TEACHING CHILDREN ABOUT RANDOMNESS

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Children often have to deal with outcomes and events that happen randomly and are therefore impossible to predict. Randomization plays a role in card and board games and randomness lies at the centre of much of what is taught at school in geography, history and science. Yet, randomness receives short shrift in UK schools. There is research on teaching children about probability (*Fischbein*, 1984, *Fischbein* and *Gazit*, 1987; *Jones* et al, 1997), but none seems to have tackled the issue of randomness. Interventions have concentrated instead on sample space and calculating probabilities.

We carried out an intervention study on the subject with children aged 9- and 10-years. We taught a Probability Intervention group (n=23) about randomness. The intervention involved small groups working with concrete material (e.g. comparing the results of throwing fair and unfair (loaded) dice, considerable use of laptop computers, discussions among the children and between children and the experimenters, and the creation of diagrams of random and non-random sequences.

In a pre-test and an immediate and delayed post-test, we compared these children to another group of children, called the Problem Solving group (n=23), whom we also saw in small groups and used the same methods and types of material to teach them about the relation between positive and negative numbers. We also included a third group of children, a Non-Intervention Control group (n=30), to whom we gave the same pre- and post-tests as to the other two groups but whom we did not see in between tests.

The pre- and post-tests assessed children's ability to solve (1) problems about randomness: the items dealt with the difference between random and determined sequences, the independence of successive events in a random sequence and the law of large numbers. (2) items about the relation between positive and negative numbers.
The two interventions, one on randomness given to the Probability Intervention group and the other on positive and negative numbers given to the Problem-Solving group, took place in five, weekly, hour-long sessions. In the week after the last session, the children took an immediate post-test and two months later a delayed post-test.

The randomization intervention was successful. There were more improvement from pre- to post-tests in the randomness items by the Probability Group who were taught about randomness than by the other groups. This difference was significant in an analysis of co-variance in which the co-variate was the pre-test scores. Given the right kind of experience with familiar material and the opportunity to discuss, for example, the differences between random and non-random sequences, children seem able to learn about randomness and this learning lasts over a period of two months at least.