

## MENTAL TOUGHNESS DEVELOPMENT THROUGH ADOLESCENCE: EFFECTS OF AGE GROUP AND COMMUNITY SIZE

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ANNA M. ZALEWSKA

*SWPS University of Social Sciences and Humanities*

BEATA KRZYWOSZ-RYNKIEWICZ

*University of Warmia and Mazury in Olsztyn*

PETER J. CLOUGH AND NEIL DAGNALL

*Manchester Metropolitan University*

Scholars have reported that mental toughness (MT) moderates stress, helps with regaining balance after failure, and promotes mobilizing action. Accordingly, we used the Mental Toughness Questionnaire-48 to explore stage-related MT differences in a sample of 342 teenagers representing 3 stages of adolescence: 11-year-olds (early adolescence;  $n = 104$ ), 14-year-olds (middle adolescence;  $n = 125$ ), and 17-year-olds (late adolescence;  $n = 113$ ), who came from either a large city or a small town. Analysis revealed that although MT increased across the stages of adolescence, the degree of change varied between subscales of the Mental Toughness Questionnaire-48: Challenge and confidence increased, whereas control and commitment remained unchanged. Moreover, age effects also varied as a function of community size. The findings illustrate the advantage of using a multi-dimensional model of toughness for better understanding its development processes. Moreover, they could inform the design of training programs aimed at targeting problem behaviors, for example, encouraging attendance at and enhancing academic performance programs.

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Anna M. Zalewska, Department of Individual Differences and Psychological Diagnosis, SWPS University of Social Sciences and Humanities; Beata Krzywosz-Rynkiewicz, Department of Psychology of Development and Education, University of Warmia and Mazury in Olsztyn; Peter J. Clough and Neil Dagnall, Department of Psychology, Manchester Metropolitan University. Peter Clough is now at Department of Psychology, University of Huddersfield. This study was supported by Special Grant ESF-84-2006 from the Polish National Committee for Scientific Research.

Correspondence concerning this article should be addressed to Beata Krzywosz-Rynkiewicz, Department of Psychology of Development and Education, University of Warmia and Mazury in Olsztyn, Oczapowskiego Str 2, Olsztyn, Poland. Email: [beata.rynkiewicz@uwm.edu.pl](mailto:beata.rynkiewicz@uwm.edu.pl)

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Early researchers on mental toughness (MT) identified this concept as a set of attributes associated with successful sporting performance. Alongside psychological advantages (e.g., increased optimism and effective coping; Nicholls, Polman, Levy, & Backhouse, 2008), MT is associated with physiological benefits (i.e., increased physical endurance and heightened pain tolerance; Crust & Clough, 2005). Fundamentally, MT moderates the effects of stress, helps with regaining balance after failure, and promotes mobilizing action, especially when risks and challenges are involved (Crust & Keegan, 2010).

Although several models of MT exist we adopted Clough, Earle, and Sewell's (2002) conceptualization because it is supported by an established psychometric research tool and contains four factors that can be linked to MT development: challenge, commitment, control, and confidence (Perry, Clough, Crust, Earle, & Nicholls, 2013). *Challenge* refers to perceiving barriers or obstacles as tests rather than burdens, and entails adopting effective coping strategies. *Commitment* involves striving for success and persistence in goal achievement. *Control* denotes taking charge of one's own life, making conscious changes, choosing goals and making plans, and having the ability to manage and use one's emotions to achieve success. *Confidence* encompasses believing in one's abilities (i.e., individual qualities) independent of external validation, and forming interpersonal connections by being assertive and un intimidated in social contexts.

In research conducted on athletes intense physical exercise has been found to be important for the development of MT (Sheard & Golby, 2006). However, MT can develop within populations not committed to competitive sports, although research in this area is relatively limited. Accordingly, in the current study we explored stage-related MT differences in adolescents drawn from a nonsporting population.

### **Literature Review and Hypotheses**

There has been debate regarding whether MT is a stable personality trait (Crust, 2008) or a state of mind that changes

throughout the life span of individuals (Gibson, 1998). More recently, a position of compromise has emerged, in which MT is depicted as a modifiable trait-like construct (e.g., Clough et al., 2002). This definition explains why adaptations in MT occur over time. The notion that MT is malleable and develops throughout one's life could inform the design of training programs aimed at targeting problem behaviors.

In the limited extant literature on age-related developmental changes in MT it has been suggested that by the age of 5, some MT elements are established (Bahmani et al., 2016). However, other researchers have identified adolescence as a significant period for MT development (Connaughton, Wadey, Hanton, & Jones, 2008) that may stem from the fact that it is an extended formative period of psychological transformation and social growth (Boyd & Bee, 2012).

We built on preceding work in which progression through adolescence has been found to influence the confidence and challenge components of MT in numerous ways. In adolescence teenagers begin to establish independence, gain insight into their abilities, and concentrate on interpersonal relationships or social bonds (Boyd & Bee, 2012). These changes are associated strongly with the establishment of confidence. Similarly, self-esteem and perceptions of one's own skills advance through adolescence (see Erikson, 1980; developmental crisis: industry vs. inferiority). Consequently, teenagers begin to deal independently with challenges that play an important role in forming effective coping strategies, or result in frustration and withdrawal (Boyd & Bee, 2012).

However, previous researchers have indicated that adolescence may have less impact on the control and commitment components of MT. As their temporal perspective develops, teenagers gain a truer sense of time and life continuity (Trommsdorff, 1994). However, learning to make life changes, produce personal plans, and define goals occurs later in life (late adolescence–early adulthood). Hence, adulthood is a time of peak physical health and performance, when individuals are typically less susceptible to disease and more physically agile than they are later in life (Arnett, 2012). Additionally, the maturation of several brain structures facilitates greater emotional and social information processing,

resulting in better planning, more processing of risk and rewards, fewer impulsive decisions, and greater emphasis being placed on planning and evaluation of situations (Arnett, 2012). Overall, these findings indicate that commitment and control develop considerably beyond adolescence. Consequently, we formed the following hypothesis:

**Hypothesis 1:** Mental toughness will increase during adolescence, as evidenced by higher levels of challenge and confidence, whereas control and commitment levels will remain unchanged.

Larger cities (vs. smaller towns) have been found to provide less social support and lower levels of community cooperation. They offer more anonymous relationship opportunities that are often superficial and tend to be more instrumental (focus on meeting one's own needs and benefits rather than associating partners with each other) and entail frequent rivalry (Freeman & Stansfield, 1998). In this context, urban (vs. rural) adolescents should potentially encounter more challenges and competition, which are factors known to facilitate MT development. Therefore, we formed the following hypothesis:

**Hypothesis 2:** Adolescents growing up in larger, more densely populated cities (compared to smaller, less populous towns) will possess higher levels of mental toughness.

## Method

### Participants and Procedure

Participants were 342 students from three age groups corresponding to the developmental stages of adolescence identified by Boyd and Bee (2012): 11-year-old primary school students (early adolescence;  $n = 47$  girls and 57 boys), 14-year-old grammar school students (middle adolescence;  $n = 80$  girls and 45 boys), and 17-year-old high school students (late adolescence;  $n = 67$  girls and 46 boys).

Approximately half of the participants lived in a big city (the capital of Poland), and the other half in two small towns (15,000 inhabitants each, in one of the poorest areas of Poland). The three age groups were randomly selected across primary, secondary, and high schools, although in every location (the city and the two towns) the given age group came from one school. The research

design adhered to all local ethical rules. Data were kept anonymous and all necessary parental agreements were obtained.

### Measure

Participants completed the Mental Toughness Questionnaire-48 (MTQ48; Clough, Marchant, & Earle, 2007), which comprises 48 statements (e.g., "I can usually adapt myself to challenges that come my way"). Participants respond to each item on a 5-point Likert scale (from 1 = *strongly agree* to 5 = *strongly disagree*).

The MTQ48 possesses well-established psychometric properties. Four subscales measuring commitment, challenge, control, and confidence have been established using confirmatory factor analysis (Perry et al., 2013). Moreover, all items have been found in the past to have good reliability and internal consistency (Cronbach's  $\alpha = .90$ ; Perry et al., 2013), as was the case in the present study. Subscale reliabilities were adequate for the older groups (14- and 17-year-olds), but lower than desirable in the 11-year-old group (see Table 1).

Insert Table 1 about here

## Results

A series of two-factor 3 (age in years: 11 vs. 14 vs. 17)  $\times$  2 (community size: town vs. city) analyses of variance were conducted on overall MTQ48 scores and subscale scores.

Insert Table 2 about here

### Overall Mental Toughness

For overall MT two effects were close to significance: the main effect of age,  $F(2, 342) = 2.74, p = .066$ , and the age  $\times$  community size interaction,  $F(2, 342) = 2.43, p = .089$ . Post hoc comparisons for age (see Table 2) indicated a trend toward higher scores for the 17- versus the 11-year-old group; the 14-year-olds did not differ from the other two groups. Community size had no effect on MT ( $M_{\text{City}} = 3.40, SD = 0.42; M_{\text{Towns}} = 3.37, SD = 0.42$ ); however, the significant interaction term indicated that the development of MT varied as a function of community size. For the

city community size, the effect of age was significant: 11-year-olds manifested lower MT scores than did 14- and 17-year-olds. Moreover, only within the 14-year-old group did city dwellers tend to manifest higher MT compared to town residents (see Table 2). Among students aged 11 and 17 years, the level of MT was independent of community size.

### **Mental Toughness Subscales**

Commitment,  $F(2, 342) = 0.38, p = .683$  and control,  $F(2, 342) = 0.40, p = .672$ , effects were not significant, indicating that these dimensions remained stable across the three age cohorts, which supports Hypothesis 1.

However challenge,  $F(2, 342) = 9.58, p = .001$ , effects on age revealed as significant. Post hoc comparisons for age showed that 11-year-olds scored lower on challenge ( $M = 3.30, SD = 0.57$ ) than did 14-year-olds ( $M = 3.62, SD = 0.60, p < .001$ ) and 17-year-olds ( $M = 3.57, SD = 0.50, p < .001$ ), but 14-year-olds scored similarly to 17-year-olds ( $p > .10$ ).

The significant age and community interaction on challenge ( $F(2, 342) = 7.51, p = .001$ ) necessitated calculation of simple main effects. Within big cities age affected challenge (Table 2), with post hoc comparisons indicating that challenge levels differed between the 11- and 14-year-olds, and between the 11- and 17-year-olds, but not between the 14- and 17-year-olds. Age also affected challenge in smaller towns, such that 11-year-olds differed from 17-year-olds. Further, 14-year-olds in cities scored higher on challenge than did their peers in towns (see Figure 1). This indicates that adolescents from cities (vs. towns) accept challenges earlier (aged 14 years vs. aged 17 years).

**Insert Figure 1 about here**

Age also affected confidence ( $F(2, 342) = 4.63, p = .01$ ). Post hoc comparisons showed that 17-year-olds reported higher confidence ( $M = 3.51, SD = 0.45$ ) than did 11-year-olds ( $M = 3.32, SD = 0.48, p < .015$ ), but there were no significant differences between 11- and 14-year-olds ( $M = 3.39, SD = 0.56, p = .863$ ), or between 14- and 17-year-olds ( $p = .172$ ). In both sizes of community, the effect of age on confidence was significant ( $F(2,$

365\_ = 4.87,  $p = .008$ ). In the city confidence levels differed between 11- and 14-year-olds, and between 11- and 17-year-olds, but not between 14- and 17-year-olds, and in the towns 14-year-olds differed from 17-year-olds. Moreover, among 14-year-olds those in the city manifested higher scores on confidence (as they did for challenge) than did students in towns, but 11-year-old pupils in the city reported lower confidence than did their peers from the towns (see Figure 2). This supports Hypothesis 2.

Insert Figure 2 about here

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## Discussion

We examined the effects of age group and community size on adolescents' MT development, and found that the MT components of commitment or control remained stable. There is considerable evidence to support the conclusion that commitment and control develop outside of adolescence, peaking during the early teenage years (see, e.g., Erikson, 1980). Control is a complex construct, as acknowledged by the development of factorial measures to assess this concept accurately (i.e., the Multidimensional Health Locus of Control Scale; Luszczynska & Schwarzer, 2005). This may explain why no differences were evident within the present study context. Consequently, future researchers could seek to identify elements of control affected by changes that occur during adolescence. This approach, when applied to other developmental stages of life, has been found to be effective in identifying important facts of age-related control (e.g., increased self-control and emotional stability, (Fox & Calkins, 2003).

Community size was found to affect challenge and confidence components of MT. Our results indicated that living in big cities facilitates higher levels of challenge, especially during middle adolescence (14-year-olds), although this difference disappears in late adolescence (17-year-olds). Confidence effects paralleled those observed for challenge, with the only difference being that 11-year-olds in the city (vs. towns) demonstrated lower levels of confidence.

Overall, community size had a modest, temporally limited effect on challenge and confidence components of MT. Compared to

small towns, large cities provide access to greater cultural offerings and information sources. Further, big communities afford greater opportunity to act, but at the same time provide greater competition (Ruback & Patnaik, 1989). This results in modular relationship building (Toffler, 1997), where particular personality traits are more crucial for relationships than for the person as a whole. Overall, this results in less repetitive and more fragmented interactions, the impersonal nature of which probably offers less support and fosters greater quality of life, especially among highly autonomous and self-efficacious (self-confident) individuals (Smith & Goodnow, 1999; Warner et al., 2011).

MT, as defined by Clough et al. (2002), is a complex, multidimensional phenomenon; consequently, dimensional variations are small and differential. Hence, challenge (10%) and confidence (6%) components accounted for some variance in adolescents' MT, whereas commitment or control components produced no significant effects. The findings reported here illustrate the advantage of using a multidimensional model of MT to provide a better understanding of the processes underlying MT development. A broad-brush, unidimensional approach, in contrast, may miss important developmental features.

Our findings regarding age and community population size require cautious interpretation. We employed a cross-sectional design to enable consideration of age and community-size effects; however, the use of this research design means we did not reveal cause-and-effect relationships because past and future levels of MT were not assessed. Charting changes in MT over time requires longitudinal studies.

Using self-reported data, such as those obtained from the MTQ48, may be problematic because adolescents may not possess full access to and/or awareness of their metacognitive processes. It can be reflected in MTQ subscale reliability that are lower (below .70) among 11-year-olds. Hence, the reported judgments represent only snapshots of the adolescents' psychological levels of MT. Accordingly, the relationship between subjective MT performance and actual MT performance might be weak especially among younger teenagers. For these reasons, subsequent researchers could triangulate MTQ48 responses with other measures, such as interviews, external ratings from peers or parents, and objective

performance measures. However, it is worth noting that other recent researchers have successfully used the MTQ48 with the age groups included in our sample (e.g., St Clair-Thompson et al., 2015).

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Table 1. *Internal Consistency Scores (Cronbach's Alpha) for the Mental Toughness Questionnaire-48 for the Whole Sample and Age Subgroups*

Subscale/group	Overall scale	Challenge	Commitment	Control	Confidence
<b>Whole sample</b>	.88	.63	.70	.60	.73
<b>11-year-olds</b>	.84	.50	.57	.53	.61
<b>14-year-olds</b>	.90	.72	.75	.60	.80
<b>17-year-olds</b>	.87	.60	.75	.60	.70

Table 2. *Scores on the Overall Mental Toughness Questionnaire-48 and Challenge and Confidence Subscales by Age Group and Community Size*

Effects Niche/Age	11-year-olds: a		14-year-olds: b		17-year-olds: c		Age (F)
	M	SD	M	SD	M	SD	
<b>Overall mental toughness</b>							
<b>City</b>	3.25 <sup>b*c^</sup>	0.36	3.45 <sup>a*</sup>	0.40	3.44 <sup>a^</sup>	0.39	3.23*
<b>Town</b>	3.35	0.58	3.30	0.48	3.45	0.38	1.66
<b>Niche (F)</b>	1.31		3.46 <sup>^</sup>		0.02		
<b>Challenge</b>							
<b>City</b>	3.24 <sup>b***c*</sup>	0.65	3.79 <sup>a***</sup>	0.57	3.57 <sup>a*</sup>	0.49	13.56 <sup>***</sup>
<b>Town</b>	3.35 <sup>c^</sup>	0.50	3.38	0.56	3.58 <sup>a^</sup>	0.51	3.19*
<b>Niche (F)</b>	1.01		16.24 <sup>***</sup>		0.02		
<b>Confidence</b>							
<b>City</b>	3.20 <sup>b**c*</sup>	0.47	3.47 <sup>a*</sup>	0.55	3.49 <sup>a*</sup>	0.48	5.00 <sup>**</sup>
<b>Town</b>	3.42	0.44	3.27 <sup>c*</sup>	0.56	3.53 <sup>b*</sup>	0.41	3.99*
<b>Niche (F)</b>	5.05*		4.01*		0.23		

Note. Letters in superscripts (<sup>a</sup>, <sup>b</sup>, <sup>c</sup>) indicate which subgroups differ from a given group (for MT Overall, Bonferroni correction; for the subscales, Games-Howell nonparametric post hoc test). <sup>^</sup>  $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

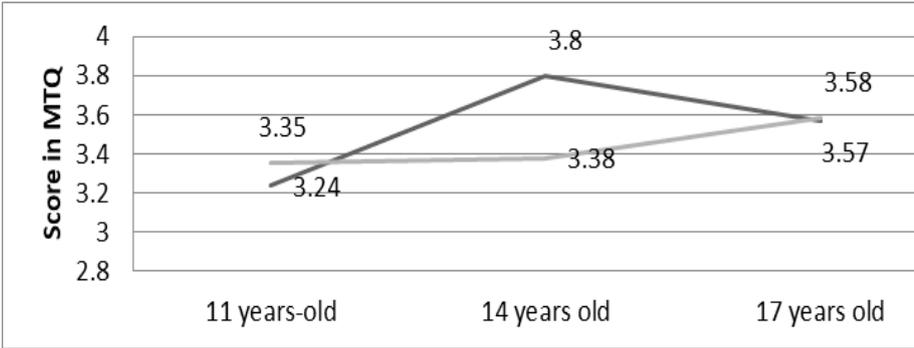


Figure 1. Challenge scores on the Mental Toughness Questionnaire-48 by age group and community size.

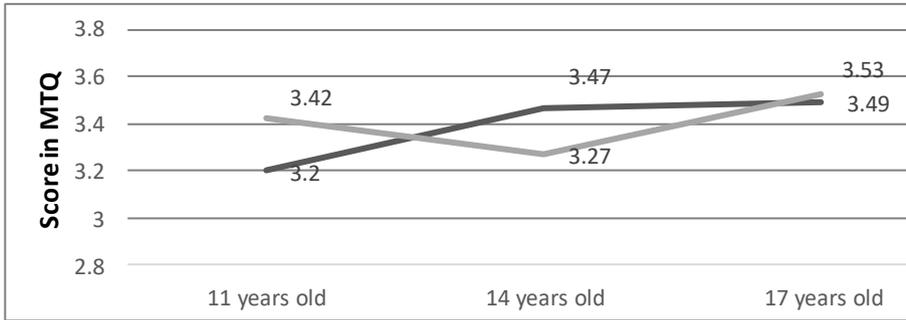


Figure 2. Confidence scores on the Mental Toughness Questionnaire-48 by age group and community size.