

1 **Mental toughness and attributions of failure in high performing male and female**
2 **swimmers**

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Abstract

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This study examined the relationship between mental toughness and failure attributions in high level swimmers. Participants were 80, ($M_{age}=21.64$, S.D: 4.96 years) regional and national level swimmers who were currently competing. Participants were asked to recall a perceived failure in the previous four weeks, fill in the controllability, stability, globality and universality attribution measure (CSGU) and eight weeks later complete the mental toughness questionnaire-48 (MTQ48). Multiple regression analysis found a significant effect of mental toughness and stability on controllability ($\Delta R^2 = 0.042$, $p = 0.021$) when the generalizability dimensions were added to the model. Separate multiple regression analysis for both genders, revealed that males mental toughness and stability predicted controllability ($\Delta R^2 = 0.200$, $p = 0.029$) compared to females mental toughness and universality ($\Delta R^2 = 0.080$, $p = 0.027$) predicting controllability. In conclusion the present study found evidence for mental toughness predicting controllability attributions following competitive failure for a group of high level male and female swimmers. Gender differences were found in how the generalizability attributions predicting controllability. Findings are discussed in terms of mental toughness and the generalizability dimensions predicting controllability attributions in response to competitive failure and suggestions to examine the relationship further.

Keywords: Attributions; swimming; gender differences; failure; mental toughness

1 **Introduction**

2 Mental toughness (MT) has been shown to be a prerequisite for success in many
3 competitive sports (Gucciardi, 2017). Evidence has found that mental toughness
4 distinguishes athletes at different levels within sports, such as Mixed Martial Arts (Chen &
5 Cheesman, 2013) and Australian Football (Gucciardi, Gordan & Dimmock, 2008).
6 Characteristics such as problem focused coping (Nicholls, et al, 2011) and self-belief (Chen
7 & Cheesman, 2013) have been found to be related to mental toughness. Mental toughness
8 can be defined as a state-like psychological resource that is purposeful, flexible and efficient
9 for the enactment and maintenance of goal directed pursuits (Gucciardi, 2017). A central
10 facet of this model, is that MT is a state like resource (Brand, et al, 2014) and a key element
11 of self-regulation in response to losing. Mentally tough performers are highly motivated to
12 succeed and able to maintain self-belief despite the occasional competitive failure (Madrigal,
13 Gill & Willse, 2017). Following a resounding defeat, the content and nature of self reflection
14 can have a critical impact on psychological factors such as, problem focused coping to help
15 maintain motivation (Madrigal, Gill & Willse, 2017). As athletes strive to understand the
16 meaning of competitive outcomes, failure attributions may play an important role for future
17 psychological performance states by influencing MT.

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19 Recent research has sought to understand how self-awareness is related to the
20 maintenance of MT (Cowden, 2017) and how the attributions that athletes employ following
21 failure are important cognitions underlying MT (Meggs, Ditzfield & Golby, 2014).
22 Maintaining positive cognition following post-competition failure is a critical part of mental
23 toughness (Madrigal, Gill & Willse, 2017) which distinguishes it from related concepts such

1 as hardiness. For example, within the MT framework developed by Jones, Hanton and
2 Connaughton (2007) the post-competition dimension includes the ability to handle failure.

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4 Some attribution researchers have examined the retrospective cognitions that athletes
5 exhibit following competitive events (Coffee, 2009). Allen, Jones and Sheffield (2010)
6 maintain that following defeat, unstable causal attributions for outcomes are functional and
7 that athletes should be encouraged to focus on the positives of performance that are likely to
8 lead to future success. In this line of thinking, MT can be used to predict attributions
9 following a sporting failure. Theoretically, the most desirable dimension is controllability
10 (whether the cause is controllable or uncontrollable), as attributing a failed outcome to
11 controllable causes will more likely increase internal locus of control and maintenance of
12 self-belief (Rees, Ingledeu & Hardy, 2005). The explanations that athletes give for causes of
13 events along this dimension have been shown to have implications for, self-efficacy (Bond,
14 Biddle & Ntoumanis, 2001) and confidence (Parkes & Mallett, 2011); both of which are
15 components of MT.

16 In mentally tough performers, controllability of outcomes and unstable attributions
17 following failure may be strongly related. As some researchers believe that mental toughness
18 can be modified (Golby & Sheard, 2006) it may be beneficial to investigate how MT predicts
19 specific patterns of attributions. Interestingly, the generalizability dimension of globality is
20 defined as whether the cause of performance is deemed to affect a wide or narrow range of
21 situations with which the person is faced. It could be reasoned that mentally tough individuals
22 would perceive the cause of failure to be local and narrow rather than generalizable to future
23 performances, as this would facilitate its interpretation as unstable. Universality is the extent
24 to which the cause is perceived to be common among others, or specific to the individual. It

1 is unknown to what extent universality improves the explained variance of the relationship
2 between mental toughness and controllability.

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4 There is also the possibility of differences between males and females in terms of the
5 relationship between mental toughness and controllability cognitions following failure. Crust
6 and Swann (2013) reported higher levels of sense of control for men compared to women.
7 However, White (1993) found a gender difference between participants self ratings of
8 controllability attributions and locus of control, with males seeing the reasons for their
9 success to be more internal than females, while females reported the reasons for their win to
10 be more controllable than males. Research has found that females generally use more
11 emotion focused and social support and less problem focused coping in response to a
12 demanding event (Hammermiester & Burton, 2004) or injury (Andrews & Chen, 2014). It
13 may be theorized that genders differences in control attributions following a competitive
14 failure may be expected due to different coping patterns.

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16 The aim of this study is to examine the how mental toughness and the generalizability
17 dimensions predict controllability in response to perceived failure. It was predicted that
18 participants with higher mental toughness will have increased controllability. It was also
19 predicted that the generalizability dimensions will predict controllability. Due to possible
20 gender differences in how success is conceptualised, males and females will exhibit a
21 different relationship in how MT and the generalizability dimensions predict controllability.

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1 **Methodology**

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3 **Participants**

4 The sample was 80 participants ($M_{\text{age}}=21.64$, S.D: 4.96 years), which included both
5 male (n=44) and female (n=36) regional and national level swimmers who were currently
6 competing and had at least seven years of experience in their sport. The swimmers were taken
7 from competitive clubs in the north-east of England. They were all in mid-season training and
8 therefore had several recent competitions from which they could reflect upon and provide
9 attribution responses. Ethical approval was granted from the University ethics committee and
10 participants provided informed consent.

11 **Procedure**

12 Sampling was opportunistic, with participants recruited at local clubs and
13 organisations via email invitation. Participants were then asked to log on to the online survey
14 and follow the clear instructions to complete a self-report attributions questionnaire (the
15 CSGU) about their most recent perceived failure. Participants were asked to recall a
16 perceived failure in the previous four weeks. Following this, eight weeks after they
17 completed the attributions measure, participants were then asked to complete a measure of
18 mental toughness (MTQ48). Participants were then thanked for their participation and
19 provided with an opportunity to withdraw from the study.

20 **Measures**

21 Attributions: The CSGU is a 16-item self-report measure (Coffee & Rees, 2008) that
22 requires the participants to identify the main cause of their performance and then rate this

1 along four attribution dimensions: controllability (the extent to which the cause is a factor
2 under personal control), stability (if the cause is deemed fixed or fluctuating over time),
3 globality (if the cause is specific to a situation or generalizable to other situations) and
4 universality (if the cause is unique to the participant or common among other athletes). Each
5 subscale is determined by four separate items. Response options are on a Likert scale ranging
6 from 1 (not at all) to 5 (completely). Higher values represent attributions that are more
7 controllable, stable (except for the item “*fluctuates across performances,*” which is reverse
8 scored), global and universal. Coffee and Rees (2008) confirmed the factor structure of the
9 measure with an athletic sample across both most and least successful conditions (i.e.,
10 perceived success and failure). Across conditions composite reliabilities ranged from .80 to
11 .92.

12 *Mental toughness:* A 48-item Mental Toughness Questionnaire (MTQ48; Clough,
13 Sewell & Earle, 2002) was included in order to assess this construct. The MTQ48 assesses
14 global mental toughness (MT) and six subscales: challenge, commitment, interpersonal
15 confidence, confidence in own abilities, emotional control, and life control. The items on the
16 MTQ48 are rated on a 5-point Likert scale anchored at 1 = *Strongly disagree* to 5 = *Strongly*
17 *agree*. The MTQ48 has received recent construct validity support (Perry, et al, 2013) as
18 scores on the scale have been shown to be correlated significantly with: self-image (.42); life
19 satisfaction (.56); self-efficacy (.68); trait anxiety (.57) and personal endurance (Crust &
20 Clough, 2005).

21 Analysis

22 Analysis was conducted using IBM SPSS Statistics 23. Independent t tests were done
23 with gender as the factor and the four attribution dimensions and mental toughness as the
24 dependent variables. Any violations of homogeneity of variance resulted in a corrected

1 significance value. The data was checked for outliers and regression assumptions prior to
2 data analysis. Graphical scatterplots revealed no serious violations of homoscedasticity,
3 standardized residuals were normally distributed and there were no outliers in the data. There
4 was no evidence of co-linearity as indicated by correlations and tolerance statistics. Pearson's
5 cross correlations (see Table 2) revealed low magnitude (0. - 0.3) correlations between the
6 three predictors. Co-linearity diagnostics indicated a variance inflation factor (VIF) between
7 1.031 – 1.332 (i.e < 10). Tolerance ranged between 0.75 – 0.982 (i.e > 0.2) indicating no
8 multi-colinearity concerns (Field, 2013). Sample size recommendations from Khamis &
9 Kepler (2010) suggest $n \geq 20 + 5m$, where m is the number of single predictors. For this
10 study the amount of predictors in the model is $m = 4$, therefore making a minimum sample
11 size of 40. Stepwise multiple regression analysis was performed with mental toughness
12 entered first and then the generalizability dimensions entered as a block of predictors with
13 controllability as the criterion variable. This was done for the whole sample and then for
14 males and females separately. The significance of increments in explained variance (ΔR^2) in
15 controllability over and above variance accounted for by those variables already entered into
16 the equation, as well as the sign of the regression coefficients (B) was assessed. In the case of
17 a significant increment in explained variance, the significance values of the regression
18 coefficients were used to identify salient variables. An alpha level of $p \leq 0.05$ was used for
19 all statistical analysis.

20 **Results**

21 Independent t tests showed significant gender differences in controllability
22 attributions $t(69.2) = 2.754, p = 0.008$ with females scoring significantly higher. For
23 globality, $t(78) = 2.316, p = 0.023$, males scored significantly higher. There were no gender
24 differences in mental toughness, stability or universality.

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TABLES 1 & 2 HERE

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Stepwise multiple regression analysis: When the generalizability dimensions were added as predictors of controllability with mental toughness there was an improvement in the model fit ($\Delta R^2 = 0.042$, $p = 0.021$). Both mental toughness ($B = 0.04$, $p < 0.001$) and stability were significant ($B = 0.24$, $p = 0.021$) but not globality and universality.

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Stepwise multiple regression analysis was done for males and females separately. For males, when the generalizability dimensions were added as predictors of controllability there was an improvement in the model fit ($\Delta R^2 = 0.200$, $p = 0.029$). Stability was a significant predictor ($B = 0.46$, $p = 0.008$) along with mental toughness ($B = 0.039$, $p < 0.001$). For females, when the three generalizability dimensions were added as predictors of controllability there was an improvement in the model fit ($\Delta R^2 = 0.080$, $p = 0.027$), with both mental toughness ($B = 0.03$, $p < 0.001$) and universality ($B = 0.179$, $p = 0.027$) reaching significance.

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19 **Discussion**

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The current study examined how mental toughness and the generalizability dimensions predict controllability in response to perceived failure. In addition, gender

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differences in this relationship was analysed. The study found support for the hypothesis that

1 MT, and the generalizability dimensions predict controllability. This relationship between
2 mental toughness and controllability following failure was found for both males and females.
3 High mental toughness scores were positively related to controllability. This means that
4 following a perceived failure, higher mental toughness scores are related to conceptualizing
5 the causes of failure to be within one's control which is likely to help maintain self belief and
6 perseverance following defeat. Consequently, those who have higher mental toughness scores
7 are more likely to explain performance following failure as being due to controllable factors.
8 The psychological advantage that results from this perception is evident; the source of failure
9 can be controlled within the individual and therefore maintain the belief that action can be
10 taken to minimize its effects on future performance.

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12 These findings are consistent with Coffee and Rees (2009) who found a significant
13 main effect for controllability on self-efficacy after reflection for a less successful group of
14 performers but not the successful group. It is also consistent with the explanation that
15 following a failed outcome, controllable causes are more likely to maintain self efficacy
16 (Bond, Biddle & Ntoumanis, 2001; Rees, Ingledew & Hardy, 2005). Self-efficacy and
17 mental toughness share some conceptual overlap and the MTQ-48 has been shown to be
18 strongly correlated with self-efficacy measures (0.68) so this similarity between the findings
19 is not surprising. This finding also seems to support the work of Ferla, Valcke, and Schuyten
20 (2007) that controllability is the most important attribution dimension for maintaining
21 positivity. Previous studies have put forward the idea that controllability attributions are an
22 important foundation of maintaining confidence when reflecting constructively on failure
23 which is thought to be major component of individuals maintaining stable mental toughness

1 (Golby & Sheard, 2006) and coming back positively from slumps in performance (Grove &
2 Heard, 1997). These findings are equally true for both males and females.

3 However, when the generalizability terms were added to the model there were
4 gender differences that emerged. For males, stability and mental toughness were both
5 significant predictors of controllability. This means that following failure, perceiving the
6 relevant performance factors as stable along with high mental toughness are strongly related
7 to high levels of controllable attributions. This seems counterintuitive and at odds with
8 attribution theory which states that unstable reasons for negative outcomes are more desirable
9 than stable ones (Coffee & Rees, 2009). For males, it may be that stable reasons for failure,
10 are related to post-reflections indicating that effort was not good enough previously but
11 within the individuals control in the future. Thus such a reflection would enhance focus on
12 positive future outcomes in performance (Allen et al, 2010). This may also be related to
13 males having a need for a strong internal locus of control (White, 1993) to be successful. It
14 should be borne in mind that mental toughness still strongly predicted controllable cognitions
15 in female swimmers. However, for females, controllability was more strongly predicted by
16 mental toughness and universality. This may mean that, for females, controllable cognitions
17 post failure is aided by high mental toughness and also thinking that such causal factors for
18 failure are universal. As females tend to have a higher social motive for sport competition
19 (Weiss & Frazer, 1995), thinking about failure in terms of a common experience shared by
20 other competitors may reduce the possibility of negative emotional impact. This
21 interpretation is supported by females having significantly lower globality scores than males,
22 thus indicating a tendency to think that causes are more generalizable rather than specific to
23 the situation. The psychological functionality of mental toughness in terms of gender
24 differentiation of attributions seems more in terms of predicting emotions and cognitions

1 rather than being an outcome of those variables (e.g Beckford et al, 2013). Further
2 experimental work will be needed to determine the direction and causality between MT and
3 cognitive and emotional variables.

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5 There are some differences with the current study compared to the findings of
6 Coffee and Rees (2009). Firstly, attributions may develop differently over time in relation to
7 a perceived failure (Bond et al, 2001). In the current study the participants were asked to
8 recall a failure within the previous four weeks. It may be that the additional time of 4 weeks
9 allowed individuals to gather deliberate and explicit information about the cause of the event
10 which may not have been possible for more automatic and rapid attributions. In comparison,
11 Coffee and Rees (2009) collected attribution data immediately after a performance and 4 days
12 later, thus allowing the possibility for more automatic responses. Although Coffee and Rees
13 (2009) argue on the basis of their results that there is little benefit in assessing attributions
14 beyond immediate assessments, there is no theoretical reason for this. We argue that a longer
15 time frame is valid because appraisal of failure appears to be an extended and long-term
16 process whereby individuals reframe and understand their experiences with the incorporation
17 of new knowledge, the perceptions of others, other similar experiences and the consequences
18 for their future achievement and performance. Second, it is unknown to what extent and how
19 frequently the group in this study experienced successful performance and/or failure. If there
20 is a strong need to generate a satisfactory explanation for a poor performance it is important
21 to know to what extent the individuals experienced a poor performance in the weeks prior to
22 the study.

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1 However, a number of limitations of the study should be noted. First, it would have
2 been useful to include both immediate and reflective attribution time points to examine
3 changes during that time period. Second, another measurement point would increase the
4 reliability of the study conclusions in relation to MT being a resource that is challenged
5 according to failure. It would also be useful to measure the relationship between attributions
6 and mental toughness at different stages of the season (e.g Weiss & Frazer, 1995). Third, it
7 may be useful to analyse how the specific dimensions of mental toughness relates to
8 controllability. One could theorise that the emotional control subscale would be most
9 strongly related to controllability attributions for example. If this was found, it would justify
10 practitioners implementing cognitive restructuring techniques to help athletes maintain a
11 sense of control following a disappointing performance.

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13 **Conclusions**

14 In conclusion, this study has found evidence for mental toughness predicting
15 controllability attributions in response to competitive failure. Controllable causal factors
16 following failure were also predicted from stability and universality in males and females
17 respectively. It may be useful in future research to examine differences between males and
18 females in terms of the relative importance of the stability and universality attribution
19 dimensions for maintaining motivation and self-belief following a competitive defeat.

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