
Fear of failure		
Anxious about errors	Higher perfectionistic concerns	Perfectionism
Concerned with negative feedback		
Identify mistakes rather than positives		
Struggle to reach expectations	Excessive expectations	
Must do *everything* right		
Require positive feedback		

1