The Relation of need for cognition to information acquisition and media usage

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Need for cognition (NFC) is conceptualized as intrinsic motivation to engage in and enjoy effortful cognitive endeavors. It has been a useful predictor of dispositional differences in information processing. We were interested in the relation of NFC to information acquisition and media usage in experimental paradigms as well as in daily life. We therefore conducted an online study in a student sample ($N = 395$), where different aspects of media usage (concerning PC, TV, and books) were assessed, and a further study with a subsample ($N = 108$) focusing on information and knowledge acquisition using texts with central and peripheral information, and pictures, respectively. First results for participants scoring high in NFC suggest that they prefer text over pictures for information acquisition and that they use media to get information rather than for entertainment. The results from the total sample are presented and discussed with regard to practical implications for media and information design.

http://dx.doi.org/10.1016/j.paid.2013.07.175

Explaining individual differences in mathematical ability: Genes, cultures, personality, and cognition

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Despite a growing body of educational, psychological, and genetic research into individual differences in mathematical ability, motivation, and achievement, many issues remain unresolved. This symposium presents different approaches to the study of variation in mathematics, addressing issues of genetic and cross-cultural differences (Talks 1 and 3); developmental issues (Talk 3); contribution of non-cognitive factors, such as emotional regulation and other regulatory processes, such as goal planning and modeling of goal achievement (Talks 2 and 4); and dimensional issues, such as whether factors underlying mathematical giftedness are qualitatively different from those driving mathematical variation in the normal range. We present findings from Russia, Kyrgyzia, and the UK, and discuss them in the context of existing literature and educational implications.

http://dx.doi.org/10.1016/j.paid.2013.07.176

Are the mechanisms underlying mathematical learning in mathematically-gifted students fundamentally different?

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It is currently unknown whether the mechanisms underlying mathematical learning in mathematically talented children are fundamentally different from those in unselected students. For example, do mathematically gifted children have particularly well developed number sense? We administered a large battery of mathematical, spatial, and number sense tests to two groups of 16 year old Russian students: a representative sample of students from several standard public schools; and a unique sample of mathematically gifted children from 3 specialist schools for mathematically gifted children. For all of the measures, the mathematically gifted students showed significantly different distributions from those for the unselected sample. Significant differences between the groups were found in performance on most measures, and in the structure of the relationships among the measures. The results are discussed in terms of the role of spatial and number sense abilities in mathematical achievement, as well as genetic factors involved in mathematical learning.

http://dx.doi.org/10.1016/j.paid.2013.07.177

Mathematical Anxiety and mathematical learning: Multidimensional approach

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Research suggests that mathematical anxiety is a complex phenomenon related to mathematical achievement, developmental dyscalculia, strategies of numerical information processing, and negative emotional states. The goal of this currently on-going large-scale study is to implement a mixed method approach towards assessment of mathematical anxiety across the school grades. The methods include: a picture-based assessment; a questionnaire measuring attitudes towards mathematics; and a computerized test-battery measuring mathematics related cognitive processes. This mixed method approach addresses mathematical anxiety as a multidimensional, multi-faceted and dynamic manifestation of individual differences in a specific educational context. The research also allows exploring interrelations between non-cognitive and cognitive processes involved in mathematical anxiety. Here we present the results of the first wave of the investigation, involving data from 3 different age groups, assessed in several schools in Russia and the UK. The results suggest the importance of accounting for educational contexts in measuring and treating mathematical anxiety.

http://dx.doi.org/10.1016/j.paid.2013.07.178

Number Sense and mathematics across development and cultures

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Number Sense can be defined as a primitive mechanism that allows animals and humans to deal with basic numerical information. Babies show this numerical intuition in the ability to recognise and discriminate quantities/numerosities. Studies have shown that Number Sense abilities correlate with mathematical performance and achievement. Recent behavioural genetic research suggests that although the heritability of number sense is not high, the links between number sense and mathematical ability are largely mediated by genetic factors. The developmental course, the direction of causal links between number sense and mathematics, and the effects on education on these links remain unclear. We present a cross-cultural investigation into the links between number sense and mathematics across the school years in a large sample of Kyrgyz and Russian children. The results suggest uneven relationship between number sense and mathematics across development and quality of educational provision.

http://dx.doi.org/10.1016/j.paid.2013.07.179

Self-regulation, cognitive characteristics, and mathematical success

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Recent research has focused on the involvement of spatial, numerical and other cognitive characteristics in mathematical achievement.