

University of Warwick institutional repository: <http://go.warwick.ac.uk/wrap>

This paper is made available online in accordance with publisher policies. Please scroll down to view the document itself. Please refer to the repository record for this item and our policy information available from the repository home page for further information.

To see the final version of this paper please visit the publisher's website. Access to the published version may require a subscription.

Author(s): Scott E. J. Watson; Natalie Vannini; Sarah Woods; Kerstin Dautenhahn; Maria Sapouna; Sibylle Enz; Wolfgang Schneider; Dieter Wolke; Lynne Hall; Ana Paiva; Elizabeth Andr; Ruth Aylett  
Article Title: Inter-cultural differences in response to a computer-based anti-bullying intervention

Year of publication: 2010

<http://dx.doi.org/10.1080/00131881003588261>

Publisher statement: 'This is an electronic version of an article published in Scott, E.J. et al. (2010). Inter-cultural differences in response to a computer-based anti-bullying intervention. Educational Research, Vol. 52(1). pp. 61-80. Educational Research is available online at:

<http://www.informaworld.com/smpp/content~content=a919006328~db=all~jumptype=rss>

## **Inter-cultural differences in response to a computer based anti-bullying intervention**

Scott. E.J. Watson<sup>a</sup>, Natalie Vannini<sup>b</sup>, Sarah Woods<sup>c</sup>, Kerstin Dautenhahn<sup>a\*</sup>, Maria Sapouna<sup>d</sup>, Sibylle Enz<sup>e</sup>, Wolfgang Schneider<sup>b</sup>, Dieter Wolke<sup>d</sup>, Lynne Hall<sup>f</sup>, Ana Paiva<sup>g</sup>, Elizabeth André<sup>h</sup>, Ruth Aylett<sup>i</sup>.

\*Corresponding author.

<sup>a</sup>*Adaptive Systems research group, School of Computer Science, University of Hertfordshire, Hatfield, Hertfordshire, UK;*

<sup>b</sup>*Universität Würzburg, Lehrstuhl für Psychologie IV, Würzburg, Germany;*

<sup>c</sup>*School of Psychology, University of Hertfordshire, Hatfield, Hertfordshire, UK;*

<sup>d</sup>*Department of Psychology, The University of Warwick, Coventry, UK;*

<sup>e</sup>*Otto-Friedrich-Universität-Bamberg, Bamberg, Germany;*

<sup>f</sup>*Department of Computing, Engineering, and Technology, University of Sunderland, Sunderland, UK;*

<sup>g</sup>*INESC-ID, Instituto Superior Técnico, Lisboa, Portugal;*

<sup>h</sup>*Institut für Informatik, Universität Augsburg, Augsburg, Germany;*

<sup>i</sup>*School of Maths and Computer Science, Heriot-Watt University, Edinburgh, Scotland*

*Background and purpose:* Many holistic anti-bullying interventions have been attempted, with mixed success, while little work has been done to promote a 'self-help' approach to victimization. The rise of the ICT curriculum and computer support in schools now allows for approaches which benefit from technology to be implemented. This study evaluates the cross cultural effects of a computer based anti-bullying intervention on primary school aged children's knowledge about bullying and relevant coping strategies.

*Programme description:* FearNot! is an interactive computer based virtual learning environment designed for use as an anti-bullying intervention. It includes interactive virtual agents who assume the most common participant roles found in episodes of bullying. FearNot! was used by children over three consecutive weeks to allow its effectiveness to be evaluated in a longitudinal in-situ programme.

*Sample:* Two comparable samples were drawn from the UK and Germany. In the UK, 651 participants (aged 8-11) were recruited from primary schools in Hertfordshire, Coventry, and Warwickshire; while the 535 German participants (aged 7-10) were sourced from Grundschulen in the Bayern and Hessen regions. Due to lack of parental consent, late joiners and absences/ missing responses, data from 908 participants (UK 493; Germany 415) were analysed.

*Design and methods:* A quasi-experimental, pre/post-tests control group design employed pre-published and bespoke questionnaires to collect data. Descriptive and inferential analyses were conducted.

*Results:* UK students possessed higher coping strategy knowledge scores than German participants, but German children's scores improved over time and as a result of the FearNot! intervention.

*Conclusions:* Overall, while not effective at increasing children's coping strategy knowledge in this study, the FearNot! intervention could prove a useful classroom tool to approach the issue of bullying as part of a wider initiative. Cultural differences at baseline, and reactions to the intervention are discussed.

**Keywords:** bullying; anti-bullying intervention; computer based; virtual learning environment; longitudinal study; cultural difference

## Introduction

Bullying is commonly defined as a repeated act, which continues regularly over time, in which the victim is the target of negative action on the part of one or more others (Olweus 1995), and which often relies on a perceived imbalance of power (Whitney and Smith 1993). Rather than the traditional dyadic bully-victim relationship, recent conceptions acknowledge the importance of the social arena in which bullying occurs. Six main roles have been confirmed in a number of studies (e.g. Salmivalli et al. 1996; Sutton and Smith 1999): the 'pure' bully, the 'pure' victim, the bully-assistant (who joins in with bullying, but does not initiate it), the bully-reinforcer (who provides positive feedback to the bully, but does not actively take part), the defender, and the outsider/bystander. Wolke et al (2001b) also identified bully-victims – who both bully and are bullied by others.

Bullying is, unfortunately, a common issue in most European countries, though prevalence does vary. Estimates of victimisation across Europe often vary between 8-46% (Wolke et al 2001a). Specifically, Germany has a low prevalence at around 10% (Hanewinkel 2004) while England shows a moderate prevalence at around 24% (Wolke et al 2001b). Bullying is a serious issue: victimisation can lead to long lasting interpersonal and self-esteem issues (Ledley et al. 2006), physical illness (Fekkes et al. 2006) and mental health problems (Wilkins-Shurmer et al. 2003). There are also negative consequences for bullies and the surrounding peer group (c.f. Berger 2007).

Previous interventions that have taken a holistic approach have demonstrated mixed success (Eslea and Smith 1998; Smith, Ananiadou, and Cowie 2003; Lodge and Frydenberg 2005), while peer-based support groups (such as befriending schemes, conflict-resolution schemes, and counselling-based schemes) seem to be effective for those children that choose to use them (Cowie 2000). Unfortunately, such peer-based schemes may suffer from a

number of other drawbacks including difficulties in setting up and maintaining the scheme, and hostility towards the peer supporters themselves.

Left to their own devices, most children respond to bullying with strategies that are either ineffective, or which actually encourage continued victimization (Craig, Pepler, and Blais 2007). This is especially true of boys, who often believe that their aggressive/confrontational responses to bullying are more effective than they actually are (Mahady-Wilton, Craig, and Pepler 2000).

While some studies show that victimisation only changes in form, a number of studies have reported that victimisation does decrease between the ages of 8 and 16 years (c.f. Whitney and Smith 1993; O'Moore, Kirkham, and Smith 1997; Rigby 1997). Smith, Madsen, and Moody (1999) suggest an explanation: Through experiencing harassment at a younger age, older children become more socially skilled and thus develop more and better coping strategies. In addition, Smith and Shu (2000) demonstrate that, while most children know of many different responses to bullying, older children often choose more effective ways of coping than younger children, and that the most helpful strategies include telling peers rather than adults.

It follows, then, that a progressive avenue of research would be to equip children with effective responses to bullying at a younger age with the eventual aim of developing a 'self-help' approach, to be used alongside existing interventions, to reducing victimisation.

This is the approach taken by the eCIRCUS<sup>1</sup> consortium (of which the authors were members, acting as experts in psychology and education), which has created *FearNot!*<sup>2</sup> – an interactive Virtual Learning Environment (VLE) which can be used in schools as part of both Information and Communication Technology (ICT) and Personal and Social Health Education (PSHE) curriculum. Further details of the FearNot! software are presented in the

---

<sup>1</sup> Education through Characters with emotional-Intelligence and Role-playing Capabilities that Understand Social interaction

<sup>2</sup> Fun with Empathic Agents Reaching Novel Outcomes in Technology

method/materials section. Extensive pilot studies with FearNot! have shown that the characters are believable (Woods et al. 2003) and can elicit a range of emotions in users (Hall et al. 2005; Watson et al. 2007), but this is the first time that FearNot! has been evaluated in a longitudinal intervention.

While other studies are investigating various implications of the FearNot! software (Enz et al. In preparation; Sapouna et al. In press; Vannini et al. Submitted), this paper focuses on FearNot!'s ability to affect younger (7-11 year old) children's *Knowledge About Bullying* (KAB) and respective *Coping Strategy Knowledge* (CSK). KAB refers to how much children know about bullying from a relatively objective and impersonal point of view; while CSK refers to how much children know about *coping* with bullying – i.e. which responses they believe are the most effective to counteract different kinds of bullying. New questionnaires to measure these concepts were developed within the eCIRCUS project. The study investigated the following research questions.

At baseline, do KAB and/or CSK scores vary across involvement in bullying, gender, age group, or country?

Do KAB and/or CSK change as a result of the FearNot! intervention?

## **Method**

### ***Design***

The intervention evaluation employed a quasi-experimental, pre/post-test control group utilising a battery of adapted pre-published (Moral Disengagement [adapted from Hymel et al. 2005], and Social Norms [adapted from Salmivalli and Voeten. 2004] questionnaires) and bespoke questionnaires (Participant Roles, Knowledge About Bullying, and Coping Strategy Knowledge questionnaires) designed by the eCIRCUS project team used to collect data.

The experimental group received two questionnaire administration sessions, which enclosed a three week period during which children used the FearNot! software intervention, and a further follow-up questionnaire administration that was conducted five weeks after the intervention. The control group followed the same schedule, but did not use the FearNot! software – rather they continued with their standard school lessons, which included no specific reference to bullying other than usually encountered in standard PSHE curriculum. The control group received the FearNot! Software after the evaluation had been completed.

#### *Knowledge About Bullying analysis*

We considered an analysis plan to evaluate the difference between experimental and control groups, differences between countries, and whether there was any change over time.

However, preliminary analysis revealed a ceiling effect (details given in the results section), so further analysis was not undertaken.

#### *Coping Strategy Knowledge analysis*

A series of mixed ANOVAs with CSK scores at each of the three measurement points (baseline vs post-test vs follow-up [time]) included experimental group (experimental vs control [group]) as a consistent between groups factor were run in order to investigate whether CSK scores change between the three assessment sessions. Further between groups factors included age (7/8 year olds vs 9 year olds vs 10/11 year olds), participant role (not involved vs victim vs bully, bully/victim), and country.

### ***Participants***

#### *Overall sample*

26 Key Stage 2 (7-11 year old children) primary school classes from the UK (from the Local Education Authorities of Hertfordshire [10], Coventry, and Warwickshire [16]) and 22 3<sup>rd</sup>

grade (7-10 year old children) Grundschulen classes (from the Bayern and Hessen Bundesländer [federal states]) from Germany took part in the FearNot! longitudinal evaluation, leading to a sampling framework of 1186 children. Each location received ethical approval from their relevant body<sup>3</sup>. Parents were given information sheets and were allowed to withdraw their children before the study began. Furthermore, both children and parents were allowed to withdraw from the study at any time thereafter, though none did.

It was not possible to randomly allocate participants to experimental conditions due to the technical requirements of the FearNot! software. Instead, participants were allocated to the intervention group on a class-by-class basis if FearNot! ran well on their school's computers, and to the control group if not. This allowed for FearNot! to be correctly implemented in the experimental group.

Such allocation, while unavoidable, could be open to the possibility of some selection bias – the argument could be made that schools with better equipment are more actively funded, and will therefore give rise to more able pupils. Due to the already large battery of questionnaires administered to participants it was not possible to test rigorously for equivalency of ability, but the areas from which schools were recruited were similar in terms of Socio-Economic Status and it is expected that any variation in ability should become normalised in a sample of this size.

All children completed both the KAB and CSK questionnaires, with differences in sample size accounted for by lack of consent, late joiners, or absenteeism.

#### *Knowledge About Bullying sample*

At baseline (excluding children who were refused parental consent or who joined the study after the first questionnaire administration), a total of 931 children completed all 10

---

<sup>3</sup> University of Hertfordshire Faculty of Engineering and Information Sciences Ethics Committee; University of Warwick Ethic Committee; Bayern Ministry of Education.



component items of the KAB questionnaire. This included 446 (48%) children in the intervention group and 485 (52%) in the control group, 484 (52%) males and 447 (48%) females, 516 (55%) children from the UK and 415 (45%) from Germany, with an overall mean age of 8.9 (sd.74) years

#### *Coping Strategy Knowledge sample*

After accounting for children who were refused parental consent (Non-consent), joined the study after the first questionnaire administration (Late Joiners), or failed to complete all three assessments (Absent/Missing), the final sample for the CSK analysis included 908 children (Table 1).

Table 1. Overview of the sampling process for the CSK sample

|                    | Location      | Sample Framework | Non-consent | Late Joiners | Absent/missing | Final Sample |
|--------------------|---------------|------------------|-------------|--------------|----------------|--------------|
| Control Group      | Hertfordshire | 176              | 1           | 3            | 47             | 125          |
|                    | Warwickshire  | 182              | 4           | 0            | 45             | 133          |
|                    | Bayern/Hessen | 271              | 18          | 3            | 39             | 211          |
|                    | Total         | 629              | 23          | 6            | 131            | 469          |
| Intervention Group | Hertfordshire | 124              | 1           | 1            | 24             | 98           |
|                    | Warwickshire  | 169              | 0           | 0            | 32             | 137          |
|                    | Bayern/Hessen | 264              | 25          | 1            | 34             | 204          |
|                    | Total         | 557              | 26          | 2            | 90             | 439          |
| Overall            |               | 1186             | 49          | 8            | 221            | 908          |

The intervention group includes fewer participants (439, 48%) than the control group (469, 52%) overall. While there are no significant age differences between the experimental groups, there are statistically significant differences in age between the three evaluation locations:  $F(2, 905) 404.74, p < .001$ , with the Hertfordshire sample being the oldest ( $\bar{x} = 9.42$  [0.55]) followed by Warwick ( $\bar{x} = 9.29$  [0.45]), and Bayern/Hessen ( $\bar{x} = 8.34$  [0.55]) having the youngest sample (Table 2). In terms of gender there are no apparent differences between location, but the intervention group includes fewer males (216, 45%) and more females (223, 52%), than the control group (261 [55%], and 208 [48%], respectively) – a pattern which is approaching significance:  $\chi^2(1) 3.78, p = .052$  (Table 2).

Table 2. Gender and age of sample by condition and location for the CSK sample

|                    | Location      | Males |           |                   | Females |           |                   | Overall |           |                   |
|--------------------|---------------|-------|-----------|-------------------|---------|-----------|-------------------|---------|-----------|-------------------|
|                    |               | n     | Age Range | $\bar{X}$ (s) Age | n       | Age Range | $\bar{X}$ (s) Age | n       | Age Range | $\bar{X}$ (s) Age |
| Control Group      | Hertfordshire | 68    | 8-10      | 9.31 (0.50)       | 57      | 9-10      | 9.33 (0.48)       | 125     | 8-10      | 9.32 (0.49)       |
|                    | Warwickshire  | 67    | 9-10      | 9.34 (0.49)       | 66      | 9-10      | 9.30 (0.46)       | 133     | 9-10      | 9.32 (0.47)       |
|                    | Bayern/Hessen | 126   | 7-10      | 8.41 (0.56)       | 85      | 7-9       | 8.22 (0.50)       | 211     | 7-10      | 8.34 (0.54)       |
|                    | Total         | 261   | 7-10      | 8.89 (0.69)       | 208     | 7-10      | 8.87 (0.72)       | 469     | 7-10      | 8.88 (0.70)       |
| Intervention Group | Hertfordshire | 37    | 9-11      | 9.46 (0.61)       | 61      | 8-11      | 9.61 (0.74)       | 98      | 8-11      | 9.55 (0.69)       |
|                    | Warwickshire  | 72    | 9-10      | 9.18 (0.39)       | 65      | 9-10      | 9.34 (0.48)       | 137     | 9-10      | 9.26 (0.44)       |
|                    | Bayern/Hessen | 107   | 7-10      | 8.38 (0.59)       | 97      | 7-10      | 8.30 (0.52)       | 204     | 7-10      | 8.34 (0.56)       |
|                    | Total         | 216   | 7-11      | 8.83 (0.70)       | 223     | 7-11      | 8.96 (0.82)       | 439     | 7-11      | 8.90 (0.77)       |
| Overall            |               | 477   | 7-11      | 8.86 (0.70)       | 431     | 7-11      | 8.92 (0.78)       | 908     | 7-11      | 8.89 (0.74)       |

It is to be noted, that while the data collected here is clustered, the current analysis does not take this into account. A further study would be recommended to use a multi-level regression approach to rectify this.

### *Materials*

#### *Questionnaires*

The FearNot! intervention evaluation employed a battery of questionnaires to measure bullying behaviour, moral disengagement, and knowledge about bullying and coping strategies. This paper describes only results concerning the knowledge and copying strategies outcomes; findings from others will be reported elsewhere (Enz et al. In preparation; Vannini et al. Submitted; and Sapouna et al. In preparation)

Two new questionnaires were developed, piloted, and modified to measure KAB and CSK. A full description of the scale construction process and final scale norms will be found in Watson et al. (In Press). There were two gender-specific versions of each of the KAB-Q and CSK-Q, though they do not differ in terms of plot. Both KAB-Q and CSK-Q were available in German and English, and were back and forward translated (van de Vijver and Hambleton 1996).

*The Knowledge About Bullying questionnaire*

The KAB-Q begins with a 7 panel storyboard<sup>4</sup> showing a bullying incident which: 1) includes the bullies' intention of performing a harmful act, 2) includes an imbalance of power between bullies and victim, 3) includes an impassive audience, and 4) emphasises the repetitive nature of this incident. Following the story, 10 statements are provided with respondents asked to state whether they believed the statement to be 'right' or 'wrong'. The statements refer to elements of the definition of bullying (e.g. "Power imbalance": "*Marcia cannot defend herself against Sally and Jasmine on her own.*") and acquire information about whether the correspondents have understood the picture story and identified it as a bullying incident. Each item is scored as zero for an incorrect response or 10 for a correct response leading to a range of scores between zero to 100, where a higher score indicates a greater understanding of the story.

*The Coping Strategy Knowledge questionnaire*

Since relational/indirect and physical/direct bullying are generally considered to be separate (though related) forms of bullying, the CSK-Q reflects this separation in comprising two sections. In each, respondents read a short (6 panel) storyboard which shows an episode of bullying take place. After reading the story, respondents are presented with 13 common coping strategies and are asked to indicate those strategies that they would recommend the victim (in the story) uses to reduce future episodes of bullying. Respondents may select as many strategies as they wish, and are also offered the opportunity to provide their own ideas in a single open-ended question "Are there any other things <the victim> could do? Please write them in the box if you can think of any".

---

<sup>4</sup> Storyboards were created using the Kar2ouche Composer software and Bullying add-on pack from Immersive Education Ltd

Unknown to respondents, each of the coping strategies has a numerical weighting scored out of 10, to represent how effective the strategy is in real life. These weightings were assigned by researchers, based upon evidence from previous studies which describe how effective certain coping strategies are in a natural school environment (e.g. Salmivalli, Karhunen, and Lagerspetz 1996; Kochenderfer and Ladd 1997; Hodges and Perry 1999). For the purposes of scoring the CSK questionnaire, the weighting of all selected strategies are added together and then divided by the total number of strategies selected. This division is necessary to ensure that respondents can not score highly simply by ticking all the strategies – but will obtain high scores only by selecting the *most effective* strategies. The final range of potential scores is between zero to eight where higher scores represent a more sophisticated knowledge of coping strategies (see Table 3).

Table 3. Coping strategy weightings.

| Coping Strategy                 | Weighting (out of 10) |
|---------------------------------|-----------------------|
| Start Crying                    | 1                     |
| Run away (from the bully)       | 2                     |
| Stay away (from school)         | 0                     |
| Tell (the victim's own) parents | 7                     |
| Avoid (the bully)               | 0                     |
| Call (the bully) names          | 4                     |
| Tell (the victim's own) friends | 8                     |
| Ignore (the bully)              | 4                     |
| Tell (the victim's own) teacher | 8                     |
| Ask (the bully) to stop         | 6                     |
| Laugh it off                    | 6                     |
| Fight (the bully)               | 5                     |
| Blame (the victim's own) self   | 0                     |

#### *Intervention software*

FearNot! version 2.0 (see Figure 1) is a virtual learning environment designed to reflect a typical primary school environment, complete with *virtual actors* who take on the roles normally associated with bullying. The characters play out emergent cartoon-like episodes of bullying (Aylett and Louchart 2003; Aylett et al. 2005), in which sequences of bullying actions occur. Here, the characters' behaviours are not entirely pre-scripted but emerge from

the interaction situations and the characters' goals and mental states. These cartoon-like episodes are connected by interactive episodes where the user can 'talk to' the victim character via an instant messenger inspired interface i.e. by typing into a text box and reading the character's responses on screen. Here, the user can recommend coping strategies for the victim character to attempt in the following emergent episode.

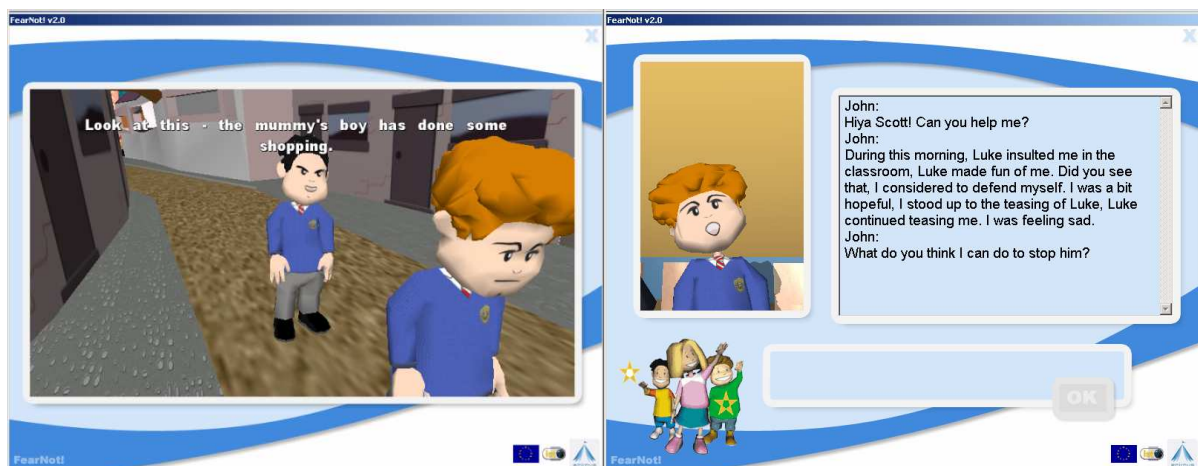


Figure 1. Screenshots of cartoon-like and interaction episodes within FearNot!.

The characters choose for themselves whether to follow the user's advice or not – this decision being based on their previous experience, current mental states, and goals. The consortium made the decision that the characters should not always follow the advice of the users in order to make the story and user-character interactions more believable and 'life-like' – in real life advice given to e.g. friends is not always taken on board depending on the context, situation and persons involved. The various coping strategies that characters can employ are assigned a rating on a ten-point scale to reflect their real life success. More detailed descriptions of the technical framework of FearNot!, and the agents' decision making processes, can be found in Dias (2005), Dias and Paiva (2005) and Dias et al. (2007). By observing the outcomes of the use of coping strategies, children can vicariously learn the best and worst ways to deal with being bullied.

The user can select to play either the male or female scenarios (with male episodes including more physical bullying and female episodes more relational bullying). In the current intervention, most children were able to play both scenarios, but all had been instructed to begin with the scenario that matched their own gender. English and German language versions are available.

### ***Procedure***

#### *Intervention administration*

The intervention required the use of the FearNot! software for one 30 minute session per week (equivalent to around five cartoon-like episodes per session), for three consecutive weeks. Children worked individually (to allow children to answer honestly and privately, and to avoid social facilitation effects), and returned to the same computer each session to allow their particular story to continue. The intervention was conducted during normal teaching hours and was supervised by teachers. No researchers were involved in the administration of the FearNot! intervention sessions, but teachers were thoroughly briefed and provided with explicit guidelines before the intervention began. Teachers were instructed to refrain from pro-active assistance unless children encountered comprehension difficulties, or were finding it too challenging to think of new suggestions.

#### *Questionnaire administration*

The KAB-Q and CSK-Q were presented to respondents as part of a larger battery used in the FearNot! intervention evaluation. The other questionnaires in the pack were the Participant Roles Questionnaire (with sections adapted from Olweus 1991; Salmivalli et al. 1996; and Wolke and Samara 2004), and Classroom Norms Questionnaire (adapted from Salmivalli and Voeten 2004), and the Moral Disengagement Questionnaire (adapted from Hymel, Rocke-

Henderson, and Bonanno 2005). There were separate versions of the questionnaire pack for boys and girls, and there were three versions of the pack with the questionnaires in different orders. In each pack, however, the KAB-Q immediately preceded the CSK-Q questionnaire.

At the beginning of the first questionnaire administration only, an educational session consisting of a presentation and discussion (question & answer) sections was delivered by a researcher to each class. These sessions described to children exactly how bullying is defined and what constitutes relational and physical bullying; and ensured that every child was equipped with at least the same basic knowledge of the terminology used in the questionnaire. Educational sessions were delivered by only one researcher at each location to minimize any discrepancies between delivery styles and, though there was no fixed script, each researcher delivering the educational session presented the same material and provided equivalent definitions of the various aspects of bullying. Children were free to ask whatever questions they wished concerning the educational session, and researchers only concluded the session once they were satisfied that all children in the class had understood the content.

Questionnaires were administered on a class by class basis, at a time convenient to the teacher and school. All children present were seated in their usual classroom places, and were instructed to work individually and quietly. Children with special educational needs were aided by teachers or their usual carer/assistant and all children present were allowed to ask questions at any time during the administration. Teachers/assistants were permitted to help researchers in the administration, but were limited to aiding children with reading/writing difficulties – only researchers could offer advice on how to complete the questionnaire pack. Once children had completed the questionnaire pack they were required to continue with their usual schooling (primarily reading tasks) until all the class had finished, at which time the whole class was thanked for their participation. Administration sessions took around 40 minutes to one hour each, depending on the literacy skills of the children.

## Results

### *Data coding.*

Before any analyses were run, the obtained data were coded into meaningful grouping variables. As there were only ten each of 7 and 11 year old children, these participants were joined with the 8 and 10 year olds respectively to form three categories of age: 7/8 year olds, 9 year olds, and 10/11 year olds.

Children also provided self-nomination data (in another questionnaire of the battery) regarding their participant roles. Using this data, children could be coded as bullies, victims, bully/victims, or not involved for both relational and physical bullying. Children were classified as bully or victim if they stated that they bullied others or were bullied themselves at least four times in the last month; a bully/victim if they admitted to both; and not involved if they admitted to neither.

In addition, these data allowed us to categorise each child's overall involvement in bullying, irrespective of participant role – not involved, only relationally involved, only physically involved, or involved in both relational and physical bullying.

This paper uses the participant role and overall involvement categorisations from the baseline assessment.

### *Knowledge about Bullying results*

Preliminary analysis of the KAB-Q revealed a ceiling effect ( $\bar{x} = 84.9 [13.85]$ ), with no significant differences between participant role, age group, gender, or country.

This ceiling effect demonstrates that the majority of children in this study found the storyboard/question format simple to understand and to complete, and that the KAB measures story comprehension rather than knowledge about bullying as originally intended. Because of



this high baseline ceiling effect, improvement in KAB scores was highly unlikely and no analysis of the intervention was performed in terms of KAB.

### *Coping Strategy Knowledge results*

*Descriptive analysis.* Both relational<sup>5</sup> and physical<sup>6</sup> CSK are normally distributed. The distributions are bi-modal – suggesting that while most participants score just above half way, there is a second group who score very highly (see Figure 2). This implies that while most children have an average CSK, some children already possess a strong knowledge of how to cope with bullying.

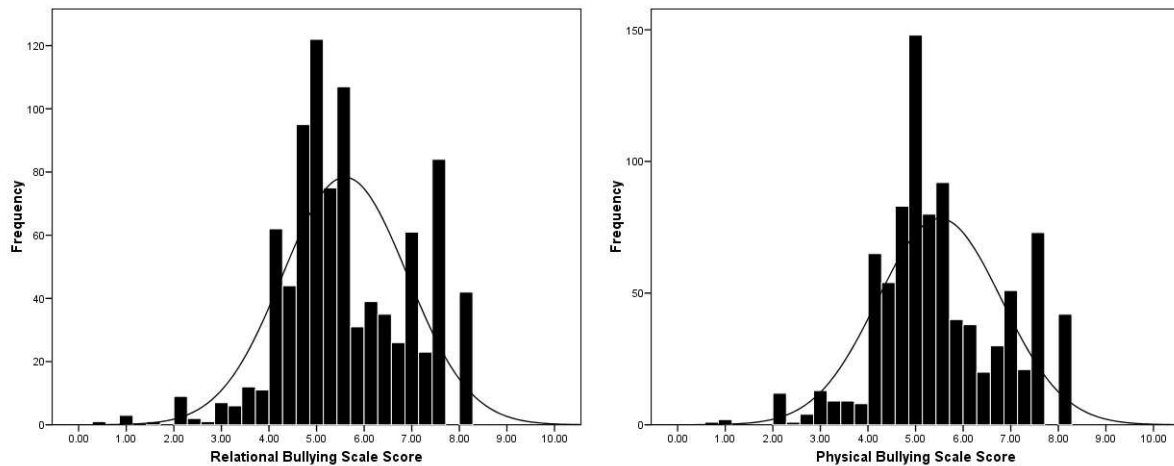


Figure 2. Frequency (n children) distributions for relational and physical CSK scales.

A demographic breakdown of the children who score seven or more on the CSK scales reveals that high scorers are more likely to be: not involved in bullying, male, nine years of age, and from the UK (Table 4).

Regarding the whole dataset, there are no statistically significant differences between participant roles on either relational or physical CSK scales, though it should be noted that no

<sup>5</sup> e.g. being called names, being excluded from social groups

<sup>6</sup> e.g. having belongings stolen, being beaten up

child nominated themselves as a pure bully in this sample (see Table 5). There are also no significant differences in terms of overall involvement or gender.

Table 4. Demographic details of high scorers on relational and physical CSK scales.

|                              |                           | Relational Scale | Physical Scale |
|------------------------------|---------------------------|------------------|----------------|
| Relational Participant Role* | Not Relationally Involved | 152 (72.4%)      | 154 (73.3%)    |
|                              | Relational Bully          | N/A              | N/A            |
|                              | Relational Victim         | 26 (12.4%)       | 32 (15.2%)     |
|                              | Relational Bully/Victim   | 10 (4.8%)        | 8 (3.8%)       |
| Physical Participant Role*   | Not Physically Involved   | 145 (77.5%)      | 143 (76.5%)    |
|                              | Physical Bully            | N/A              | N/A            |
|                              | Physical Victim           | 18 (9.6%)        | 27 (14.4%)     |
|                              | Physical Bully/Victim     | 9 (4.8%)         | 6 (3.2%)       |
| Involvement in Bullying      | Not Involved In Bullying  | 138 (65.7%)      | 132 (70.6%)    |
|                              | Involved Relationally     | 10 (4.8%)        | 8 (4.3%)       |
|                              | Involved Physically       | 11 (5.2%)        | 11 (5.9%)      |
|                              | Involved in Both          | 26 (12.4%)       | 19 (10.2%)     |
| Gender                       | Male                      | 111 (52.9%)      | 104 (55.6%)    |
|                              | Female                    | 99 (47.1%)       | 83 (44.4%)     |
| Age                          | 7/8 Years                 | 37 (17.6%)       | 29 (15.5%)     |
|                              | 9 Years                   | 112 (53.3%)      | 104 (55.6%)    |
|                              | 10/11 Years               | 61 (29%)         | 54 (28.9%)     |
| Country                      | UK                        | 159 (75.7%)      | 145 (77.5%)    |
|                              | Germany                   | 51 (24.3%)       | 42 (22.5%)     |

\* Missing cases omitted from table

Table 5. Descriptive statistics of relational and physical CSK by participant role, overall involvement, gender, age, and country.

|                             |                           | Relational CSK |        |               | Physical CSK |        |               |
|-----------------------------|---------------------------|----------------|--------|---------------|--------------|--------|---------------|
|                             |                           | n              | Range  | $\bar{x}$ (s) | n            | Range  | $\bar{x}$ (s) |
| Relational Participant Role | Not Relationally Involved | 696            | .5-8   | 5.56 (1.30)   | 694          | 1-8    | 5.50 (1.29)   |
|                             | Relational Bully          | 0              | N/A    | N/A           | 0            | N/A    | N/A           |
|                             | Relational Victim         | 119            | 2-8    | 5.53 (1.28)   | 119          | 2-8    | 5.42 (1.25)   |
|                             | Relational Bully/Victim   | 33             | 3.88-8 | 5.99 (1.26)   | 33           | 2.71-8 | 5.53 (1.41)   |
| Physical Participant Role   | Not Physically Involved   | 694            | .5-8   | 5.60 (1.28)   | 691          | 1-8    | 5.50 (1.29)   |
|                             | Physical Bully            | 0              | N/A    | N/A           | 0            | N/A    | N/A           |
|                             | Physical Victim           | 134            | 1.67-8 | 5.48 (1.35)   | 134          | 2-8    | 5.49 (1.30)   |
|                             | Physical Bully/Victim     | 30             | 2-8    | 5.51 (1.63)   | 30           | 2-8    | 5.50 (1.29)   |
| Overall Involvement         | Not Involved In Bullying  | 623            | .5-8   | 5.60 (1.28)   | 621          | 1-8    | 5.51 (1.29)   |
|                             | Involved Relationally     | 53             | 3-8    | 5.58 (1.20)   | 53           | 2-8    | 5.35 (1.24)   |
|                             | Involved Physically       | 63             | 1.67-8 | 5.16 (1.40)   | 63           | 2-8    | 5.32 (1.28)   |
|                             | Involved in Both          | 95             | 2-8    | 5.67 (1.35)   | 95           | 1-8    | 5.50 (1.32)   |
| Gender                      | Male                      | 471            | .5-8   | 5.57 (1.33)   | 470          | 1-8    | 5.51 (1.35)   |
|                             | Female                    | 428            | 1-8    | 5.62 (1.28)   | 426          | .67-8  | 5.50 (1.25)   |
| Age                         | 7/8 Years                 | 271            | 1-8    | 5.30 (1.15)   | 270          | 1-8    | 5.21 (1.12)   |
|                             | 9 Years                   | 461            | .5-8   | 5.62 (1.36)   | 457          | 1-8    | 5.53 (1.31)   |
|                             | 10/11 Years               | 167            | 1-8    | 6.03 (1.30)   | 169          | .67-8  | 5.90 (1.44)   |
| Country                     | UK                        | 485            | 1-8    | 5.93 (1.34)   | 486          | .67-8  | 5.80 (1.37)   |
|                             | Germany                   | 414            | .5-8   | 5.21 (1.15)   | 410          | 1-8    | 5.15 (1.11)   |

There are significant differences between age groups on both relational ( $F[2, 899] 16.73, p < .001$ ) and physical ( $F[2, 893] 15.25, p < .001$ ) CSK scales. Post hoc comparisons show that CSK scores increase with age (Table 6).

Table 6. Post-hoc comparisons for the main effect of age.

|                         | Age 1 | Age 2 | Mean Difference | p     |
|-------------------------|-------|-------|-----------------|-------|
| Relational Bullying CSK | 7/8   | 9     | -.16            | .071  |
|                         | 7/8   | 10/11 | -.44            | <.001 |
|                         | 9     | 10/11 | -.28            | .003  |
| Physical Bullying CSK   | 7/8   | 9     | -.11            | .330  |
|                         | 7/8   | 10/11 | -.39            | <.001 |
|                         | 9     | 10/11 | -.28            | .001  |

Children from the UK score significantly higher on both relational ( $t[896.61] 8.66, p < .001$ ) and physical ( $t[892.67] 7.87, p < .001$ ) CSK scales than the German sample, with medium effect sizes for both (relational CSK:  $d = .58$ ; and physical CSK:  $d = .53$ )<sup>7</sup>. Since it has already been shown, however, that the German sample is significantly younger than the UK sample, it is likely that these age and country effects are linked.

Including age and country together as between subjects factors in two-way ANOVAs demonstrate that the main effect of age disappears, but country remains significant for the relational CSK scale ( $F[1, 893] 7.24, p = .007$ ), and marginally so for the physical CSK scale ( $F[1, 890] 3.11, p = .078$ ). In addition, a series of ANCOVAs showed that country remains a significant main effect when controlling for age, but age remains significant when controlling for country only for the relational CSK scale. The pervasiveness of country and the marginalisation of age as main effects leads to the conclusion that that any age-CSK relationships are spurious, but the finding that the UK sample scores more highly than the German sample is well supported by the data.

*Evaluation analysis.* It was expected that the FearNot! anti-bullying intervention would affect participant's CSK scores. To evaluate this, a series of mixed ANOVAs with CSK scores at each measurement point (baseline vs post-test vs follow-up [time]) as a within subjects factor, and experimental group (intervention vs control intervention [group]) as a consistent between

<sup>7</sup> Cohen's  $d$  calculated using the online calculator found at: <http://web.uccs.edu/lbecker/Psy590/escalc3.htm>

groups factor was employed. Further between groups factors, each tested independently, included participant role (not involved vs victim vs bully vs bully/victim [role]), overall involvement (not involved vs involved relationally vs involved physically vs involved in both [involvement]), gender (males vs females [gender]), and country (UK vs Germany [country]). Age was omitted as a factor due to the spurious relationship with country. ANOVAs were run separately for relational and physical CSK scales.

As might be expected after the descriptive analysis, there were no significant main effects or interaction effects with role, involvement, or gender on either CSK scale. Furthermore, there were no significant main effects or interaction effects including group, suggesting that the FearNot! intervention had had little impact on children's CSK.

There were, however, significant main effects of time for both relational ( $F[1, 879] 50.99, p < .001$ ) and physical ( $F[1, 870] 35.17, p < .001$ ) CSK scales; and significant country\*time interactions for relational ( $F[2, 1758] 11.75, p < .001$ ) and physical ( $F[2, 1740] 13.32, p < .001$ ) CSK scales. To investigate these effects more carefully further group\*time ANOVAs were conducted separately within each country.

Within the UK sub-sample, there are main effects of time for both relational ( $F[2, 946] 5.41, p = .005$ ) and physical ( $F[2, 934] 5.53, p = .004$ ) CSK scales, though there are no main effects of, or interactions with, group. Post hoc comparisons (Table 7) show that relational CSK scores decrease between baseline and post-test, while physical CSK scores decrease between post-test and follow-up.

While unexpected, this pattern of decreasing CSK scores occurs within both experimental and control conditions, indicating that the FearNot! intervention is not responsible for this finding.

Within the German sub-sample there are main effects of time ( $F[2, 812] 6.82, p < .001$ ) and marginally of group ( $F[1, 406] 3.23, p = .073$ ), but no interaction, for the relational CSK

scale. The physical scale yields significant main effects of time ( $F[2, 806] 9.94, p < .001$ ) and group ( $F[1, 403] 4.41, p = .036$ ) but no interaction effect. The intervention group scores more highly overall than the control intervention group on both relational and physical CSK scales, and post hoc comparisons of time show that CSK scores increase between baseline and post-test on both relational and physical scales (Table 8).

Table 7. Post hoc t-tests on time main effects for UK group\*time ANOVA.

|                         | Time 1    | Time 2    | Mean Difference | p    |
|-------------------------|-----------|-----------|-----------------|------|
| Relational Bullying CSK | Baseline  | Post-Test | -.16            | .020 |
|                         | Post-Test | Follow-Up | -.04            | .417 |
|                         | Baseline  | Follow-Up | -.21            | .003 |
| Physical Bullying CSK   | Baseline  | Post-Test | -.09            | .226 |
|                         | Post-Test | Follow-Up | -.15            | .028 |
|                         | Baseline  | Follow-Up | -.24            | .001 |

Table 8. Post hoc t-tests on time main effects for German group\*time ANOVA.

|                         | Time 1    | Time 2    | Mean Difference | p      |
|-------------------------|-----------|-----------|-----------------|--------|
| Relational Bullying CSK | Baseline  | Post-Test | .20             | .002   |
|                         | Post-Test | Follow-Up | .003            | .967   |
|                         | Baseline  | Follow-Up | .20             | .002   |
| Physical Bullying CSK   | Baseline  | Post-Test | .24             | .001   |
|                         | Post-Test | Follow-Up | .02             | .723   |
|                         | Baseline  | Follow-Up | .26             | < .001 |

While there are no statistically significant interaction effects, profile plots (available on request from corresponding author) do indicate that, as CSK scores increase for both experimental and control conditions after baseline measurement, they increase more in the intervention group than in the control group for both relational and physical CSK scales.

## Discussion

This study has evaluated the potential educational impact of a new virtual learning environment, designed as an anti-bullying intervention. Specifically, we were interested in FearNot!'s ability to improve children's knowledge about the best and worst ways to cope with bullying.

Data from the FearNot! anti-bullying intervention has shown that most children already possess an average knowledge of how to cope with bullying, with some children able to identify the best strategies rather well. This goes some way to support Camodeca and Goossens' (2005) finding that children favour effective coping strategies when presented with a list of alternatives. The demographic details of the highest scorers have been identified, but there is little overall difference in coping strategy knowledge in terms of participant role, bullying involvement, or gender.

This is somewhat surprising as one might expect, for example, that boys would know more about coping with physical bullying and less about relational bullying than girls since these groups encounter these respective bullying styles more often (Bjorkqvist 1994; Crick and Grotpeter 1995, 1996). One might also expect that uninvolved children would know more about coping as they have successfully escaped or avoided victimisation, though it would appear that other predictors of bullying avoidance are stronger than coping strategy knowledge. These predictors include: social inclusion (Salmivalli, Huttunen, and Lagerspetz 1997), strong friendships (Bollmer et al. 2005), more positive self esteem (O'Moore and Kirkham 2001), being well adjusted (Smith et al. 2004), lower moral disengagement (Hymel, Rocke-Henderson, and Bonanno 2005), better social and moral cognition (Gini 2006), and higher empathic ability (Joliffe and Farrington 2006).

There were age differences in that younger children had lower CSK scores than older children. It was concluded, however, that this was likely an artefact of the age difference between the UK and German samples as country showed a stronger effect under further scrutiny. The UK sample scored significantly more highly than the German sample on both relational and physical CSK scales, which fits with previous findings that bullying is more

prevalent and commonplace in the UK (Wolke et al 2001b) – greater prevalence would naturally lead to a greater awareness<sup>8</sup>.

There appeared to be no overall effect of the FearNot! intervention software itself, as any observable patterns occurred simultaneously in both experimental and control conditions. These patterns showed the UK sample's CSK to decrease between baseline and post test, while an increase was witnessed in the German sample. Therefore, while there is no apparent effect caused by the FearNot! intervention software, it does appear that children in the two countries responded to the overall research programme in different ways.

Such cultural differences could be due to idiosyncrasies in language (Smith et al. 2002). For example, while the English term 'bullying' is used colloquially by children, the German equivalent 'Schikanieren' is not (Wolke et al. 2001b). While this issue was addressed by using the more idiomatic term 'Mobbing' in Germany, and also by providing educational sessions, everyday understanding of the concepts of 'bullying' and 'Mobbing' may have overridden these efforts (c.f. Arora 1996).

The German sample did respond positively to the FearNot! intervention. Had the intervention lasted for a longer period of time, it is possible that this effect would have become significant, as lengthier interventions achieve greater success (Limber et al. 2004; Olweus 2004; Smith et al. 2004). Therefore, we hypothesise that FearNot! may be educational for children who begin with low CSK scores, if used for longer than in the current study. In addition, we would suggest that FearNot! be employed by schools as part of a wider initiative – i.e. to generate discussion within the classroom and to address a serious issue in a novel, fun, and engaging way.

Future work employing the current Coping Strategy Knowledge scale would be to identify the coping strategies most often selected to counter each type of bullying. It would be

---

<sup>8</sup> Note, greater awareness may also lead to greater prevalence – an intricate relationship between how we perceive and conceptualize the world and a discussion which would go beyond the scope of this paper.

beneficial to learn, for example, whether children prefer different strategies to counter different forms of bullying, as suggested by Kanetsuna, Smith, and Morita (2006).

While forced response options were employed for ease of completion, open-ended questions might have elicited more natural responses from children. With that said, very few children took the opportunity to add their own alternative coping strategies (and hence no analyses of the open ended questions was performed), suggesting that either our response options are quite exhaustive or that other means of inquiry (e.g. verbal) might have been more suitable for eliciting more natural responses.

The phraseology of the CSK question “What do you think <the victim> should do...” may have led the respondents in two ways. Firstly, it requires that the children place themselves in the role of the victim, rather than responding from their own personal view. As Camodeca and Goossens (2005) have shown, children tend to choose different ‘effective interventions’ when asked to take on alternative perspectives. Secondly, the question may provoke socially desirable ‘correct’ responses as it asks what the victim *should do* as opposed to what the victim *could or would do*.

Baseline scores from the KAB-Q demonstrated a ceiling effect (whereby maximum scores are achieved by a large proportion of the sample), which unfortunately made any potential effect of the FearNot! intervention on this construct unlikely. This demonstrates that the KAB-Q did not measure knowledge about bullying but also shows that the storyboard/question format is easily understood and responded to.

## **Conclusion**

Our study has not shown an overall effect of the FearNot! intervention on either relational or physical CSK scales, but there is a cultural effect. Relational and physical CSK scores



*decreased* during the research programme in the UK sample, while both *increased* in the German sample. This pattern occurred in both experimental conditions – with or without the FearNot! intervention. The German sample did respond to the FearNot! intervention to some extent, though the witnessed improvement was not statistically significant. This suggests that a longer intervention period may prove beneficial in improving low scoring children's CSK scores. Finally, we recommend that FearNot! be implemented as part of a wider and longer initiative.

### **Acknowledgements**

We would like to thank all the schools, teachers, and children who have taken part in this study. In addition we would like to thank the following researchers, without whom this study would not have been possible: Stefanie Brosch, Rafal Dawidowicz, Megan Davis, Joao Dias, Rui Figueiredo, Adrian Gordon, Marc Hall, Wan Ching Ho, Michael Kriegel, Karin Leichtenstern, Mey Yii Lim, Patricia Lippeck, Sandy Louchart, Asad Nazir, Chystopher Nehaniv, Luis Oliveira, Malcolm Padmore, Matthias Rehm, Paola Rizzo, Harald Schaub, Tim Tisdale, Isabel Transoco, Marco Vala, Thurid Vogt, Marc Webster, and Carsten Zoll. Many thanks also to Nimrita Bahia, Sophie Birch, Daniel Cox, and Sunil Sthanakiya for their assistance with data collection and entry.

This work was partially supported by the European Community (EC) and was funded by the eCIRCUS project IST-4-027656-STP with university partners Heriot-Watt, Hertfordshire, Sunderland, Warwick, Bamberg, Augsburg, Würzburg plus INESC-ID and Interagens. The authors are solely responsible for the content of this publication. It does not represent the opinion of the EC, and the EC is not responsible for any use that might be made of data appearing therein.

Images of FearNot! are reproduced with the permission of the eCIRCUS consortium.

**Correspondence to**

Prof. Kerstin Dautenhahn, Adaptive Systems research group, School of Computer Science,  
University of Hertfordshire, Hatfield, Hertfordshire, UK; Tel: +44 1707 284333; email:  
k.dautenhahn@herts.ac.uk

**References**

- Arora, T. 1996. Defining bullying. *School Psychology International*, 17: 317-329.
- Aylett, R. S., S. Louchart. 2003. Towards a narrative theory of virtual reality. *Virtual Reality*, 7: 2-9.
- Aylett, R.S., S. Louchart, J. Dias, A.Paiva, and M. Vala. 2005. FearNot! An experiment in emergent narrative. Paper presented at Intelligent Virtual Agents (IVA), September 12-14, in Kos, Greece.
- Becker, L.A. Effect size calculators. University of Colorado at Colorado Springs.  
<http://web.uccs.edu/lbecker/Psy590/escalc3.htm>.
- Berger, K.S. 2007. Update on bullying at school: Science forgotten? *Developmental Review*, 27: 90-126.
- Björkqvist, K. 1994. Sex differences in physical, verbal, and indirect aggression: A review of recent research. *Sex Roles*, 30, nos. 3/4: 177-188.
- Bollmer, J.M., R. Milich, M.J. Harris, and M.A. Maras. 2005. A friend in need: The role of friendship quality as a protective factor in peer victimization and bullying. *Journal of Interpersonal Violence*, 20, no. 6: 701-712.
- Camodeca, M., and F.A. Goossens. 2005. Children's opinions on effective strategies to cope with bullying: The importance of bullying role and perspective. *Educational Research*, 47, no. 1: 93-105.
- Cowie, H. 2000. Bystanding or standing by: Gender issues in coping with bullying in English schools. *Aggressive Behavior* 26: 85-97.
- Craig, W., D. Pepler, and J. Blais. 2007. Responding to bullying. *School Psychology International*, 28, no. 4: 465-477.
- Crick, N.R., and J.K. Grotpeter. 1995. Relational aggression, gender, and social-psychological adjustment. *Child Development*, 66: 710-722.
- Crick, N.R., and J.K. Grotpeter. 1996. Children's treatment by peers: Victims of relational and overt aggression. *Development and Psychopathology*, 8: 367-380.
- Dias, J. 2005. FearNot! Creating emotional autonomous synthetic characters for emphatic interaction. PhD diss., Instituto Superior Técnico.
- Dias, J., and A. Paiva. 2005. Feeling and reasoning: a computational model for emotional agents. Paper presented at 12<sup>th</sup> Portuguese Conference on Artificial Intelligence (EPIA), December 5-8, in Covilhã, Portugal.
- Dias, J., W.C. Ho, T. Vogt, N. Beeckman, A. Paiva, and E. André. 2007. I know what I did last summer: Autobiographic memory in synthetic characters. Paper presented at Affective Computing and Intelligent Interaction (ACII), September 12-14, in Lisbon, Portugal.
- Enz, S. et al. In preparation.

- Eslea, M., and P.K. Smith. 1998. The long-term effectiveness of anti-bullying work in primary schools. *Educational Research* 40, no. 2: 203-218.
- Fekkes, M., F.I.M. Pijpers, A.M. Fredriks, T. Vogels, and S.P. Verloove-Vanhorick. 2006. Do bullied children get ill, or do ill children get bullied? A prospective cohort study on the relationship between bullying and health-related symptoms. *Pediatrics* 117, no. 5:1568-1574.
- Gini, G. 2006. Social cognition and moral cognition in bullying: What's wrong? *Aggressive Behavior*, 32: 528-539.
- Hall, L., S. Woods, R. Aylett, L. Newall, and A. Paiva. 2005. Achieving empathic engagement through affective interaction with synthetic characters. Paper presented at Affective Computing and Intelligent Interaction (ACII), October 22-24, in Beijing, China.
- Hanewinkel, Reiner. 2004. Prevention of bullying in German schools: An evaluation of an anti-bullying approach. In *Bullying in schools: How successful can interventions be?*, ed. P.K. Smith, D. Pepler, and K. Rigby., 81-97. Cambridge: Cambridge University Press.
- Hodges, E.V.E., and D.G. Perry. 1999. Personal and interpersonal antecedents and consequences of victimisation in peers. *Journal of Personality and Social Psychology* 76, no. 4: 677-685.
- Hymel, S., N. Rocke-Henderson, and R.A. Bonanno. 2005. Moral disengagement: A framework for understanding bullying among adolescents. *Journal of Social Sciences, Special Issue*, 8:1-11.
- Joliffe, D., and D.P. Farrington. 2006. Examining the relationship between low empathy and bullying. *Aggressive Behavior*, 32: 540-550.
- Kanetsuna, T., P.K. Smith, and Y. Morita. 2006. Coping with bullying at schools: Children's recommended strategies and attitudes to school-based interventions in England and Japan. *Aggressive Behavior*, 32: 570-580.
- Kochenderfer, B.J., and G.W. Ladd. 1997. Victimized children's responses to peers' aggression: Behaviors associated with reduced versus continued victimization. *Development and Pathology*, 9: 59-73.
- Ledley, D.R., E.A. Storch, M.E. Coles, R.G. Haimberg, J. Moser, and E.A. Bravata. 2006. The relationship between childhood teasing and late interpersonal functioning. *Journal of Psychopathology and Behavioral Assessment* 28, no. 1: 33-40.
- Limber, S.P., M. Nation, A.J. Tracy, G.B. Melton, and V. Vlerx. 2004. Implementation of the Olweus bullying prevention program in the Southeastern United States. In *Bullying in schools: How successful can interventions be?*, ed. P.K. Smith, D. Pepler, and K. Rigby., 55-79. Cambridge: Cambridge University Press.
- Lodge, J., and E. Frydenberg. 2005. The role of peer bystanders in school bullying: Positive steps toward promoting peaceful schools. *Theory into Practice* 44, no. 4: 329-336.
- Mahady-Wilton, M., W.M. Craig, and D.J. Pepler. 2000. Emotional regulation and display in classroom bullying: Characteristic expressions of affect, coping styles, and relevant contextual factors. *Social Development*, 2: 226-244.
- Olweus, D. 1991. Bully/victim problems among schoolchildren: Basic facts and effects of a school based intervention program. In *The development and treatment of childhood aggression*, ed. D. Pepler and K. Rubin., 441-448. Hillsdale, NJ: Erlbaum.
- Olweus, D. 1995. Bullying or peer abuse at school: Facts and intervention. *Current Directions in Psychological Science* 4, no. 6: 196-200.
- Olweus, D. 2004. The Olweus bullying prevention programme: Design and implementation issues and a new national initiative in Norway. In *Bullying in schools: How successful*

- can interventions be?*, ed. P.K. Smith, D. Pepler, and K. Rigby., 13-36. Cambridge: Cambridge University Press.
- O'Moore, M., and C. Kirkham. (2001). Self-esteem and its relationship to bullying behaviour. *Aggressive Behavior*, 27: 269-283.
- Salmivalli, C., A. Huttunen, and K.M.J. Lagerspetz. 1997. Peer networks and bullying in schools. *Scandinavian Journal of Psychology*, 38: 305-312.
- Salmivalli, C., J. Karhunen, and K.M.J. Lagerspetz. 1996. How do the victims respond to bullying? *Aggressive Behavior*, 22: 99-109.
- Salmivalli, C., K. Lagerspetz, K. Björkqvist, K. Österman, and A. Kaukiainen. 1996. Bullying as a group process: Participants roles and their relations to social status. *Aggressive Behavior* 22: 1-15.
- Salmivalli, C., and M. Voeten. 2004. Connections between attitudes, groups norms, and behaviour in bullying situations. *International Journal of Behavioral Development*, 28, no. 3: 246-258.
- Sapouna, M., D. Wolke, N. Vannini, S. Watson, S. Woods, W. Schneider, S. Enz, L. Hall, A. Paiva, E. Andre, K. Dautenhahn, and R. Aylett. In press. Virtual learning intervention to reduce bullying victimization in primary school: A controlled trial. *Journal of Child Psychology and Psychiatry*, in press.
- Smith, P.K., K. Ananiadou, and H. Cowie. 2003. Interventions to reduce bullying. *Canadian Journal of Psychiatry*, 48: 591-599.
- Smith, P.K., H. Cowie, R. F. Olafsson, and A.P.D. Liefoghe. 2002. Definitions in bullying: A comparison of terms used, and age and gender differences, in a fourteen-country international comparison. *Child Development*, 73, no. 4: 1119-1133.
- Smith, P.K., S. Sharp, M. Eslea, and D. Thompson. 2004. England: The Sheffield Project. In *Bullying in schools: How successful can interventions be?*, ed. P.K. Smith, D. Pepler, and K. Rigby., 99-124. Cambridge: Cambridge University Press.
- Smith, P.K., and S. Shu. 2000. What good schools can do about bullying: Findings from a survey in English schools after a decade of research and action. *Childhood* 7 no. 2: 193-212.
- Smith, P.K., L. Talamelli, H. Cowie, P. Naylor, and P. Chauhan. 2004. Profiles of non-victims, escaped victims, continuing victims and new victims of school bullying. *British Journal of Educational Psychology*, 74: 565-581.
- Sutton, J., and P.K. Smith. 1999. Bullying as a group process: An adaptation of the participants role approach. *Aggressive Behavior* 25, 97-111.
- Vannini, N., S. Enz, M. Sapouna, D. Wolke, S. Watson, S. Woods, K. Dautenhahn, L. Hall, A. Paiva, E. André, R. Aylett, and W. Schneider. (Submitted). "FearNot!" A computer-based Anti-bullying-program designed to foster peer Intervention".
- van de Vijver, F.J.R. and R.K. Hambleton. 1996. Translating tests: Some practical guidelines. *European Psychologist*, 1, no. 2: 89-99.
- Watson, S., N. Vannini, M. Davis, S. Woods, M. Hall, L. Hall, and K. Dautenhahn. 2007. FearNot! an anti-bullying intervention: Evaluation of an interactive virtual learning environment. Paper presented at Artificial Intelligence and Simulation of Behaviour (AISB), April 2-4. Newcastle, UK.
- Watson, S.E.J. , N. Vannini, S. Woods, K. Dautenhahn, M. Sapouna, S. Enz, W. Schneider, D. Wolke, L. Hall, A. Paiva, E. André, and R. Aylett. In Press. Construction of a bullying-specific Coping Strategy Knowledge questionnaire for use with primary school children. Technical Report, University of Hertfordshire.
- Whitney, I. and P.K. Smith. 1993. A survey of the nature and extent of bullying in junior/middle and secondary schools. *Educational Research* 35, no. 1: 3-25.

- Wilkins-Shurmer, A., M.J. O'Callaghan, J.M. Najman, W. Bor, G.M. Williams, and M.J. Anderson. 2003. Association of bullying with adolescent health-related quality of life. *Journal of Pediatrics and Child Health* 39, no. 6: 436-441.
- Wolke, D., and M.M. Samara. 2004. Bullied by siblings: associations with peer victimisation and behaviour problems in Israeli lower secondary school children. *Journal of Child Psychology and Psychiatry* 45, no. 5: 1015-1029.
- Wolke, D., S. Woods, L. Bloomfield, L. Karstadt. 2001a. Bullying involvement in primary schools and common health problems. *Archives of Disease in Childhood* 85: 197-201.
- Wolke, D., S. Woods, K. Stanford, and H. Schulz. 2001b. Bullying and victimization of primary and secondary school children in England and Germany: Prevalence and school factors. *British Journal of Psychology* 92, no. 4: 673-696.
- Woods, S., L. Hall, D. Sobral, K. Dautenhahn, and D. Wolke. 2003. Animated characters in bullying intervention. Paper presented at Intelligent Virtual Agents (IVA), September 15-17, in Irsee, Germany.