Running Head: MENTAL TOUGHNESS AND TRANSITIONS

Mental toughness and transitions to high school and to undergraduate study

Helen St Clair-Thompson and Rebecca Giles

Newcastle University

Sarah P. McGeown

University of Edinburgh

David Putwain

Edge Hill University

Peter Clough

Manchester Metropolitan University

John Perry

University of Hull

Author Note

Correspondence concerning this article should be addressed to Helen St Clair-Thompson, School of Psychology, Newcastle University, Ridley Building 1, Queen Victoria Road, Newcastle Upon Tyne, NE1 7RU, UK, email: helen.st-clair-thompson@ncl.ac.uk

Abstract

Mental toughness can be conceptualised as a set of attributes that allow people to deal effectively with challenges, stressors, and pressure. Recent work has suggested that it may be a valuable construct to consider within educational settings. The current studies explored the associations between mental toughness and educational transitions. Study 1 examined the relationships between mental toughness and concerns about moving to a new school in 105 children aged 12-13 years of age. The results revealed significant relationships between several aspects of mental toughness, but particularly confidence in abilities, and children's concerns. Study 2 examined the relationships between mental toughness and adjustment to university in 200 undergraduate students at various stages of their course. The results revealed a role for several aspects of mental toughness; commitment, control of life, control of emotion, confidence in abilities and interpersonal confidence. The results are discussed in terms of implications for educational practice. It is suggested that measures of mental toughness could be used to identify individuals who may benefit from additional support during transition to a new school or to university, and that future research should explore the potential benefits of mental toughness training.

Keywords; Mental toughness, educational transitions, adjustment to university

Mental toughness and transitions to high school and to undergraduate study

In recent years there has been substantial interest in educational transitions. The majority of pupils in the UK education system transition from primary to secondary education at the age of 11 years. A smaller number of schools operate in a three tier system where pupils transition from first to middle school at 9 years and from middle to high school at 13 years. At aged 16 many adolescents then enter further education (academic, technical, or vocational). Following this, a large number of 18 year olds then enter higher education. For example, in the 2013/14 academic year nearly half a million students in the UK enrolled in full-time first year undergraduate study (Higher Education Statistics Agency, 2015). Transitions involve many changes, including to learning environments, academic expectations, and social interactions (e.g., Anderson, Jacobs, Schramm, & Splittgerber, 2000; Crede & Niehorster, 2012). Adjusting to these changes can be anxiety provoking and difficult to negotiate (e.g., Parker, Hogan, Eastabrook, & Oke et al., 2006; Tobbell, 2003; Zeedyk, Gallacher, Henderson & Hope et al., 2003), and can potentially reduce academic performance and diminish future potential (e.g., West, Sweeting & Young, 2010).

Transitions can have an impact on various educational outcomes. The transition to a new school has been found to increase anxiety (Blyth, Simmons & Carton- Ford, 1983; Greene & Ollendick, 1993), lead to poor attendance and behavioural problems (Anderson et al., 2000; Galton, Morrison, & Pell, 2000, Smith, Akos, Lim, & Wiley, 2008), and can sometimes result in a decline in academic performance (e.g., Simmons & Blyth, 1987; West et al., 2010). Similarly, the transition into higher education has been related to a range of educational outcomes, primarily academic performance and retention (e.g., Baker & Siryk, 1984; Crede & Niehorster, 2012).

There are, however, individual differences in the extent to which pupils experience difficulty in dealing with transitions (e.g., Qualter, Whiteley, Hutchinson, & Pope, 2007;

Vanlede, Little, & Card, 2006). For example, studies have revealed higher levels of anxiety during school transitions in girls than in boys (e.g., Duchesne, Ratelle, & Roy, 2012; Loke & Lowe, 2013; Riglin, Frederickson, Shelton, & Rice, 2013). Pupils with behavioural problems also tend to have more difficulty with making transitions (e.g., Berndt & Mekos, 1995), as do the less academically capable (Anderson et al., 2000; Crede & Niehorster, 2012; Sennett et al., 2003). Other individual differences predicated on personality may also be important. Researchers utilising the 'big five' model of personality have suggested that high levels of extraversion, agreeableness, openness, and emotional stability may facilitate transitions by allowing students to develop social relationships more quickly, and conscientiousness may be beneficial for adjusting to new academic demands (Crede & Niehorster, 2012; Wintre & Sugar, 2000). Conscientiousness has also been consistently related to academic attainment (e.g., Ackerman, Chamorro-Premuzic, & Furnham, 2011).

Of particular interest, research has identified protective factors which may reduce the chance of difficulties arising during educational transitions, such as social support, self-esteem, and coping strategies. Easier school adjustment has been found for adolescents reporting a better network of friends (Kingery & Erdley, 2007), positive perceptions of acceptance from their peer group (Grillis- Taquechel, Norton, & Ollendick, 2010), and also higher self-esteem (confidence in their own worth or abilities) (Aikins, Bierman, & Parker, 2005; Anderson et al., 2000; Galton et al., 2000; West et al., 2010). Research has also revealed a role for core self-evaluations including self-esteem and self-efficacy in managing the transition to University (e.g., Morton, Mergler, & Boman, 2014). Another influence on adjustment is coping style, in particular students' use of problem versus emotion-focussed coping strategies. Problem-focussed strategies target the cause of stress in a practical way. In contrast, emotion-focussed strategies are aimed at emotional responses and may include

reappraisal or avoidance. Crede and Niehorster (2012) revealed that coping styles that reflect engagement with the problem were more beneficial for successful adjustment.

The current studies explored another factor which may potentially play a role in educational transitions; mental toughness. Mental toughness describes a set of attributes related to how people deal with challenges, stressors, and pressure. It has been frequently related to successful sport performance (Bull, Shambrook, James, & Brooks, 2005; Connaughton, Wadey, Hanton, & Jones, 2008; Jones, Hanton, & Connaughton, 2007). Recent work has suggested that it may also be a valuable construct to consider within educational settings (Crust, Earle, Perry, Earle, Clough, & Clough, 2014; McGeown, St Clair-Thompson, & Clough, 2015; St Clair-Thompson, Bugler, Robinson, Clough, McGeown, & Perry, 2014).

Several theoretical models of mental toughness have been proposed (e.g., Gucciardi, Gordon, & Dimmock, 2009; Jones et al., 2007). However, the model that perhaps offers the most parsimonious account of mental toughness (Weinberg & Gould, 2007) was provided by Clough, Earle, and Sewell (2002). This model of mental toughness comprises six related but separable sub-components; commitment, challenge, control of emotion, control of life, confidence in abilities and interpersonal confidence. Commitment refers to persevering with tasks even under difficult circumstances and challenge refers to seeking out opportunities for self-development. Emotional control is described as the ability to keep anxiety in check and not reveal emotions to others, and life control refers to an individual's belief that they are able to control the course of their life. Confidence in abilities refers to a belief in individual qualities with little dependence on external validation, and interpersonal confidence refers to being assertive and not intimidated in social contexts. Alongside this model of mental toughness Clough et al. (2002) developed the Mental Toughness Questionnaire- 48

(MTQ48), which is now the most commonly used measure of mental toughness in published research (e.g. Gucciardi, Hanton & Mallet, 2012).

Although there are differing models of mental toughness, there is general agreement that mental toughness is a multifaceted construct (e.g. Crust, 2008; Gucciardi, Gordon & Dimmock, 2009; Perry, Clough, Clough, Earle & Nicholls, 2013). In addition, Perry et al. (2013) examined the factorial structure of the MTQ48 in a sample of over 8000 adults, and revealed that the 6-factor model provided the best account of the data. St Clair-Thompson et al. (2014) examined the structure of the MTQ48 in adolescents aged 11-16 years of age, and again results supported the 6-factor model. Findings in several research domains also suggest utility in considering distinct subcomponents of mental toughness (e.g. Nicholls, Polman, Levy, & Backhouse, 2008; Stamp, Crust, Swann, Perry, Clough, & Marchant, 2015; St Clair-Thompson et al., 2014)

St Clair-Thompson et al. (2014) demonstrated relationships between mental toughness and several educational outcomes and experiences in adolescents aged 11-16 years. Several aspects of mental toughness, but particularly control of life, were related to higher attainment, attendance, and lower teacher ratings of counterproductive behaviour. Components of mental toughness, but particularly confidence, were also positively related to peer relationships. Crust et al. (2014) revealed significant relationships between mental toughness and the grades and progression of first year undergraduate students. They suggested that a measure of mental toughness could be a useful tool for identifying students at risk of failing and dropping out of undergraduate study. Mental toughness has also been considered in relation to well-being. For example, Gerber, Kalak, Lemola, and Clough et al. (2013) examined relationships between levels of perceived stress, mental toughness and depressive symptoms in high school pupils and undergraduate students. They found that mental toughness mitigated the relationship between high stress and depressive symptoms. Stamp et al. (2015) also revealed

relationships between mental toughness and psychological wellbeing in undergraduate students. Analyses revealed greatest predictive value for commitment, confidence in abilities, and interpersonal confidence.

In addition to research that has investigated the relationship between mental toughness and the educational experience, a number of studies have looked at how mental toughness relates to other individual differences that have been related to transition success. Mental toughness, as conceptualised by Clough et al (2002), has been linked to the big five personality model. For example, Horsburgh Schermer, Veselka, and Vernon (2009) established significant correlations between the MTQ48 and the big five personality factors (extraversion, openness, agreeableness, conscientiousness, and lower neuroticism). Research has also suggested relationships between mental toughness and use of coping strategies. Nicholls et al. (2008) found mental toughness to be associated with more problem or approach coping strategies (see also Kaiseler, Polman, & Nicholls, 2009).

McGeown et al. (2015) discussed mental toughness in terms of the extent to which the subcomponents align with other non-cognitive attributes studied in education, including resilience (e.g., Putwain, Nicholson, Connors & Woods, 2013), buoyancy (e.g., Martin & Marsh, 2009), self-efficacy (e.g., Caprara et al. 2011; Stakov & Lee, 2014), confidence (e.g., Stankov & Lee, 2014), motivation (e.g., Lepper, Henderlong- Corpus & Iyengar, 2005), and grit (Duckworth, Peterson, Matthews, & Kelly, 2007). For example, the commitment and challenge subcomponents of mental toughness share some similarities with grit, defined as perseverance for long-term goals (Duckworth et al., 2007). Confidence in abilities also appears to align with self-efficacy, whereas interpersonal confidence overlaps somewhat with self-esteem (see also St Clair-Thompson & McGeown, in press). However, they also proposed several advantages of adopting the mental toughness framework within educational settings. The model of mental toughness (Clough et al., 2002) brings together quite different

concepts, enabling a simpler, yet relatively comprehensive approach to studying non-cognitive constructs. The model also has the potential for providing focussed or targeted intervention. Mental toughness has been conceptualised in some circumstances as a mind-set. For example, a recent study conducted by Gucciardi, Hanton, Gordon, Mallett and Temby (2015; Study 4) explored the degree to which individual differences in mental toughness were accounted for by variation in between-person (i.e. trait) and within-person (i.e. state) factors. Undergraduate students completed a measure of mental toughness once every week for ten consecutive weeks. Gucciardi et al. assessed participants' current mental toughness in comparison to both his or her usual mental toughness and other participants' mental toughness. The findings suggested that 56% of the variance was due to within-person variation across the course of the study. This supports the idea that to some extent mental toughness is sensitive to changes of situations over time. This also suggests that mental toughness can be enhanced through psychological skills training. For example, Sheard and Golby (2006) evaluated the effects of a 7-week program consisting of goal setting, visualisation, relaxation, concentration, and thought stopping skills. It was found to result in significant increases in mental toughness in a group of athletes (see also; Crust, 2008, Crust & Clough 2011).

The current studies therefore sought to examine the relationships between mental toughness and educational transitions. The first study employed children aged 12-13 years of age prior to a transition, and the second study employed undergraduate students. Theoretically, it seems reasonable to predict that those scoring higher on mental toughness will find transitions easier. More specifically, those scoring higher on the mental toughness component of challenge will be more likely to make a successful transition, the component of commitment will be beneficial for adjusting to new academic demands, emotional control may confer an advantage in terms of managing anxiety, and life control in terms of managing

academic workload. Finally, confidence in abilities may be important with regards to concerns about academic work, and interpersonal confidence may confer an advantage in terms of engaging in social interaction and making friends.

Study 1

Study 1 aimed to examine the relationships between mental toughness and concerns about school transitions. The participants were children aged 12-13 years, who were about to undergo the transition from middle school to high school. Participants completed The Mental Toughness Questionnaire 48 (Clough et al., 2008) and The School Concerns Questionnaire (Thomasson, Field, O'Donnell & Woods, 2006). Given previous findings that pupils with lower self-esteem are vulnerable to poorer school and peer transitions (Aikins et al., 2005; Anderson et al., 2000; Galton et al., 2000; West et al., 2010), an additional aim was to examine whether mental toughness was related to concerns about transitions over and above self-esteem. Therefore participants also completed Rosenberg's Self-Esteem Scale (Rosenberg, 1965), and hierarchical regression analyses were used to examine the extent to which mental toughness predicted school concerns when it was entered after self-esteem. Based on previous findings that there may also be sex differences in concerns about educational transitions (e.g., Anderson et al., 2000), sex differences were also examined. It was hypothesised that each subcomponent of mental toughness would be correlated to school concerns, and that girls would experience more concerns about school transitions than boys.

Method

Participants

The participants were 105 pupils (52 males and 53 females) aged 12-13 years (mean age 13 years and 5 months), from a school in the North East of England. The children were in school Year 8 of a middle school, and were about to undergo the transition to high school in

the following academic term. The socio-economic background of the pupils was mixed, and all students in participating classes were asked to take part. There were no exclusion criteria.

Materials and Procedure

Pupils were asked to complete three questionnaires, assessing mental toughness, self-esteem and school concerns. Mental toughness was assessed using The Mental Toughness Questionnaire 48 (MTQ48, Clough et al., 2002). This is comprised of items assessing each of the dimensions of mental toughness described earlier: challenge, commitment, control of emotion, control of life, confidence in abilities, and interpersonal confidence. There are 48 items in the questionnaire. For each item participants are asked to agree/disagree with a series of statements on a 5 point Likert-type scale (ranging from "*I disagree strongly*" to "*I agree strongly*"). An average score was computed for each of the subscales. Previous research has revealed suitable internal reliability of data collected using the questionnaire. However, it has also found relatively low reliability of the control of emotion subscale (Perry et al., 2013; St Clair-Thompson et al., 2014) and has therefore suggested the removal of questionnaire items 26 and 34. After removal of these items the current study calculated Cronbach's α values for scores on each of the subscales as .67, .75, .66, .60, .77, .72, and .92 for challenge, commitment, control of emotion, control of life, confidence in abilities, interpersonal confidence and total mental toughness respectively.

Self-esteem was assessed using Rosenberg's Self-Esteem Scale (Rosenberg, 1965), one of the most widely used measures of this construct, with evidenced psychometric properties (e.g., Roth, Decker, Herzberg, & Brahler, 2008). The scale consists of 10 items, 5 positively worded and 5 negatively worded, such as "I am satisfied with myself" and "Sometimes I think I am no good at all". Participants rate the extent to which they agree with

each statement on a scale of 0 (strongly disagree) to 3 (strongly agree). A total score is then computed. In the current study Cronbach's α of scores on the self-esteem scale was .88.

Pupils also completed The School Concerns Questionnaire (Thomasson et al., 2006). This lists 17 potential concerns about moving to a new school, including making friends, doing homework and being bullied. For each item pupils rate their level of concern on a 10-point scale, ranging from not worried to extremely worried. A total score is then computed. Previous research has revealed good reliability and validity of scores on the questionnaire when used in both primary and secondary school (Rice, Frederickson & Seymour, 2011). In the current study Cronbach's α was calculated as .95.

Ethical approval was granted from the appropriate committee at the host institution prior to commencement of the study. Following agreement from a Head Teacher that pupils in their school could take part in the study, parental consent and child assent was sought for all children who took part. The pupils completed the questionnaires in their school classroom. They did so anonymously, and were asked to complete the questionnaires in silence. The order of the questionnaires was counterbalanced across neighbouring participants to reduce the chance of children discussing their answers with their classmates.

Data Analysis

To examine the validity of the measures used with the samples in these two studies, we tested the factor structure using exploratory structural equation modelling (ESEM; Asparouhov & Muthén, 2009) in M*plus* 7 (Muthén & Muthén, 2012). ESEM analysis estimates the loadings from each observed variable onto a pre-determined number of latent variables. The main benefit here compared to typical confirmatory factor analysis of independent cluster models (CFA-ICM) is that non-significant cross-loadings are not viewed as mis-specifications (Marsh, Hau, & Wen, 2004). All ESEM analyses employed the robust maximum likelihood (MLR) estimator to guard against departure from multivariate

normality. To assess model fit, comparative fit index (CFI) and Tucker-Lewis index (TLI) were used as an indicators of incremental fit and root-mean-square error of approximation (RMSEA) and standardized root mean-square residual (SRMR) were used as an indicators of absolute fit. Fit was broadly interpreted as adequate if CFI and TLI close to .90 and RMSEA and SRMR close to .05 and .08 respectively, as suggested by Hu and Bentler (1999) while recognising the recommendations of researchers to avoid rigidly using these as cut-off values (Perry, Nicholls, Clough, & Crust, 2015).

Descriptive statistics were then computed for scores on The Mental Toughness Questionnaire, Rosenberg's Self-Esteem Scale, and The School Concerns Questionnaire. These were followed by a correlation analysis. Hierarchical regression analysis was then used to examine the extent to which mental toughness and self-esteem predicted scores on The School Concerns Questionnaire. Gender differences were controlled for.

Results

Preliminary Analyses

First, we tested the factor structure of measures used in this study. For mental toughness, we combined the sample with that in Study 2 to create a total sample of 305. This was to enable a satisfactory sample size to assess the underlying factor structure, as it is a relatively complex model. As reliability analysis had identified the potential removal of items 26 and 34 from the MTQ48, we tested the model with and without these items. As there has been some debate regarding the dimensionality of mental toughness, we tested single-factor, four-factor, and six-factor models. Model results are displayed in Table 1. The single-factor and four-factor models did not present adequate fit, although this was improved when adjusted to remove items 26 and 34. The six-factor model presented acceptable model fit, which was also improved by the removal of these items.

Table 1 here

The Rosenberg Self-Esteem Scale is unidimensional and therefore, all items were indicators of the overall self-esteem latent variable. Model fit was generally a little weaker than ideal (Table 1). However, given the small sample size, the fact that internal consistency was high, and that all items loaded at greater than .45 onto the latent variable (average variance extracted = .44), the underlying structure was considered strong enough to progress without modification. The School Concerns Questionnaire similarly has a unidimensional structure and exhibited a similar model fit to the Rosenberg Self-Esteem Scale (Table 1). Internal consistency was also high though and all standardized parameter estimates were greater than .50 (average variance extracted = .54). Consequently, the underlying structure was supported without modification.

Main Results

Table 2 here

The descriptive statistics for the Mental Toughness Questionnaire, School Concerns Questionnaire and Self-Esteem Scale for both boys and girls are shown in Table 2. The results revealed that boys gave higher ratings of mental toughness than girls, with differences being significant for challenge, control, confidence in abilities, interpersonal confidence, and confidence. Boys also reported higher levels of self-esteem, and fewer school concerns.

Table 3 here

The correlations between mental toughness, self-esteem and scores on the School Concerns Questionnaire are shown in Table 3. There were statistically significant correlations

between each subcomponent of mental toughness, self-esteem and school concerns. Hierarchical regression analyses were then conducted to examine the degree to which mental toughness and self-esteem predicted school concerns. Given the gender differences described above gender was entered into the regression model first. Of particular interest to the current study was the extent to which mental toughness predicted school concerns over and above self-esteem. Therefore self-esteem was entered with gender in block 1, with mental toughness added in block 2. Collinearity statistics were examined, and there were no variance inflation factor values > 10 (Bowerman & O'Connell, 1990; Myers, 1990) and no tolerance values below .20 (Field, 2000). This suggests that collinearity was not a problem for the regression model. The results of the regression analyses are shown in Table 4. Model 1 accounted for 25% of the variance, F (2, 102) = 16.80, $p < .01$, $R^2 = .25$, with both gender and self-esteem being significant predictors of school concerns ($\beta = .22$, $p < .01$ and $\beta = -.39$, $p < .01$ respectively). Model 2 accounted for an additional 9% of the variance, ΔF (6, 96) = 2.24, $p < .05$, $\Delta R^2 = .09$ with only confidence in abilities being a significant predictor ($\beta = -.37$, $p < .01$).

Table 4 here

Discussion

The aim of study 1 was to examine the relationships between mental toughness and concerns about school transitions. We began by examining the factor structure of the measures using exploratory structural equation modelling. The results revealed that the six-factor model of mental toughness provided the best account of the data. This is consistent with previous findings (e.g. Perry et al., 2013; St Clair-Thompson et al., 2014), and supports the suggestion that mental toughness is a multifaceted construct (e.g. Crust et al., 2008). In contrast, some other non-cognitive attributes considered within educational settings are

considered to be unidimensional, such as that of grit (Duckworth et al., 2007). This suggests that one benefit of adopting the mental toughness framework is that it is an overarching way of aggregating conceptually distinct but empirically related constructs. Analyses further supported the unidimensional structure of the Self-Esteem and School Concerns questionnaires.

Relationships between scores on the measures were then examined. The correlation analyses revealed that each subcomponent of mental toughness was significantly related to school concerns. However, the regression analysis revealed that the most important component of mental toughness was confidence in abilities. Confidence in abilities describes a belief in individual qualities, with little dependence on external validation (e.g., Clough et al., 2002). The findings suggest that children who score more highly on this subscale are sufficiently confident that they have the skills and abilities required that they experience fewer concerns about moving to a new school. Confidence in abilities has clear correspondences with the concept of self-efficacy, defined as "the belief in one's capabilities to organise and execute courses of action required to produce given attainments" (Bandura, 1997). The findings are therefore consistent with previous findings from studies in higher education, that self-efficacy is a strong predictor of students' ratings of adjustment (e.g., Morton et al., 2014). It is, however, interesting to note that in the regression analyses the contributions of control of emotion and interpersonal confidence were nearing significance. This suggests that pupils who are more able to control their emotions and who are more confident in interacting with others also experience fewer worries about school transitions.

An additional aim of Study 1 was to examine whether mental toughness was related to concerns about transitions over and above self-esteem. Although self-esteem was a significant predictor of school concerns (see also Aikins et al., 2005; Anderson et al., 2000; Galton et al., 2000; West et al., 2010), its contribution became non-significant when mental

toughness was also entered into the regression analysis. This finding highlights the potential value of considering mental toughness as a construct that could be targeted as part of interventions to aid school transitions.

It is, however, worthy of note that the School Concerns Questionnaire (Thomasson et al., 2006) only provides an overall score for school concerns. Pupils can be concerned about a range of issues, such as the school environment, academic demands, and peer relationships (e.g. Anderson et al., 2000; Smith et al., 2008; Zeedyk et al., 2003). Future research could examine relationships between mental toughness and different types of concerns. For example, it seems reasonable to suggest that commitment may be related to concerns about academic demands, and that interpersonal confidence may be associated with engaging in social interaction and making friends. Rather than engaging in post-hoc exploratory analysis in this study, this issue was explored in Study 2 with undergraduate students.

It is also important to note that the results of study 1 revealed significant gender differences. Boys reported higher levels of mental toughness, which extends previous findings of gender differences in adult samples (e.g. Crust et al., 2014) to children aged 12–13 years. Girls also reported lower self-esteem and greater concern about school transitions. These results are consistent with previous discoveries of sex differences in self-esteem (e.g., Birndorf, Ryan, Auinger, & Aten, 2005), and anxiety during school transitions (e.g., Duchesne et al., 2012; Loke & Lowe, 2013; Rice et al., 2011; Riglin et al., 2013). This suggests that any interventions that are designed to target school transitions are likely to be particularly beneficial for girls.

Study 2

Study 2 aimed to examine the relationships between mental toughness and transitions into higher education. The participants were undergraduate students (post-transition). They completed The Mental Toughness Questionnaire 48 (Clough et al., 2008), and the Student

Adaptation to College Questionnaire (Baker & Siryk, 1984). This has been one of the most commonly used measures of adjustment in a broad and varied literature on adjustment to undergraduate study (e.g., Crede & Niehorster, 2011). This instrument allowed for the examination of transitions according to four categories; academic adjustment refers to a student's success in coping with educational demands, social adjustment describes a student's success in coping with interpersonal- societal demands, personal-emotional adjustment refers to both psychological and physical wellbeing, and attachment reflects a student's degree of attachment to the particular institution (Baker & Siryk, 1999). Following Study 1, gender differences were also examined. It was hypothesised that the component of commitment would be particularly related to academic adjustment, that interpersonal confidence would be important for social adjustment, and that emotional control would be related to personal-emotional adjustment.

Method

Participants

The participants were 200 students (38 males and 162 females) from a university in the North East of England. They were in various stages of their undergraduate degree (89 in Year 1, 69 in Year 2, and 40 in Year 3), and were enrolled in a range of courses (98 in Psychology, 82 in Medicine, and 20 in a range of other subjects). They participated for either course credit or for the opportunity to win shopping vouchers.

Materials and Procedure

Participants completed the Mental Toughness Questionnaire 48 (MTQ48, Clough et al., 2002) as described for Study 1. Again, due to reliability questionnaire items 26 and 34 were removed prior to analysis. After removal of these items Cronbach's α values for scores on each of the subscales of the MTQ48 were calculated as .77, .80, .59, .67, .68, .81, .78, .85

and .93 for challenge, commitment, control of emotion, control of life, control, confidence in abilities, interpersonal confidence, confidence, and total mental toughness respectively.

Participants also completed the Student Adaptation to College Questionnaire (Baker & Siryk, 1984), a self-report questionnaire that consists of sixty-seven items. The questionnaire consists of statements assessing four subscales; academic adjustment (e.g. "I have been keeping up to date on my academic work"), social adjustment (e.g. "I have several close social ties at University"), personal-emotional adjustment (e.g. "Lately I have been feeling blue and moody a lot"), and institutional attachment (e.g. "I feel that I fit in well as part of the University environment"). Participants respond on a 9-point scale ranging from 'applies very closely to me' to 'doesn't apply to me at all.' Scores range from less adaptive to more adaptive adjustment. Cronbach's α values were calculated as .86, .88, .85, and .85 for academic adjustment, social adjustment, personal-emotional adjustment, and institutional attachment scores respectively. Owing to the length of the scale and multi-dimensions, ESEM analysis on the SACQ requires the estimation of 384 free parameters. Therefore, we were unable to appropriately examine the factor structure in a sample of 200.

Ethical approval was granted from the appropriate committee at the host institution prior to commencement of the study. Participants were invited to take part on a voluntary basis, and took part anonymously; either completing paper questionnaires in a timetabled session or completing an online version in their own time. They were asked to complete the questionnaires individually without discussing their responses with their peers.

Results

Table 5 here

The descriptive statistics for the Mental Toughness Questionnaire and Student Adaptation to College Questionnaire for both males and females are shown in Table 5. The results revealed that males gave significantly higher ratings for each component of mental toughness, with the exception of commitment. Males also reported significantly better personal-emotional adjustment.

Table 6 here

The correlations between mental toughness and scores on the Student Adaptation to College Questionnaire are shown in Table 6. There were statistically significant correlations between each subcomponent of mental toughness and adjustment. A series of simultaneous regression analyses (enter method) were then conducted to examine the degree to which mental toughness predicted each subcomponent of adjustment. As in Study 1, gender was also entered in to the regression models. Given that adaptation is commonly assessed in students during their first year of undergraduate study (e.g. Crede & Niehorster, 2011; Feldt, Graham & Dew, 2011; but see Mattanah, Hancock, & Brand, 2004), year of study was also entered into the regression analyses. Collinearity statistics were examined, and there were no *VIF* values greater than 10 (Bowerman & O'Connell, 1990; Myers, 1990) and no tolerance values below .20 (Field, 2000). This suggests that collinearity was not a problem for the regression model. The results of the regression analyses are shown in Table 7. For academic adaptation the model accounted for 51% of the variance, F (8, 191) = 24.60, $p < .01$, $R^2 = .51$, with both commitment and control of life being significant predictors ($\beta = .67$, $p < .01$ and $\beta = .18$, $p < .05$, respectively). For social adaptation the model accounted for 33% of the variance, F (8, 191) = 11.99, $p < .01$, $R^2 = .33$ with control of life and interpersonal confidence emerging as significant predictors ($\beta = .27$, $p < .01$ and $\beta = .22$, $p < .05$, respectively). For personal-emotional adaptation the model accounted for 53% of the variance, F (8, 191) =

27.22, $p < .01$, $R^2 = .53$, with commitment, control of emotion, and confidence in abilities all being significant predictors ($\beta = .15$, $p < .05$, $\beta = .16$, $p < .05$, and $\beta = .16$, $p < .01$ respectively). Finally, for institutional attachment the model accounted for 26% of the variance, with F (8, 191) = 8.28, $p < .01$, $R^2 = .26$, with only control of life emerging as significant, ($\beta = .31$, $p < .01$).

Table 7 here

Discussion

The aim of study 2 was to examine the relationships between mental toughness and transitions to undergraduate study. Each subcomponent of mental toughness was significantly correlated with each category of student adaptation. However, the regression analysis revealed a more detailed pattern of findings; different subcomponents of mental toughness were important for different facets of adjustment.

Commitment was a significant predictor of both academic and personal-emotional adjustment. Its role in academic adjustment may result from committed students persevering when faced with difficult learning tasks. In this way commitment may serve in a similar manner to conscientiousness, which is known to be important for educational attainment (e.g., Poropat, 2009) as well as adjustment to university (Wintre & Sugar, 2000). Relationships with personal-emotional adjustment may reflect commitment being involved in the degree to which situations are appraised as being stressful. This framework has been used to explain relationships between conscientiousness and anxiety and stress (e.g., Bienvenu, Samuels, Costa, & Reti et al., 2004).

Regarding control, control of emotion was a significant predictor of personal-emotional adjustment. Thus students who are better able to control their emotions experience fewer psychological and physical symptoms of anxiety. Control of life was a significant

predictor of academic adjustment, social adjustment, and institutional attachment. Its role in academic adjustment may reflect individuals high on life control demonstrating effective planning, time management, and prioritising (McGeown et al., 2015). Relationships with social adjustment may result from viewing social outcomes as dependent upon their own efforts making these students more motivated and able to manage the social demands of university life. In this way control of life may be comparable to locus of control (Rotter, 1954). Considered more recently in attribution based theories of motivation (e.g., Weiner, 2010), this describes the degree to which individuals believe that they, rather than others or uncontrollable factors, are responsible for outcomes in their lives. Previous studies have revealed associations between locus of control and social relationships (e.g., Crozier, 2011; Kang, Chang, Chen, & Greenberger, 2015). Feeling in control may also encourage autonomy and motivation to develop an attachment with the university. Alternatively, students high on life control may be more actively involved in their choice of university and hence feel a greater institutional connection.

Confidence in abilities emerged as a significant predictor of personal-emotional adjustment. This is consistent with previous findings that efficacious individuals perceive events as challenging rather than as stressful (e.g., Ebstrup, Eplov, Pisinger, & Jorgensen, 2011; Leganger & Kraft, 2003). In contrast, interpersonal confidence was a significant predictor of social adjustment. This could be attributed to engagement in group activities, and not feeling intimidated in social situations (e.g. see also McGeown et al., 2015). This finding is also consistent with the results of St Clair-Thompson et al. (2014), who found relationships between interpersonal confidence and adolescents peer relationships.

The findings of study 2 also revealed higher levels of mental toughness in males than in females (see also Crust et al., 2014), along with higher levels of personal-emotional

adjustment. This is consistent with the findings of Wintre and Sugar (2000) using the Student Adaptation to College Questionnaire.

General Discussion

The current studies revealed an important role for mental toughness in educational transitions. Study 1 found that mental toughness is associated with concerns about upcoming school transitions, and Study 2 found that mental toughness is associated with adjustment to undergraduate study. Study 1 revealed that confidence in abilities was particularly important for school concerns, whereas Study 2 revealed a role for each of commitment, control of life, control of emotion, confidence in abilities and interpersonal confidence. These findings have important implications for educational practice.

Many schools in the UK implement programmes to support pupils through educational transitions. Evangelou, Taggart, Sylva, and Melhuish et al. (2008) described strategies being used in the UK as using bridging materials, sharing information between schools, pre-transfer visits by staff and pupils, talks and taster days (see also Galton, Gray, & Ruddock, 2003). Other interventions focus on pupils who have been identified as more vulnerable by primary school teachers (Bloyce & Frederickson, 2012), for example those with special educational needs or with low socio-economic status. The ability of mental toughness to predict concerns about school transitions suggest that measures of mental toughness could be used to identify children at risk of struggling with school transitions, and also that interventions targeting mental toughness could have beneficial effects.

Given that poor adjustment is the main factor predicting student attrition and low academic performance at university (e.g., Sennett et al., 2003) a substantial investment is also made in practices to ease the transition to undergraduate study. These include various induction activities, peer mentoring, and individual meetings with tutors (e.g., Rodger & Tremblay, 2003). The findings of close relationships between mental toughness and

adjustment to university suggests that a measure of mental toughness could also be a useful tool for identifying students at risk of failing and dropping out of undergraduate study (see also Crust et al., 2014) and that interventions aimed at improving mental toughness could have beneficial effects. Given the role of mental toughness in several educational outcomes and experiences (see St Clair-Thompson et al., 2014), and also its relationships with mental health and psychological well-being (Gerber et al., 2013; Stamp et al., 2015) any interventions that target mental toughness have the potential to have diverse effects.

There is some evidence that mental toughness can be improved through psychological skills training (e.g., Crust & Clough, 2011). Sheard and Golby (2006) examined the effects of a program conducted with a group of athletes, consisting of goal setting, visualisation, relaxation, concentration, and thought stopping skills. It was found to result in significant increases in mental toughness (see also; Crust, 2008, Crust & Clough 2011). A 10- month study carried out by Gerber, Brand , Feldmeth, Lang, Elliot, and Holsboer-Trachsler (2013) further revealed that mental toughness levels can change in adolescents. Their results showed that the mentally tough became tougher, probably as a result of experiential learning, whereas the sensitive showed no enhancement. It is therefore likely that some form of formal intervention may be needed for developing toughness in some individuals. However, as yet research has not explored mental toughness interventions within educational settings. Research is needed to examine the potential of mental toughness training, and the likelihood of enhanced mental toughness being beneficial for educational transitions. The results of Study 1 suggest that interventions focussed on confidence in abilities are most likely to be beneficial for school children. Theoretically such interventions could include goal setting (Strycharczyk & Clough, 2014). The results of Study 2 suggest that interventions targeting most of the components of mental toughness could be beneficial for those beginning

undergraduate study. These might involve positive thinking, goal setting, anxiety control, and attentional control (Strycharczyk & Clough, 2014).

It is also important to note that the current studies revealed important gender differences in mental toughness and educational transitions. Males were found to report higher mental toughness in both the adolescent and undergraduate samples. Gender differences were also evident in school concerns, self-esteem and personal-emotional adjustment in the Student Adaptation to College Questionnaire (see also Duchesne et al., 2012; Wintre & Sugar, 2000). The pattern of findings therefore suggests that any interventions to address transitions may be particularly beneficial for girls. However, these findings also suggest that any interventions may need to be tailored to individual students. Due to higher levels of mental toughness boys may not benefit from the same interventions as girls, for example, as a result of being sufficiently confident they may be more resistant to change.

Educational researchers and practitioners would therefore benefit from research into mental toughness training, and also the applicability of such training to varying participant groups. It is, however, important to note some limitations of the current studies. Study 1 examined school concerns prior to the transition, whereas some previous studies have examined concerns post-transition (e.g., Rice et al., 2011; West et al., 2010). Studies have reported that worries typically decline during the first term of a new school (e.g., Rice et al., 2011). It would therefore be interesting to examine the role of mental toughness in the time course and longevity of school concerns. Study 2 examined adaptation post-transition, as is common in studies using the Student Adaptation to College Questionnaire (e.g., Crede & Niehorster, 2012). However, understanding the role of mental toughness in the time course of adjustment would be important for developing specific and timely interventions. Given the importance of adjustment to university study for student attrition and academic performance

(e.g., Sennett et al., 2003; Strahan, 2003) future research could also examine whether adjustment partly mediates the relationships between mental toughness and attainment and attrition (e.g., Crust et al., 2014; St Clair-Thompson et al., 2014).

It is also important to note that both studies relied upon the use of self-report measures, and that the measures were administered concurrently. This allows for the possibility that the correlations were inflated due to two types of common method effects (e.g. Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). It is however, not always the case that relationships between self-report variables are overestimated (e.g. Conway & Lance, 2010; Spector, 2006). In relation to this point, Conway and Lance (2010) highlighted the need to consider three distinct issues; whether self-reports are appropriate, evidence of reliability and validity, and the overlap between items assessing each construct. Alternative methods of assessing mental toughness and adjustment to school and university are not currently available. There is substantial evidence for the construct validity of mental toughness and also adaptation to university (e.g. Beyers & Goosens, 2002; Crede & Niehorster, 2012; Perry et al. 2013). The current studies also revealed suitable reliability of each measure. Finally, in considering the overlap between items assessing each construct, mental toughness is viewed as a trait, so when completing the MTQ48 participants are instructed to think about how they feel generally, responding to statements like “I generally find something to motivate me”, whereas when completing the Student Adaptation to College Questionnaire participants are asked to decide how well something applies to them at the present time, for example “I feel that I fit in well as part of the college environment”. Therefore there are some important differences between the items used to assess each construct.

Regarding the concurrent assessment of mental toughness and adjustment, previous studies examining relationships between a range of variables and adjustment to university have also taken this approach (e.g. Hinderlie & Kenny, 2002; Mathis & Lecci, 1999;

Mattanah et al., 2004). However, concurrent correlations do not give an indication of the direction of the effects. Higher mental toughness could result in fewer concerns or more successful adaptation, or conversely, more concerns or poorer adaptation could result in reports of lower mental toughness. Despite these limitations the present studies represent an important first step in establishing the usefulness of mental toughness within this domain. Further research using a longitudinal design is needed to examine the ability of mental toughness to predict later adaptation.

A final suggestion for future research is concerned with the issue of domain specificity. Within mental toughness research, some researchers have suggested that mental toughness may be context specific (Crust, 2008). However, others have proposed that mental toughness appears to have a greater degree of generalisability (Clough et al., 2002). Similarly, within the study of non-cognitive attributes in education, some researchers have adopted domain specific approaches (Wigfield, 1997), but others have taken more global stances (e.g., Duckworth et al., 2007; Putwain et al., 2013). To develop interventions for mental toughness in educational settings, more research is needed to establish whether mental toughness is a generalised attribute, or domain-dependent.

In conclusion, the current studies revealed an important role for mental toughness in transitions to high school and to undergraduate study. The findings suggest that measures of mental toughness could be used to identify individuals who would benefit from additional support to ease the process of educational transitions. The findings also indicate that there is potential in exploring possible methods of mental toughness training.

References

Ackerman, P. L., Chamorro-Premuzic, T., & Furnham, A. (2011). Trait complexes and academic achievement. Old and new ways of examining personality in educational contexts. *British Journal of Educational Psychology, 81*(1), 27-40. doi:10.1348/000709910X522564

Aikins, J. W., Bierman, K. L., & Parker, J. G. (2005). Navigating the transition to junior high school: The influence of pre-transition friendship and self-system characteristics. *Social Development, 14*(1), 42-60. doi:10.1111/j.1467-9507.2005.00290.x

Anderson, L. W., Jacobs, J., Schramm, S., & Splittgerber, F. (2000). School transitions: beginning of the end or a new beginning? *International Journal of Educational Research, 33*(4), 325-339. doi:10.1016/S0883-0355(00)00020-3

Asparouhov, T., & Muthén, B. (2009). Exploratory structural equation modeling. *Structural Equation Modeling, 16*, 397–438. doi: 10.1080/10705510903008204

Baker, R. W., & Siryk, B. (1986). Exploratory intervention with a scale measuring adjustment to college. *Journal of Counseling psychology*, *33*(1), 31.

Baker, R. W., & Siryk, B. (1999). *SACQ: Student adaptation to college questionnaire: Manual*. Los Angeles, CA: Western Psychological Services.

Bandura, A. (1997). *Self-efficacy: the exercise of control*. New York: Freeman.

Berndt, T. J., & Mekos, D. (1995). Adolescents' perceptions of the stressful and desirable aspects of the transition to junior high school. *Journal of Research on Adolescence, 5*(1), 123-142.

Beyers, W., & Goossens, L. (2002). Concurrent and predictive validity of the student adaptation to college questionnaire in a sample of European freshman students.

Educational and Psychological Measurement, *62* (3), 527-538. doi:10.1177/00164402062003009

Bienvenu, O. J., Samuels, J. F., Costa, P. T., Reti, I. M., Eaton, W. W., & Nestadt, G. (2004). Anxiety and depressive disorders and the five-factor model of personality: A higher-and lower-order personality trait investigation in a community sample. *Depression and Anxiety*, *20*(2), 92-97. doi:10.1002/da.20026

Birndorf, S., Ryan, S., Auinger, P., & Aten, M. (2005). High self-esteem among adolescents: Longitudinal trends, sex differences, and protective factors. *Journal of Adolescent Health*, *37*(3), 194-201.

Bloyce, J., & Frederickson, N. (2012). Intervening to improve the transfer to secondary school. *Educational Psychology in Practice*, *28*(1), 1-18. doi:10.1080/02667363.2011.639345

Blyth, D. A., Simmons, R. G., & Carlton-Ford, S. (1983). The adjustment of early adolescents to school transitions. *The Journal of Early Adolescence*, *3*, 105-120.

Bowerman, B. L., & O'Connell, R. T. (1990). *Linear Statistical Models: An Applied Approach* (2nd edition). Belmont, CA: Duxbury.

Bull, S. J., Shambrook, C. J., James, W., & Brooks, J. E. (2005). Towards an understanding of mental toughness in elite English cricketers. *Journal of Applied Sport Psychology*, *17,* 209-227. doi**:**10.1080/10413200591010085

Clough, P. J., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. In I. Cockerill (Ed.). *Solutions in sport psychology* (pp. 32–43). London: Thomson.

Connaughton, D., Wadey, R., Hanton, S., & Jones, G. (2008). The development and maintenance of mental toughness: Perceptions of elite performers. *Journal of Sport Sciences, 26*, 83-95. doi:10.1080/02640410701310958

Conway, J. M., & Lance, C. E. (2010). What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology, 25*, 325-334. Doi:10.1007/s10869-010-9181-6

Credé, M., & Niehorster, S. (2012). Adjustment to college as measured by the student adaptation to college questionnaire: A quantitative review of its structure and relationships with correlates and consequences. *Educational Psychology Review, 24*(1), 133-165. doi: 10.1007/s10648-011-9184-5

Crozier, W. (2011). Shyness and self-esteem in middle childhood. *British Journal of Educational Psychology, 65*, 85–95. doi:10.1111/j.2044-8279.1995.tb01133.x

Crust, L. (2008). A review and conceptual re-examination of mental toughness: Implications for future researchers. *Personality and Individual Differences, 45*, 576- 583. doi:10.1016/j.paid.2008.07.005

Crust, L. & Clough, P. J. (2011). Developing mental toughness: from research to practice. *Journal of Sport Psychology in Action, 2*, 21-32. doi:10.1080/21520704.2011.563436

Crust, L., Earle, K., Perry, J., Earle, F., Clough, A., & Clough, P. (2014). Mental toughness in higher education: Relationships with achievement and progression in first year undergraduate sports students. *Personality and Individual Differences, 69*, 87-91. doi: /10.1016/j.paid.2014.05.016

Duchesne, S.**,** Ratelle, C. F., & Roy, A. (2012). Worries about the middle school transition and subsequent adjustment: The role of classroom goal structure. *Journal of Early Adolescence, 32,* 681-710. doi: 10.1177/0272431611419506.

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly., D. R. (2007). Grit: Perseverance and Passion for Long-term Goals. *Journal of Personality and Social Psychology, 92,* 1087–1101. doi:10.1037/0022-3514.92.6.1087

Ebstrup, J. F., Eplov, L. F., Pisinger, C., & Jørgensen, T. (2011). Association between the Five Factor personality traits and perceived stress: is the effect mediated by general self-efficacy? *Anxiety, Stress and Coping*, *24*(4), 407-419. doi:10.1080/10615806.2010.540012

Evangelou, M., Taggart, B., Sylva, K., Melhuish, E., Sammons, P & Siraj-Blatchford, I. (2008). What makes a successful transition from primary school to secondary school? (Report No.DCSF-RR019). Retrieved from the Department for Children, Schools and Families website: http://webarchive.nationalarchives.gov.uk/20130401151715/http://www.education.gov.uk/publications/eOrderingDownload/DCSF-RR019.pdf

Feldt, R. C., Graham, M., & Dew, D. (2011). Measuring adjustment to college: construct validity of the student adaptation to college questionnaire. *Measurement and Evaluation in Counseling and Development*, *44*, 92-104. doi:10.1177/0748175611400291

Field, A. (2000). *Discovering Statistics using SPSS for Windows*. London, UK: Sage Publications.

Galton, M., Gray, J., & Ruddock, J. (2003). Transfer and transitions in the middle years of schools (7-14): continuities and discontinuities in learning (Report No. 443). Retrieved from the Department for Education and Skills website: http://www.lotc.org.uk/wp-content/uploads/2010/12/DfES-Research-Report-RR443-2003.pdf

Galton, M., Morrison, I., & Pell, T. (2000). Transfer and transition in English schools: reviewing the evidence. *International Journal of Educational Research, 33*(4), 341-363.

Gerber, M., Kalak, N., Lemola, S., Clough, P. J., Perry, J. L., Pühse, U., ... Brand, S. (2013). Are adolescents with high mental toughness levels more resilient against stress? *Stress and Health, 29*(2), 164-171. doi: 10.1002/smi.2447

Gerber, M., Brand, S., Feldmeth, A.K., Lang, C., Elliot, C., & Holsboer-Trachsler , E. (2013). Adolescents with high mental toughness adapt better to perceived stress: A longitudinal study with Swiss vocational students. *Personality and Individual Differences, 54*(7), 808-814. doi:10.1016/j.paid.2012.12.003

Greene, R. W., & Ollendick, T. H. (1993). Evaluation of a multidimensional program for sixth-graders in transition from elementary to middle school. *Journal of Community Psychology*, *21*(2), 162-176.

Grills-Taquechel, A. E., Norton, P., & Ollendick, T. H. (2010). A longitudinal examination of factors predicting anxiety during the transition to middle school. *Anxiety, Stress, and Coping*, *23*(5), 493-513. doi:10.1080/10615800903494127

Gucciardi, D., Gordon, S., & Dimmock, J. (2009). Evaluation of a mental toughness training programme for youth-aged Australian footballers: 1. A quantitative analysis. *Journal of Applied Sport Psychology*, *21*, 307-323. doi:10.1080/10413200903026066

Gucciardi, D. F., Hanton, S., & Mallett, C. J. (2012). Progressing measurement in mental toughness: A case example of the Mental Toughness Questionnaire 48. *Sport, Exercise, and Performance Psychology, 1*(3), 194. doi: 10.1037/a0027190

Gucciardi, D. F., Hanton, S., Gordon, S., Mallett, C. J., & Temby, P. (2015). The concept of mental toughness: Tests of dimensionality, nomological network, and traitness. Journal of Personality, 83, 26-44. doi: 10.1111/jopy.12079

Higher Education Statistics Agency. (2015). First Year HE student enrolment by mode of study, sex, level of study and domicile 2009/10 to 2013/14. Retrieved from www.hesa.ac.uk/free-statistics.

Hinderlie, H. H., & Kenny, M. (2002). Attachment, social support, and college adjustment among Black students at predominantly White universities. *Journal of College Student Development, 43*, 327-340.

Horsburgh, V., Schermer, J., Veselka, L., & Vernon, P. (2009). A behavioural genetic study of mental toughness and personality. *Personality and Individual Differences, 46*, 100–105. doi: 10.1016/j.paid.2008.09.009

Hu, L., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modelling, 6*, 1–55. doi: 10.1080/10705519909540118

Jones, G., Hanton, S., & Connaughton, D. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist, 21*, 243-264.

Kang, H. S., Chang, K. E., Chen, C., & Greenberger, E. (2015). Locus of control and peer relationships among Caucasian, Hispanic, Asian, and African American adolescents. *Journal of Youth and Adolescence*, *44*(1), 184-194. doi:10.1007/s10964-013-0083-6

Kaiseler, M., Polman, R., & Nicholls, A. (2009). Mental toughness, stress, stress appraisal, coping and coping effectiveness in sport. *Personality and Individual Differences*, *47*(7), 728-733. doi:10.1016/j.paid.2009.06.012

Kingery, J. N., & Erdley, C. A. (2007). Peer experience as predictors of adjustment across the middle school transition. *Education and Treatment of Children, 30*(2), 73-88.

Leganger, A., & Kraft, P. (2003). Control constructs: Do they mediate the relation between educational attainment and health behaviour? *Journal of Health Psychology*, *8*(3), 361-372.

Lepper, M. R., Henderlong Corpus, J., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology, 97*, 184–196. doi:10.1037/0022-0663.97.2.184

Loke, S. W., & Lowe, P. A. (2013). Examination of the psychometric properties of the Environmental School Transition Anxiety Scale. *Journal of Psychoeducational Assessment, 31*, 459-468. doi: 10.1177/0734282912472860

Martin, A. J., & Marsh, H. W. (2009). Academic resilience and academic buoyancy: Multidimensional and hierarchical conceptual framing of causes, correlates and cognate constructs. *Oxford Review of Education, 35*, 353-370. doi:10.1080/03054980902934639

Marsh, H. W., Hau, K-T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers of overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11*, 320-341. doi: 10.1207/s15328007sem1103_2

Mathis, M., & Lecci, L. (1999). Hardiness and college adjustment: Identifying students in need of services. *Journal of College Student Development, 40*, 305-309.

Mattanah, J. F., Hancock, G. R., & Brand, B. L. (2004). Parental Attachment, Separation-Individuation, and College Student Adjustment: A Structural

Equation Analysis of Mediational Effects. *Journal of Counseling Psychology*, *51*, 213-225. doi: 10.1037/0022-0167.51.2.213

McGeown, S. P., St Clair-Thompson, H., & Clough, P. (2015). The study of non-cognitive attributes in education: proposing the mental toughness framework, *Educational Review*. Advance online publication. doi: 10.1080/00131911.2015.1008408

Mooney, S. P., Sherman, M. F., & LoPresto, C. T. (1991). Academic locus of control, self-esteem, and perceived distance from home as predictors of college adjustment. *Journal of Counseling and Development*, *69*, 445-448.

Morton, S., Mergler, A., & Boman, P. (2014). Managing the Transition: The Role of Optimism and Self-Efficacy for First-Year Australian University Students. *Australian Journal of Guidance and Counselling*, *24*, 90-108. doi: 10.1017/jgc.2013.29

Nicholls, A. R., Polman, R. C., Levy, A. R., & Backhouse, S. (2008). Mental toughness, optimism, and coping among athletes. *Personality and Individual Differences, 44*, 1182–1192. doi: 10.1016/j.paid.2007.11.011

Myers, R. (1990). *Classical and Modern Regression with Applications* (2nd edition). Boston, MA: Duxbury.

Parker, J. D., Hogan, M. J., Eastabrook, J. M., Oke, A., & Wood, L. M. (2006). Emotional intelligence and student retention: Predicting the successful transition from high school to university. *Personality and Individual Differences, 41*(7), 1329-1336. doi:10.1016/j.paid.2006.04.022

Perry, J. L., Clough, P. J., Crust, L., Earle, K. & Nicholls, A. R. (2013). Factorial validity of the Mental Toughness Questionnaire- 48. *Personality and Individual Differences, 54,* 587-592. doi: 10.1016/j.paid.2012.11.020

Perry, J. L., Nicholls, A. R., Clough, P. J., & Crust, L. (2015). Assessing model fit: Caveats and recommendations for confirmatory factor analysis and exploratory structural equation modeling. *Measurement in Physical Education and Exercise Science, 19*, 12-21. doi: 10.1080/1091367X.2014.952370

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*, 879-903. doi: 10.1037/0021-9010.88.5.879

Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin, 135*(2), 322-338. doi: 10.1037/a0014996

Putwain, D. W., Nicholson, L. J., Connors, L., & Woods, K. (2013). Resilient children are less test anxious and perform better in tests at the end of primary schooling. *Learning and Individual Differences, 28*, 41–46. doi:10.1016/j.lindif.2013.09.010

Qualter, P., Whiteley, H. E., Hutchinson, J. M., & Pope, D. J. (2007). Supporting the development of emotional intelligence competencies to ease the transition from primary to high school. *Educational Psychology in Practice*, *23*(1), 79-95. doi:10.1080/02667360601154584

Rice, F., Frederickson, N., & Seymour, J. (2011). Assessing pupil concerns about transition to secondary school. *British Journal of Educational Psychology*, *81*(2), 244-263. doi: 10.1348/000709910X519333

Riglin, L., Frederickson, N., Shelton, K. H., & Rice, F. (2013). A longitudinal study of psychological functioning and academic attainment at the transition to secondary school. *Journal of Adolescence, 36*(3), 507-517.

Rodger, S., & Tremblay, P. F. (2003). The effects of a peer mentoring program on academic success among first year university students. *Canadian Journal of Higher Education, 33*(3), 1-17.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Roth, M., Decker, O., Herzberg, P. Y., & Brähler, E. (2008). Dimensionality and norms of the Rosenberg Self-Esteem Scale in a German general population sample. *European Journal of Psychological Assessment, 24*(3), 190.

Rotter, J. B. (1954). *Social learning and clinical psychology*. New York: Prentice Hall.

Sennett, J., Finchilescu, G., Gibson, K., & Strauss, R. (2003). Adjustment of black students at a historically white South African university. *Educational Psychology, 23*(1), 107-116.

Sheard, M., & Golby, J. (2006). Effect of psychological skills training program on swimming performance and positive psychological development. *International Journal of Sport and Exercise Psychology, 2*, 7-24.

Smith, J. S., Akos, P., Lim, S., & Wiley, S. (2008). Student and stakeholder perceptions of the transition to high school. *The High School Journal, 91*(3), 32-42.

Spector, P. E. (2006). Method variance in organizational research truth or urban legend?. *Organizational Research Methods, 9* (2), 221-232. doi:10.1177/1094428105284955

Stamp, E., Crust, L., Swann, C., Perry, J., Clough, P., & Marchant, D. (2015). Relationships between mental toughness and psychological wellbeing in undergraduate students. *Personality and Individual Differences, 75*, 170-174. doi: 10.1016/j.paid.2014.11.038

Stankov, L., & Lee, J. (2014). Quest for the best non-cognitive predictor of academic achievement. *Educational Psychology, 34*, 1-8, doi:10.1080/01443410.2013.858908

St Clair-Thompson, H., Bugler, M., Robinson, J., Clough, P., McGeown, S., & Perry, J. (2014). Mental toughness in education: Exploring relationships with attainment, attendance, behaviour and peer relationships. *Educational Psychology.* Advance online publication. doi:10.1080/01443410.2014.895294

St Clair-Thompson, H., & McGeown. S. (in press). Mental toughness: Correlates with educational outcomes. In M. Khine (Ed.). (in press). Non-cognitive factors in educational attainment.

Strycharcczyk, D., & Clough, P. (2014). *Developing mental toughness in young people*. London, UK: Karnac Books.

Thomasson, R., Field, L., O'Donnell, C., & Woods, S. (2006). School concerns questionnaire. Buckingham: Buckinghamshire County Council.

Tobbell, J. (2003). Students' experiences of the transition from primary to secondary school. *Educational and Child Psychology*, *20*(4), 4-14.

Vanlede, M., Little, T. D., & Card, N. A. (2006). Action-control beliefs and behaviors as predictors of change in adjustment across the transition to middle school. *Anxiety, Stress, and Coping*, *19*(2), 111-127. doi**:**10.1080/10615800600632896

Weinberg, R., & Gould, D. (2007). *Psychological foundations in sport and exercise*. Champaign, IL: Human Kinetics Press.

Weiner, B. (2010). The development of an attribution-based theory of motivation: A history of ideas. *Educational Psychologist, 45*, 28-36. doi:10.1080/00461520903433596

West, P., Sweeting, H., & Young, R. (2010). Transition matters: pupils' experiences of the primary–secondary school transition in the West of Scotland and consequences for well-being and attainment. *Research Papers in Education, 25*(1), 21-50. doi:10.1080/02671520802308677

Wigfield, A. (1997). Reading Motivation: A Domain-specific Approach to Motivation. *Educational Psychologist, 32*, 59–68.

Wintre, M. G., & Sugar, L. A. (2000). Relationships with parents, personality, and the university transition. *Journal of College Student Development, 41*, 202-214.

Zeedyk, M. S., Gallacher, J., Henderson, M., Hope, G., Husband, B., & Lindsay, K. (2003). Negotiating the transition from primary to secondary school perceptions of pupils, parents and teachers. *School Psychology International*, *24*(1), 67-79.

Table 1

ESEM model fit indicators for single-factor, 4-factor, and 6-factor MTQ48 models and Self-esteem and school concerns single factor models

Model	χ^2	df	CFI	TLI	SRMR	RMSEA [90% CI]
Mental toughness						
Single-factor	2988.61	1080	.574	.555	.091	.076 [.073, .079]
4-factor	1741.67	972	.821	.786	.048	.053 [.049, .057]
4-factor (Adj)	1500.08	857	.850	.819	.045	.050 [.045, .054]
6-factor	1308.32	855	.899	.866	.035	.042 [.037, .046]
6-factor (Adj)	1144.81	774	.914	.885	.034	.040 [.035, .044]
Self-esteem	84.30	35	.858	.818	.074	.116 [.084, .148]
School concerns	218.99	119	.876	.858	.057	.089 [.071, .108]

χ^2 = chi square, *df* = degrees of freedom, CFI = comparative fit index, TLI = Tucker-Lewis index, SRMR = standardized root mean-square residual, RMSEA = root-mean-square error of approximation, Adj = Items 26 and 34 removed

Table 2
Descriptive statistics for mental toughness, self-esteem, and school concerns

	Total	Boys	Girls	*d*
Challenge	3.52 (.56)	3.74 (.52)	3.31 (.53)	.82**
Commitment	3.53 (.55)	3.61 (.54)	3.44 (.55)	.31
Control of emotion	3.16 (.62)	3.27 (.57)	3.06(.65)	.34
Control of life	3.31 (.54)	3.39 (.56)	3.23 (.51)	.30
Control	3.24 (.47)	3.33 (.47)	3.14 (.46)	.41*
Confidence in abilities	3.36 (.68)	3.56 (.56)	3.15 (.74)	.62**
Confidence interpersonal	3.54 (.73)	3.70 (.65)	3.37 (.78)	.46*
Confidence	3.43 (.61)	3.61 (.49)	3.24 (.66)	.78**
Self- esteem	19.45 (5.83)	21.06 (5.73)	17.81 (5.53)	.59**
School concerns	37.02 (34.03)	25.90 (25.12)	48.35 (38.19)	.69**

* $p < .05$, ** $p < .01$

Table 3
Correlations between mental toughness, self-esteem and school concerns

	1	2	3	4	5	6	7	8	9	10
1.Challenge	-									
2.Commitment	.54**	-								
3.Control of emotion	.38**	.26**	-							
4.Control of life	.54**	.66**	.32**	-						
5.Control	.56**	.55**	.84**	.78**	-					
6.Confidence in abilities	.66**	.64**	.39**	.74**	.68**	-				
7.Confidence interpersonal	.61**	.36**	.22*	.47**	.42**	.48**	-			
8.Confidence	.74**	.61**	.37**	.73**	.66**	.91**	.81**	-		
9.Self-esteem	.61**	.61**	.23**	.73**	.56**	.79**	.61**	.83**	-	
10.School Concerns	-.39**	-.27**	-.32**	-.32**	-.39**	-.49**	-.40**	-.52**	-.45**	-

Table 4
Summary of the regression analyses for school concerns

	B	*SE B*	β	*t*	*p*
Model 1					
Constant	58.31	15.65		3.73	<.01
Gender	15.11	6.06	.22	2.49	.01
Self-esteem	-2.26	.52	-.39	-4.33	<.01
Model 2					
Constant	97.20	28.83		3.37	<.01
Gender	11.50	6.19	.17	1.86	.07
Self-esteem	-.90	.94	-.16	-0.96	.34
Challenge	4.95	7.99	.08	.62	.54
Commitment	3.18	7.43	.05	.43	.67
Control of emotion	-9.26	5.16	-.17	-1.80	.08
Control of life	10.43	8.88	.16	1.17	.24
Confidence in abilities	-18.31	8.21	-.37	-2.23	.03
Confidence	-9.12	5.39	-.20	-1.69	.09
interpersonal					

Note. B = unstandardized coefficient, SE B = std. error, β = standardized coefficient.

Table 5
Descriptive statistics for mental toughness and adjustment

	Total	Males	Females	*d*
Challenge	3.42 (.57)	3.73 (.57)	3.35 (.55)	.68**
Commitment	3.25 (.53)	3.39 (.55)	3.22 (.52)	.32
Control of emotion	2.91 (.54)	3.28 (.50)	2.83 (.51)	.89**
Control of life	3.27 (.54)	3.48 (.56)	3.22 (.53)	.48**
Control	3.09 (.45)	3.38 (.43)	3.02 (.43)	.84**
Confidence in abilities	3.06 (.64)	3.26 (.71)	3.01 (.61)	.38*
Confidence interpersonal	3.37 (.73)	3.61 (.65)	3.31 (.74)	.43*
Confidence	3.18 (.58)	3.40 (.62)	3.13 (.56)	.46*
Academic adjustment	4.89 (1.02)	5.12 (.94)	4.83 (1.04)	.29
Social adjustment	5.17 (1.27)	5.43 (1.19)	5.10 (1.28)	.27
Personal-emotional adjustment	4.41 (1.37)	4.92 (1.19)	4.29 (1.39)	.49*
Institutional attachment	5.97 (1.17)	6.10 (1.07)	5.94 (1.19)	.14

* $p < .05$, ** $p < .01$

Table 6
Correlations between mental toughness and adjustment

	1	2	3	4	5	6	7	8	9	10	11	12
1.Challenge	-											
2.Commitment	.57	-										
3.Control of emotion	.61	.46	-									
4.Control of life	.59	.59	.55	-								
5.Control	.68	.60	.86	.90	-							
6.Confidence in abilities	.63	.50	.65	.67	.75	-						
7.Confidence interpersonal	.47	.34	.41	.47	.50	.49	-					
8.Confidence	.64	.50	.63	.68	.74	.90	.82	-				
9. Academic adjustment	.38	.70	.35	.48	.48	.33	.20	.32	-			
10.Social adjustment	.42	.37	.36	.51	.50	.46	.45	.52	.41	-		
11. Personal adjustment	.56	.51	.60	.54	.65	.68	.38	.63	.47	.45	-	
12. Attachment	.38	.19	.32	.47	.46	.39	.34	.42	.50	.86	.46	-

Table 7
Summary of the regression analyses for adjustment

	B	*SE B*	β	*t*	*p*
Academic					
Constant	.40	.57		.70	.49
Gender	-.03	.14	-.01	.22	.83
Year of study	.01	.07	.00	.07	.94
Challenge	-.10	.14	-.06	-.76	.45
Commitment	1.29	.13	.67	9.97	<.01
Control of emotion	.09	.12	.05	.74	.46
Control of life	.33	.15	.18	2.27	.02
Confidence in abilities	-.13	.13	-.08	-1.03	.31
Confidence	-.07	.09	-.05	-.84	.40
interpersonal					
Social					
Constant	.12	.83		.15	.88
Gender	.07	.21	.02	.33	.74
Year of study	.09	.10	.06	.93	.35
Challenge	.18	.20	.08	.89	.37
Commitment	.11	.19	.05	.58	.56
Control of emotion	-.08	.17	-.04	-.47	.64
Control of life	.64	.21	.27	3.06	<.01
Confidence in abilities	.22	.18	.11	1.19	.23
Confidence	.38	.13	.22	3.07	<.01
interpersonal					
Personal-emotional					

Constant	-2.29	.75		-3.05	<.01
Gender	.03	.19	.01	.14	.89
Year of study	.17	.09	.09	1.88	.07
Challenge	.20	.18	.08	1.09	.28
Commitment	.39	.17	.15	2.32	.02
Control of emotion	.42	.16	.16	2.69	.01
Control of life	.06	.19	.03	.34	.73
Confidence in abilities	.96	.16	.44	5.84	<.01
Confidence	.04	.11	.02	.38	.70
interpersonal					
Attachment					
Constant	1.59	.81		1.97	.05
Gender	.17	.20	.06	.86	.39
Year of study	.01	.10	.01	.11	.92
Challenge	.23	.19	.11	1.21	.23
Commitment	.14	.18	.06	.77	.44
Control of emotion	.06	.17	.03	.35	.73
Control of Life	.67	.20	.31	3.30	<.01
Confidence in abilities	.07	.18	.04	.41	.69
Confidence	.18	.12	.11	1.46	.15
interpersonal					

Note. *B* = unstandardized coefficient, *SE B* = std. error, β = standardized coefficient.