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## **Executive Summary**

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**Research into the impact  
of Bikeability training on  
children's ability to  
perceive and appropriately  
respond to hazards when  
cycling on the road**

**National Foundation for  
Educational Research  
(NFER)**



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## Acknowledgements

This study would not have been possible without the active participation of schools, pupils and Bikeability schemes. We would like to thank the all participants for their valuable contributions.

We are also grateful to Professor John Wann (Professor of Psychology at Royal Holloway, University of London and a British Cycling Level 3 Coach) for: advising on the relevant accident data and literature to review, advising on the content of the on-screen quiz and reviewing the interpretation of findings.



# Executive summary

## Context

Bikeability (2014) is described as ‘cycling proficiency for the 21st century’. The training is practical, skill-based, outcome-led and designed to ‘boost the confidence of the trainee and to minimise risk’. There are three levels of training and children typically start Bikeability lessons once they have learnt to ride a bike. Level 2 training is generally provided to children in Year 5 or 6 before they leave primary school. The policy purpose of Bikeability is to give children the skills and confidence needed to cycle on today’s roads and so encourage more people to cycle more often with less risk.

It is against this background that this research was designed to test the hypothesis that Bikeability training improves a child’s ability to perceive and appropriately respond to on-road hazards faced by people who cycle.

The research, undertaken by the National Foundation for Educational Research (NFER), was commissioned by The Bikeability Support Team at Steer Davies Gleave with funding from the Department for Transport.

NFER is the UK’s largest independent provider of research, assessment and information for education, training and children’s services. NFER is renowned for its well established relationship with schools in the UK, as well as in-depth experience, knowledge and expertise in the field of assessment having produced high-stakes national tests and assessments over the last 50 years.

## The research question

The main research question for the study was: how does Bikeability affect the ability of children to perceive and appropriately respond to hazards when cycling on the road, if at all?

This question was explored by means of an on-screen quiz devised to test knowledge and skills relating to hazard perception and responding appropriately to hazards. The quiz was taken by both Bikeability-trained and untrained pupils and validated by a practical on-road assessment of Bikeability-trained children.



## Definition of terms

- Phases: the research took place over three phases and involved tracking Year 5 (age 9-10) children in the summer term (2014) as they went into Year 6 in the autumn term (2014).
  - Phase 1 - baseline information was gathered and an initial assessment was carried out early in the summer term before any training took place.
  - Phase 2 - assessment information was gathered 1-3 weeks after the training took place, in the summer term.
  - Phase 3 – assessment information was gathered at least two months after the training took place, in the autumn term.
- The on-screen quiz: this presented children with a series of questions designed to assess their ability to: perceive hazards; appropriately respond to hazards; and perceive and appropriately respond to hazards, in combination. The results of the quiz as a whole (including questions addressing these three areas) have been converted into a single measure of each child's ability to perceive and appropriately respond to hazards. This is referred to as the 'hazard perception and appropriate response ability'.
- Domains: the on-screen quiz and the practical assessment assessed four domains:
  - observational skills (observation)
  - signalling knowledge and skills (communication)
  - road positioning skills (road position)
  - knowledge of priorities (priorities).
- Effect size: the effectiveness of an intervention can be measured as an effect size. This is a way of quantifying the size of the difference between two groups (e.g. children in the 'trained' and 'comparison' groups) in a way that is comparable between different interventions. In this case, an effect size can be used to measure the size of the association between the training and the resultant scores on the on-screen quiz. The effect size is the average difference in scores between the 'trained' and 'comparison' groups (the effect of the intervention) divided by the standard deviation of scores (a measure of the general spread of scores). Effect sizes for educational interventions (e.g. a new way of teaching reading or maths) are usually relatively low, at around 0.2 at best, because the underlying level of knowledge is already quite high.

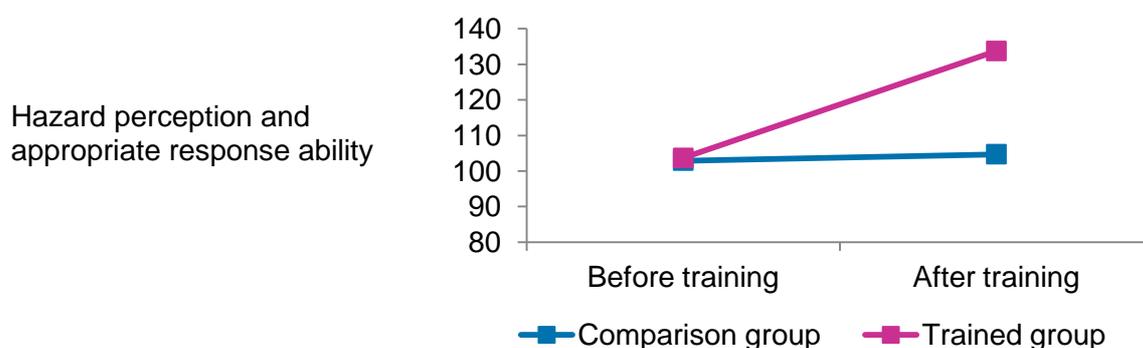


## Key findings

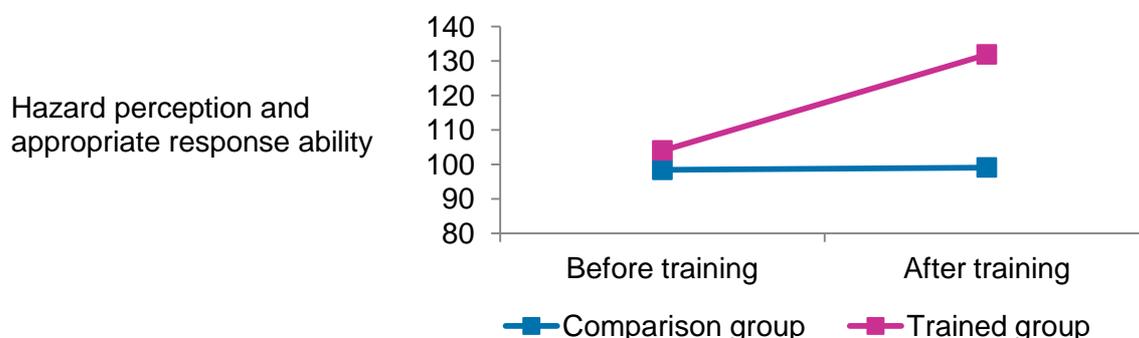
- Children who participated in Bikeability Level 2 training scored significantly higher on the hazard perception and appropriate response quiz, after training, than children who had not received training.
- The effect of the Bikeability Level 2 training was undiminished when children re-took the quiz more than two months after training. This suggests that the association between training and increased hazard perception and appropriate response strategies was sustained.

The difference in scores, referred to as ‘hazard perception and appropriate response ability’, for children who had participated in training (trained) and those who had not (comparison) is shown below.

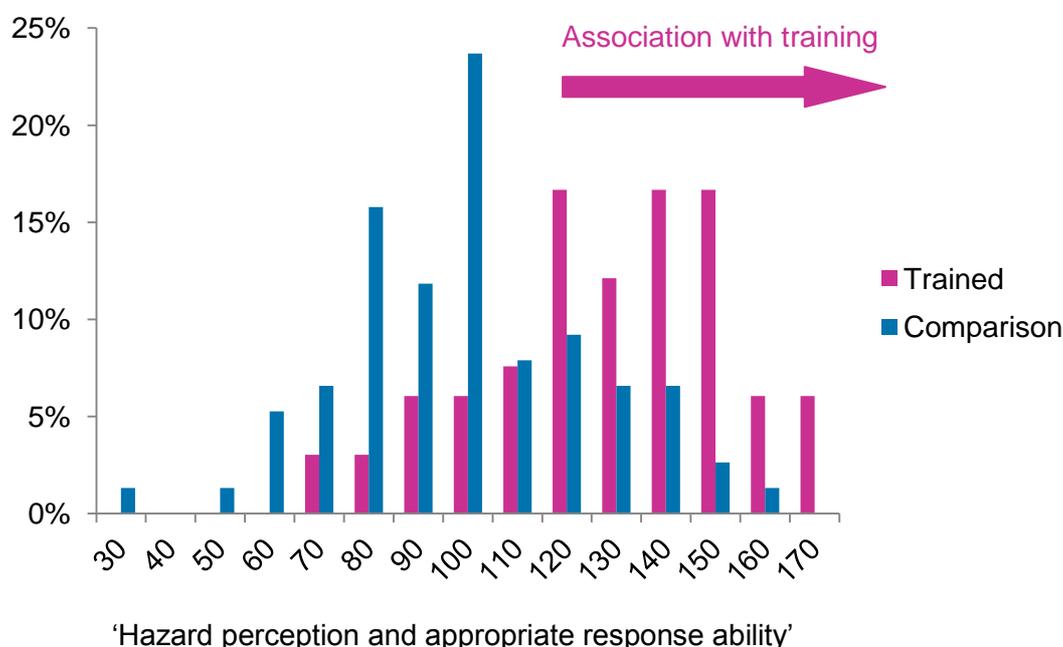
### Comparison of mean pupil ability scores at baseline before training (phase 1) and immediately after\* training (phase 2) \*within 1-3 weeks of training



### Comparison of mean pupil ability scores at baseline before training (phase 1) and at least two months\* after training (phase 3) \*within 2-3 months of training



- The size of the association between training and hazard perception, as demonstrated by the score achieved on the quiz, is very large, with an effect size of 1.6. The change in performance for children who had participated in training (trained) and those who had not (comparison) is shown in the score distribution chart below.



- In the on-screen quiz, across all three phases, 'observation' was the highest scoring domain. The largest gains associated with training in the on-screen quiz were in the domains of 'road position' and 'priorities'. (For further detail, please refer to sections 3.2 and 3.4.)
- In the practical assessments, in both phases (2 and 3) 'observation' was the highest scoring domain whilst 'communication' was the lowest scoring.
- There was a significant decrease in the mean scores achieved on the practical assessment between phase 2 and phase 3. This suggests that whilst trained children achieved higher scores for the on-screen quiz and sustained this over a period of time, the ability to put that knowledge into practice can decline over time if the skills are not practised. (For further detail, please refer to section 3.5.)
- The correlation between the practical assessment and the on-screen quiz was positive and statistically significant. However, it is a relatively weak association. There is some evidence that the practical assessment validates the on-screen quiz as they measure the same underlying construct. However, it is not a strong enough association for performance on the on-screen quiz to be a predictor on the practical assessment or vice versa. (For further detail, please refer to section 3.7.)
- The on-screen quiz functioned appropriately with a reliability measure of 0.76 (Cronbach's Alpha) indicating that it discriminates well between pupils who achieve higher and lower 'hazard perception and appropriate response ability' scores.



## Further findings

- Children who participated in training reported increased confidence when cycling on the road compared to their initial level of confidence. This increase was statistically significant. (For further detail, please refer to section 3.3 and Table 3.7.)
- There was no association between training and frequency of cycling – children did not report that they cycled more often as a result of receiving Bikeability training, despite the fact that they had increased confidence. (For further detail, please refer to section 3.3 and Table 3.7.)

## Methodology

### Who was in the sample?

The research involved pupils who were in Year 5 in summer 2014 and tracked them as they moved into Year 6 in the autumn term.

In total, 29 schools were involved in the study, with six of these schools participating in the practical assessments. A total of 668 pupils were involved in taking one or more on-screen quizzes. Further detail is provided in section 2.5.

Participating schools and their pupils were either in the intervention or comparison group. Schools in the intervention group had pupils who participated in Bikeability training during the summer term (trained pupils). Pupils in the comparison schools did not receive any training in the summer term (although they were expected to be given training whilst in Year 6).

### When did the data collection take place?

There were three data collection points: phases 1 – 3 (see Definition of terms).

An on-screen quiz was completed by pupils at each phase.

The practical assessments were taken at phase 2 and phase 3 by pupils who had successfully completed Bikeability Level 2 training.

### What did the assessment involve?

#### *On-screen quiz*

NFER developed an on-screen quiz designed to assess four domains that underpin effective hazard perception and appropriate response strategies: observation, communication, road position and priorities. In order to engage respondents, the quiz told the story of three children's cycling journeys. This allowed for inclusion of photographs and film clips showing different aspects of the children's journeys, for example, choosing where and when to start their ride, considering road position and priorities for different manoeuvres and completing the journey.

The purpose of the on-screen quiz was two-fold: to measure pupils' hazard perception and appropriate response ability and to establish the functioning of a variety of questions about



hazard perception and appropriate response with a view to providing a pool of questions for potential future use.

### ***Practical assessment***

In order to ascertain whether or not the on-screen assessment was a reliable tool for measuring hazard perception and appropriate response ability, some children who had passed their Bikeability Level 2 training were also given a practical assessment. The practical assessment was carried out by qualified and experienced National Standard Instructors (NSIQs) and involved pupils in completing two drills. These were designed to provide sufficient opportunities to demonstrate competence, confidence and consistency in the four domains also covered by the on-screen quiz. The scores achieved by pupils on the on-screen quiz and practical assessment were analysed to establish if there was a correlation.

## **Recommendations**

The on-screen quiz could be used for a number of purposes to support the delivery and development of Bikeability training including:

- monitoring the effectiveness of the training and for identifying any particular areas which may need developing or strengthening
- monitoring the impact of the training over a longer period of time to help identify which domains are sustained and if there are any areas for which follow-up or refresher training may be usefully implemented.

As there are variations in delivery style and models across the country, the on-screen quiz could be used to investigate the effectiveness of these different delivery models.



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