Correspondence

Confounding in case control studies

Sir,

I read with interest the article on computerized tests to evaluate psychomotor performance in children with specific learning disabilities (SpLD) by Taur and colleagues. The study was conducted with the aim to compare the performance on a battery of six psychomotor tests of children with SpLD and those without any learning disabilities (controls) using computerized tests. The authors deserve credit for their effort. For the purpose of this study, as stated by the authors, 25 children with SpLD and 25 controls (matched for age, socio-economic status and medium of instruction) were given three training sessions over one week. After that children were asked to perform on the six computerized psychomotor tests. Results were compared between the two groups. I have a concern with the way this study was conducted and results interpreted thereof. The authors in the results stated that the children with SpLD fared significantly worse on finger tapping test, choice reaction test, digit picture substitution test and card sorting test compared to the controls. For arriving at this conclusion a baseline comparison on computer literacy of the two groups should have been assessed. This baseline comparison should have been a part of matching as difference in the use of computers or their awareness may act as a confounder in this study. A confounding variable gives rise to situations in which the effects of two processes are not separated, or the contribution of causal factors cannot be separated, or the measure of the effect of exposure or risk is distorted because of its association with other factors influencing the outcome of the study. Therefore, matching for computer knowledge at the initial stage would have prevented it or alternatively an adjustment for difference in knowledge about computers should have been conducted. This is important in view of ever increasing use of technology by children across all sections of society.

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Authors’ response

We thank Raina for his comment on our article on the use of computerized tests to evaluate psychomotor performance in children with SpLD. He pointed out that the matching of the two groups for computer literacy was not done. We did, in fact, anticipate its potential influence on the study outcome at the time of designing the protocol. However, computer literacy is quite complex and involves the testing of at least six domains- MS Word, MS PowerPoint, MS Excel, Operating Systems (Windows), internet and e-mail. It would not have been possible to apply this to the age group we studied. Instruments for psychomotor tests until a few decades ago were actual playing cards (for example) that needed to be sorted by a child. The “computer” in our case was simply a means of putting multiple tests which were paper based in the past and, therefore, cumbersome to use, on a single platform for ease of use. The keyboard of Mindomatics instrument (M/s Sristek, Hyderabad, India) is very simple with very few keys and does not resemble a computer keyboard. Thus, Mindomatics is really not a computer in the true sense and testing for “computer literacy” would not only have been difficult and time consuming but also meaningless. All children were given training (3
sessions over 1 week) at baseline to acquaint them with the use of the keyboard and the various tests. This we believe addressed the issue of preconditioning across the groups adequately.

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