Institution: University of Hull

Unit of Assessment: A4: Psychology, Psychiatry and Neuroscience

Title of case study: Mental toughness: Measurement and its impact on performance

1. Summary of the impact (indicative maximum 100 words)

As a result of the research into mental toughness carried out at the University of Hull, the 4 'C's model is now used Worldwide. Working with partners in industry, health, education and sport sector, the model and its associated measure, have been shown to be related to mental and physical health, performance and achievement, and to identify areas for development and provide potential strategies to do this.

The model developed is now the most cited globally, and the associated measure - the MTQ48 - is the most frequently used measure of mental toughness. The model has been used to evaluate levels of mental toughness and also provide a basis for effective interventions and their evaluation.

2. Underpinning research (indicative maximum 500 words)

The term mental toughness is often used but seldom operationalised. Clough's model identifies 4 components: Control; Challenge, Confidence and Commitment. This has allowed practitioners and researchers to objectively test the claims made about the importance of this often mentioned, but little understood, concept. The key insights from the research have been to (a) establish the validity of the MTQ48 model and the questionnaire and (b) establish the relationships between mental toughness and performance (c) establish a relationship between health and well being and mental toughness and (d) produce preliminarily evidence relating to the effectiveness of mental toughening interventions. In particular, the research suggests mental toughness is related to performance enhancements, differing coping strategies and techniques, and psychological health and well being.

The foundations of this work has involved confirming the validity of the model and the associated questionnaire. Much of this ongoing research has been carried out by Dr Peter Clough, working with colleagues at Hull (e.g. Dr Crust, 2008 -2009) and at different institutions. In order for the model and test to be fully established it was vital to demonstrate the psychometric properties of the test. This has been achieved, for example, by carrying out and publishing an extensive confirmatory factor analysis (Perry et al, 2012).

Although the initial development work on mental toughness was carried out in a sports setting, most of the recent work is in non sporting domains such as business, health and education. There is clear and consistent evidence that mentally tough individuals perform better in stressful environments compared to sensitive individuals and this is reflected in their over representation in the higher echelons of business and sport. For example, Marchant et al. (2009) investigated business success by utilising a sample of senior, middle and junior mangers and found that mental toughness ratings were higher in more senior positions.

The third area of interest has been health and mental toughness. Working with collaborators at the University of Basle, Clough has shown that mental toughness is linked to mental health (e.g. Gerber et al, 2012), and associated factors such as sleep (e.g. Gerber et al 2013). It is argued that improving mental toughness may be an effective way of enhancing mental health in groupings that are perhaps more difficult to reach by more typical health interventions. Other work has examined the impact of mental toughness on recovery from injury (e.g. Levy et al., 2006). Mentally tough individuals have been found to have an advantage. This 'recovery advantage' is being investigated in other areas of health.

It is clear that mental toughness, as defined by Clough, does appear to impact on coping and performance. It is therefore imperative that the underpinning mechanisms of this advantage are identified. Work led by Dr Dewhurst at Hull University, using an experimental cognitive psychology approach for the first time in this area, has revealed that the more mentally tough experience less

interference from unwanted memories (Dewhurst et al,2012). This suggests that the 'mental toughness advantage' may have a cognitive basis. Ongoing work on the cognitive aspects of mental toughness is aimed at identifying effective cognitively based interventions.

3. References to the research (indicative maximum of six references)

Brand S, Gerber M, Kalak N, Kirov R, Lemola S, **Clough PJ**, Pühse U, Holsboer-Trachsler E. (in press). Adolescents with greater mental toughness show higher sleep efficiency, more deep sleep and fewer awakenings after sleep onset. *Journal of Adolescent Health*. (in press), doi:10.1016/j.jadohealth.2013.07.017

Perry, J, **Clough, P.J**., Crust L. And Earle K. (2012) Factorial validity of the mental toughness questionnaire-48*. Journal of Personality and individual differences,54*, 587-592. doi:10.1016/j.paid.2012.11.020

Dewhurst, S.A., Anderson, R.J., Cotter, G., Crust, L., & **Clough, P.J**. (2012). Identifying the cognitive basis of mental toughness: Evidence from the directed forgetting paradigm. *Personality & Individual Differences, 53,* 587-590.

Gerber, M., Kalak, N., Lemola, S., **Clough, P. J**., Perry, J. L., Pühse, U., Elliot, C., Holsboer-Trachsler, E., & Brand, S. (2012). Are adolescents with high mental toughness levels more resilient against stress? *Stress and Health, 29*, 164-171. doi: 10.1002/smi.2447

Marchant, D. C., Polman, R. C. J., **Clough, P. J.,** Jackson, J. G., Levy, A. R., & Nicholls, A. R. (2009). Mental toughness in the work place: Managerial and age differences. *Journal of Managerial Psychology, 27,* 428-437.

Levy, A., Polman, R.C.J., **Clough, P.J.**, Earle, K., & Marchant, D. (2006). Mental toughness as a determinant of beliefs, pain and adherence in sport injury rehabilitation. *Journal of Sport Rehabilitation*, 15(3), 246-254.

4. Details of the impact (indicative maximum 750 words)

Maximising performance in stressful environments is an area that has grown in importance in the last few years as a result of fewer resources, greater demands and the need to change. There has been a significant rise in reported stress levels in most sectors, with a growing number of stress related illnesses and associated problems. Mental toughness can help in both the selection of, and the development of, the robust individuals who can prosper and maintain wellbeing in demanding environments. Perhaps more importantly it has been linked to social mobility.

Business impact
A number of small businesses offer the model and MTQ48 measure as a core to their consultancy provision. Over 30 consultancies in 8 countries provide mental toughness training, including AQR, Corporate Energising, Call of the Wild, JHK mental toughness and PTPP. Secondly, Clough and colleagues have been directly involved in business development activities. Two specific applied examples are:

Novartis: Clough and others have worked with Novartis from 2011, providing consultancy advice and specific training related to mental toughness and safety. This has led to a significant change in the perceptions of risk and risk taking.

Greater Merseyside Connexions Staff Welfare Project: The organisation was aware that the management team was showing signs of stress and commissioned a stress audit by Clough. This confirmed that the managers were stressed, which was a major factor in underperformance. In 2008-2009, a mental toughness development programme was designed by Clough and 60

managers went through it. Within 12 months the organisation was achieving or exceeding all its goals and objectives. The organisation was recognised as one of the best performing organisations in its field (ranked #2 in the UK).

Educational impact
Again this work has two strands. Firstly the work on mental toughness has informed educational practice. For example the Institute of Leadership & Management (ILM) is the UK's largest management body, combining industry-leading qualifications and specialist member services. In 2011, 90,000 people gained an ILM qualification. The MTQ48 is available free of charge to its members and is incorporated into a number of their courses. Also, in 2011, Dubai Women's College established the Middle East's first mental toughness centre for education. This acts as a hub for mental toughness training and research in the U.A.E. Finally, the model has been discussed by an APPG interested in enhancing social mobility. They concluded "developing psychometric tools is crucial to identifying the best forms of intervention"

There are also a number of more focussed activities. Four examples are:

Right Track Project. Department for Education funding was awarded to 'reachfor' for the Right Track project to address the Improving Outcomes Theme 6 priority: Early intervention to increase participation by, and improve the achievements of, disadvantaged young people. Right Track is an initiative delivering bespoke packages of support to 4,500 young people, including Mental Toughness assessments and coaching (developed by Dr Clough) in order to improve attainment, attendance, behaviour and ultimately progression of the target cohort. Initial evaluation has shown that there has been a significant increase in mental toughness for the sample and improved attitudes to learning. Data analysis is ongoing.

Adam Smith College: This is one of the largest FE colleges in Scotland, which set up a project with the aim of using the MTQ48 questionnaire to direct a range of interventions to reduce drop-out rates. Potential loss of income due to early departure of students was quantified as being in excess of £1m. The plan put in place for the 2010/11 academic year involved testing 10% of the college's full-time FE learners. Students were supplied with the UCanPass workbooks produced by Dr Clough/AQR Ltd. The results in terms of improved early retention in the 2010/11 academic year have been encouraging. 11 of the 18 courses showed improvement with previous years, 11 improved relative to sector averages and 13 showed improvement when compared with college averages. In 2010-11, early retention rates for those full time FE student groups not tested for mental toughness fell from 85% to 84%. In contrast, early retention rates for the groups tested for mental toughness increased from a pre-intervention average of 81% to a post-intervention average of 88%.

Knowsley Firm Foundations: As part of the 2008/09 Firm Foundations programme over 370 Year 11 pupils completed the MTQ48 assessment between November 2008 and January 2009. In addition to the measure, at least one member of staff from each school attended a training session on providing feedback and delivering mental toughness interventions. As a follow-on from the training, each school received a workbook of interventions and three Bio-Feedback Tension takers to be used in school. During the 2009/10 academic year a significantly larger cohort of KS4 pupils were tested using the MTQ48.
Knowsley schools moved above the National Challenge benchmark of 30% of pupils achieving 5 A*-C grade GCSEs including English and Maths in the period during which mental toughness has been initiated. Improvements of 3.2% were made in the years 2008-9 (baseline 29.3).

Mental toughness in primary schools
A Knowledge Transfer Partnership (2011 to 2013) with AQR developed a mental toughness measure for primary school children based on the underpinning research, with Clough as the academic supervisor. The project received a very good rating and the questionnaire is currently under trial in a number of schools.

Impact on Sport

Work with professional and amateur sports teams and athletes is ongoing. This work has included input and interventions with the Polish Winter Olympic team and a number of professional Rugby League Clubs. In addition Clough has been working with the Rugby League academy to identify talent and develop resilience in young athletes. This work has become an ongoing programme and the work of Clough has clearly informed coaching practices according to Chris Chapman, National player development officer.

5. Sources to corroborate the impact (indicative maximum of 10 references)

(1) Rugby League coaching interventions (National Player Development) - (Letter of Support)

(2) Companies that provide Mental Toughness training: Information is available on request corroborating the income generated and the impact on client organisations. One selected example - (letter of support)

(3) Greater Merseyside Connexions. Letter of support

(4) Right Track project. This is ongoing –

(5) Adam Smith College: (Published case study). Thompson, C. Mental toughness in the complex world of further education, in Clough P.J. and Strycharczyk, D. (2012) *Developing mental toughness: Improving performance, wellbeing and positive behaviours in others*. Kogan Page: London

(6) Knowsley Schools (Published case study). Allen, D. & Ayre, D. Mental toughness and its application in secondary education in Clough P.J. and Strycharczyk, D. (2012) *Developing mental toughness: Improving performance, wellbeing and positive behaviours in others*. Kogan Page: London

(7) Novartis

(8) Centre for Mental Toughness in Education in Dubai: http://news.hct.ac.ae/2011/10/dwc-launches-the-middle-easts-first-mental-toughness-center-for-education/, corroborating the launch of the Center and the involvement of Dr. Clough.

(9) APPG Character and Resilience Summit (2013): Executive Summary

(10) End User focussed book. Most of the work described here formed the basis of a practical end-user focussed book (Clough & Strycharczyk, 2012). After less than a year this book has been reprinted and a second edition commissioned. It is a very successful book, for example it is the best selling Kindle book within the psychological training category on Amazon and is 5th placed best seller in the Human Resource Management category, selling over 4,000 copies: Clough P.J. and Strycharczyk, D. (2012) *Developing mental toughness: Improving performance, wellbeing and positive behaviours in others*. Kogan Page: London.