Accident frequency and unrealistic optimism: Children's assessment of risk

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ABSTRACT

Accidental injury is a major cause of mortality and morbidity among children, warranting research on their risk perceptions. Three hundred and seven children aged 10–11 years assessed the frequency, danger and personal risk likelihood of 8 accidents. Two social-cognitive biases were manifested. The frequency of rare accidents (e.g. drowning) was overestimated, and the frequency of common accidents (e.g. bike accidents) underestimated; and the majority of children showed unrealistic optimism tending to see themselves as less likely to suffer these accidents in comparison to their peers, offering superior skills or parental control of the environment as an explanation. In the case of pedestrian accidents, children recognised their seriousness, underestimated the frequency of this risk and regarded their own road crossing skill as protection. These findings highlight the challenging task facing safety educators who, when teaching conventional safety knowledge and routines, also need to alert children to the danger of over-confidence without disabling them though fear.

1. Introduction

Accidental injury is a major cause of mortality and morbidity, particularly among children and young people (Public Health England, 2014; Towner et al., 2005; WHO, 2008). In the UK in 2011, 165 children aged under 15 died as a result of unintentional injury, and annually one child in five attends an Accident and Emergency (A & E) department (Miskin Group, 2013). Injury is not only costly to individuals and families but places a burden on the state (Lyons et al., 2011) as even a single visit to A & E in the UK involving no treatment costs the state £138 (Department of Health, 2016).

Traffic accidents are a major cause of serious injury and death for children and are ranked as the second most frequent cause of death to 10–14 year olds world-wide (WHO, 2008). Notwithstanding the roles of enforcement such as 20 mph zones and other traffic calming measures, education has always been regarded as an important component of injury minimisation and prevention strategies. Schools and safety centres commonly focus on skills such as road crossing codes, which list procedures to be followed for safe navigation of the environment (Lamb et al., 2006; Schwebel et al., 2012; Schwebel et al., 2016).

Cognitive psychologists, however, have highlighted some of the barriers to effective use of these procedures. For example, children's ability to cross a busy road safely is hampered by their inability to assess the speed of approaching vehicles (Wann et al., 2011). Further difficulties may arise from inappropriate assessment of the probability or severity of various accidents (Weinstein, 2000). Research with adults has shown that people tend to be over concerned with rare and 'dreaded' hazards (such as nuclear weapons accidents) at the expense of the more common and 'mundane' (such as auto accidents) (Slovic, 1987).

Adult respondents tend to over-estimate the frequency of death from rare causes, such as botulism or tornado, while under-estimating the frequency of death from common causes such stroke and heart disease (Lichtenstein et al., 1978) with the possible consequence that people underestimate the importance of the behaviour change required in respect of common but serious illnesses and hazards (Sheeran et al., 2014). One explanation of this bias is that the frequency of rare risks is over-estimated as instances easily come to mind (i.e. they are subject to the 'availability heuristic', Tversky and Kahneman, 1973) due in part to dramatic media coverage.

Another bias which has been demonstrated to lessen people's appreciation of risk is unrealistic optimism, i.e. the tendency for people to think that risks, including accidents, apply more to other people than to themselves (Shepperd et al., 2013; White et al., 2011). Some research suggests that children are also susceptible to unrealistic optimism (Whalen et al., 1994), although little of this research has looked at unrealistic optimism concerning accidents.

This study seeks to investigate the underestimation and optimism biases in 10–11 year old children with respect to accidents as these biases, if present, are likely to impact on children's execution of safety procedures. To our knowledge estimation (as assessed by Lichtenstein et al., 1978) and the Tversky and Kahneman (1973) approach to

availability have not been investigated in children. While children of this age group are able to use statistical information to make social judgements and this increases in childhood (Jacobs and Klaczynski, 2002) it remains an open question whether children show the same biases as adults (Schlottmann and Wilkening, 2012). This age group (10–11 year olds) was also chosen as this is when UK children are about to leave primary school and are likely to begin to walk or cycle un-accompanied to school and other destinations (Shaw et al., 2013), and is just prior to the age (12 years) when pedestrians are at most risk of accident (PACTS, 2013).

2. Method

2.1. Participants

Primary schools in Oxfordshire, UK were contacted and 19/47 agreed to take part in the research. All children (N = 341) for whom parents gave consent (73%) were invited to take part. The analysis is based on 307 Year 6 children (143 boys and 164 girls, aged 10–11 years) (34/341 children were not at school on the day of the study). See Supplementary Material available online for sample size calculation. The study was approved by the Oxford Brookes University Research Ethics Committee.

2.2. Procedure and stimuli

A one-to-one interview session opened with children looking at a series of commissioned cartoons depicting a day in the life of a 10 year old child which involved a variety of activities including potential hazards on the road, in school, and at home. This primed the children to think about risk. Eight specially drawn colour images on separate cards depicting accidents 'about to happen' were then presented to the children (see Fig. 1).

These showed a sample of risks/hazards of varying frequencies which together constitute 21% of admissions to hospital via A& E for those aged 10–14 years, according to Public Health England Hospital Episode Statistics. The pictures were accompanied by a series of questions designed to measure children's judgements about danger, frequency, and personal risk/unrealistic optimism. The eight pictures were given to the children in random order and they were asked to identify the nature of the 'accident about to happen' before making a series of judgements described below.

2.2.1. Danger judgement

The children ranked the images by how dangerous and harmful such an accident would be. This measure was designed to capture Slovic's (1987) notion of 'dreaded' risks.

2.2.2. Frequency judgement I

The children ranked the same images for frequency, i.e. assessing how often these accidents happen to children their age.

2.2.3. Frequency judgement II

A second measure of frequency (designed to allow the expression of absolute rather than ranked frequency) required the children to ima-gine that they were a doctor who comes to work after a few weeks holiday to find that 50 children aged around 10–11 years had been admitted to the hospital with sufficiently bad injuries that they need to stay in hospital for a while. The children were asked to allocate cut-outs of people to the images (still in the order previously sorted by them for frequency) to show how many of the 50 children have had each kind of accident. If a child asked whether each accident had to have some admissions, they were told that it was OK for some accidents to have no admissions. The development of this measure is described in the Supplementary Material.

2.2.4. Personal risk/Unrealistic optimism

Children were asked to decide for each of the eight accidents whether there was less, more, or the same chance of this accident happening to them in comparison to other children of their age (Shepperd et al., 2015). On every occasion that a child responded with 'less likely' they were asked to give their reasoning. The explanations were categorised into references to protective factors such as their own skill or lack of exposure to the risk due, for example, to adult control of the situation.

2.2.5. Risk availability

For adults the traditional method for assessing 'availability' has involved media coverage (Lichtenstein et al., 1978). As this approach is not appropriate for use with children, we chose to instead to elicit which accidents the children in our sample viewed as 'sensational' (as a proxy for 'availability'). Each child was asked to nominate from among

Fig. 1. Images depicting accidents 'about to happen'.