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"FearNot!": a computer-based anti-bullying-programme designed to foster peer intervention

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Abstract Bullying is widespread in European schools, despite multiple intervention strategies having been proposed over the years. The present study investigates the effects of a novel virtual learning strategy ("FearNot!") to tackle bullying in both UK and German samples. The approach is intended primarily for victims to increase their coping skills and further to heighten empathy and defence of victims by non-involved bystanders. This paper focuses on the defender role. Applying quantitative as well as qualitative methodology, the present study found that "FearNot!" helped non-involved children to become defenders in the German sub-sample while it had no such effect in the UK sub-sample. German "New Defenders" (children who are initially uninvolved

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but are nominated as defenders by their peers after the intervention period) were found to be significantly more popular at baseline, and to show more cognitive empathy (Theory of Mind) for the virtual victims as compared to permanently non-involved pupils. Moreover, gender interacts with becoming a defender in its effects on affective empathy, with emotional contagion being particularly associated with New Defender status among girls. The findings are discussed in relation to previous research on anti-bullying intervention strategies and cultural differences in bullying prevalence rates and intervention outcomes.

Keywords Empathy · Peer intervention · Role-play · School bullying · Virtual learning environment

Introduction

Bullying is of widespread interest for teachers, parents, pupils and researchers alike. Effective intervention approaches are needed given the high prevalence rates across countries worldwide and the serious consequences of bullying. Worldwide prevalence estimations ranging from 4% to 32% (see Stassen Berger 2007), however, it is important to note that there are large variations in prevalence rates between countries depending among others on focus of study, data source and methodological approach of assessment as well as applied definition of bullying, The negative impact bullying has on the development and further life condition of children involved in this sub-category of aggressive behaviour range from behaviour and school adjustment problems, poor physical health, high levels of depression and anxiety to even psychotic symptoms (see, e.g. Arseneault et al. 2006; Bond et al. 2001; Fekkes et al. 2006; Nansel et al. 2004; Schreier et al. 2009). Moreover, the impact of school bullying goes beyond those directly involved (i.e. victims and bullies) and affects most members of the relevant social group (i.e. classes, schools). For instance, Hazler (1996) noted that bystanders are not immune to the negative consequences of bullying because their self-respect decreases every time they witness bullying but do not engage in stopping it.

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Bullying

The phenomenon of school bullying is defined as intentional and repeated aggression towards weaker peers: "A student is being bullied or victimised when he or she is exposed, repeatedly and over time, to negative actions on the part of one or more other students." (Olweus 2001, p. 5–6). Typical characteristics for this sub-category of aggressive behaviour are the real or perceived power imbalance between perpetrators and victims, and its systematic repetition over time. Bullying can become apparent in different behaviours such as direct verbal (blackmailing, calling names, etc.), physical (hitting, kicking, stealing, etc.) behaviour, as well as indirect behaviour including the manipulation of social relations, e.g. spreading rumours or the deliberate ending of friendships (Björkqvist et al. 1994; Crick and Grotpeter 1995). The forms of bullying seem to vary by gender: boys are more engaged in direct physical bullying while girls are rather victims or bullies of indirect forms (Olweus 1996; Scheithauer et al. 2006; Whitney and Smith 1993). However, no differences between boys and girls are found when it comes to direct verbal bullying (Scheithauer et al. 2003).

Like other forms of aggression, bullying has to be seen largely in relation to the social or group context in which it occurs: in the vast majority of bullying episodes, peers take over various roles ranging from active participants to passive bystanders (Hawkins et al. 2001; O'Connell et al. 1999; Salmivalli et al. 1996; Sutton and Smith 1999). The majority of presented peers are passive onlookers who in fact disapprove of bullying (Charach et al. 1995; Rigby and Slee 1992) but at the same time often underestimate their responsibility within the bullying process (Salmivalli 1999; 2001). Even though bystanders sometimes show the courage to stand up for the victim, which is the case in about 10–20% of the bullying events (Hawkins et al. 2001; Salmivalli et al. 1996), the most common response is to ignore what is going on or even to sympathise with the bully rather than with the victim (Tapper and Boulton 2005). By providing attention and assistance to those who are bullies, bystanders contribute to the problem by inadvertently reinforcing the bully, and the bullying is more likely perpetuated (Jeffrey et al. 2001; Rodkin 2004). The outcome is different when bystanders do intervene: Hawkins et al. (2001) reported that in 57% of all cases the bullying actually stops. This reflects the important role peers are playing in the process of bullying and implies their importance as target group of intervention programmes (Stassen Berger 2007; O'Connell et al. 1999), which according to Espelage et al. (2003) is an often disregarded aspect of aggression prevention efforts.

Peer intervention approach: pedagogical role-play

There is reason to assume that an effective programme targeted at peer intervention has to account for the variety of aspects why bystanders may hesitate to intervene during the aggressive interaction. Following social psychological research these aspects include, i.e. responsibility diffusion (Latané and Darley 1968). A second aspect might be the fear of retaliation (O'Connell et al. 1999): children will not risk becoming the next victim. A third aspect relates to an inappropriate comprehension of the bullying dynamics, and finally the insecurity of what to do to counteract bullying effectively might be another important reason for bystanders' apathy when faced with bullying episodes (Craig et al. 2000; O'Connell et al. 1999). Hazler (1996) concluded that the audience of bullying are those who are recognising what is going on but at the same time are not aware of the importance of their role including the responsibility to take practical actions. Therefore, effective intervention that aims at involving the peer group needs to increase the awareness of one's own role with its individual responsibility and the empathy for the victims, as well as the

understanding of the ongoing bullying process. Moreover, it should provide children with effective strategies to intervene (Frey et al. 2005). Given that bystanders often justify their lack of empathy by blaming the victim (Stassen Berger 2007) encouraging empathy towards the victims therefore seems particularly important.

Empathy is defined by contemporary researchers as a bi-component construct, embracing affective and cognitive aspects. While some researchers include both aspects in their empathy definitions (Davis 1994; Steinmetz and Holz-Ebeling 1995), others emphasise either the one or the other. According to Hogan (1969, p.308) "…empathy means the intellectual or imaginative apprehension of another's condition or state of mind without actually experiencing that person's feelings…" (cognitive empathy), whereas Hoffman (1977, p.169) posits that "…empathy [is] a vicarious affective response to others…" (affective empathy). In the present study, empathy is defined as an observer's understanding of the internal state of a target (cognitive empathy or Theory of Mind; Flavell 2004) as well as the observer's emotional reaction to what he/she perceives as being the internal state of a target (affective empathy).

A method that facilitates understanding and empathy in social interaction is pedagogical role-play (Hollin and Tower 1986; L'Abate and Milan 1985; Van Mets 1991). Role-play provides a safe "as-if" framework for exploring experiences of self and other: taking over the roles of others and acting out their actions provides a first-person experience of the thoughts and feelings that lead to and result from these "other" actions. Role-play thus ultimately helps to modify own behaviour and attitudes in order to better adjust to the challenges of social interaction, because it helps to understand better the thoughts, feelings, and action tendencies of others and how they are tied to our own thoughts, feelings, and actions. The explicit "as-if" mode results from the fact that role-play is introduced and implemented as game-like and "unreal", but offers real social experiences and insights that are transferable to real social interactions. For instance, by focusing on the holistic experience of another person, role-play has proved to be an effective tool in the context of social skills trainings applied in schools and therapeutical settings (Hungerige and Borg-Laufs 2001; Jupp and Griffiths 1990; Wright 2006). However, role-play is a rather time-consuming and staff-intensive pedagogical technique which frequently coincides with a school reality that is driven by curriculum needs. Furthermore—and perhaps more important—it requires groups of pupils that are involved in real-life social situations. This may cause problems because victimised children might be less able to express their suffering and anxieties in front of the whole class, even more so if their perpetrators are present as well. This notion reflects the importance for intervention strategies to differentially acknowledge and tackle the active and passive roles of children involved in the bullying process. An approach which seems to provide the required assets and minimises the aforementioned drawbacks of pedagogical role-play is the use of computer-based simulations of complex social realities.

"FearNot!"intervention

"FearNot!" version 2.0 (Fun with Empathic Agents to Achieve Novel Outcomes in Teaching; Aylett et al. 2005) is a prototype of a virtual simulation designed to mirror a primary school environment, peopled with cartoon-like virtual characters who take on the different bullying roles (bully, victim, bully-assistants, defenders of victims, bystanders). Figure 1 shows a screenshot of the German "FearNot!" version.

In this virtual learning environment, episodes of bullying in which sequences of direct and indirect bullying actions occur between the virtual characters are observed by the

Fig. 1 Screenshot of a bullying episode within FearNot! (German version)

children. In between these episodes, children take over an active part in the ongoing story by counselling the victim regarding coping strategies to handle the repeated bullying. Thus children take over the role of an "invisible friend" to the victimised character and can watch how the story further develops as a result of their advices. As a consequence, the users can affectively engage with what happens and at the same time benefit from the "as-if" mode of the virtual drama, not being involved directly but being able to distance themselves when needed (Hall et al. 2005). Recent pilot studies investigating a one-time use of "FearNot!" could show that the virtual characters are believable and evoke sympathy for the victimised character (Watson et al. 2007; Woods et al. 2003). "FearNot!" consists of male or female bullying episodes (with male episodes including more physical bullying and female episodes more relational bullying), and English and German language versions are available (for more details on the technical framework of "FearNot!" see e.g. Dias and Paiva 2005).

For the present study, "FearNot!" was implemented at primary schools in the UK and Germany. For three consecutive weeks, children of the intervention group worked with "FearNot!" for the duration of 30 min per week. During each session, children interacted individually with the programme and returned to the same computer in order to continue their particular story in subsequent sessions. Class teachers were briefed on the purposes and methodology of the study and were provided with instructions to supervise the interaction sessions. All children first played the episodes matching their own gender. After having completed these episodes they could switch to the other gender scenarios if they liked, with the majority of children using this option. Other publications have presented results of this study which demonstrate that "FearNot!" is a safe intervention in so far as it does not increase bullying as well as that the intervention with "FearNot!" had a short-term effect on escaping victimization for a priori identified victims (for details, see Sapouna et al. 2009). Moreover, within the combined sample of UK and German participants it could be found that in general UK pupils in comparison to German pupils possessed higher coping strategy knowledge when faced with bullying incidences, but German children's coping strategy knowledge improved as a result of the "FearNot!" intervention (for details see Watson et al. 2010).

Taking up the idea that inactive bystanders play an important role in perpetuating the bullying, the present study examines whether "FearNot!" may foster peer intervention by getting bystanders involved through raising their awareness of the bullying problem and

encouraging them to become pro-active when faced with bullying incidences (defenders). To investigate this hypothesised effect on bystanders, the study analysed interaction sequences with "FearNot!" such as coping strategies suggested to the virtual victim, as well as empathic reactions to the victimised character's situation. "FearNot!" is designed to foster empathy with the victimised character and to enhance the understanding of bullying as a complex social phenomenon. Thus, any indication that empathy or Theory of Mind is displayed during the interaction might serve as a sign that the learning goals of "FearNot!" were achieved.

Method

Overall design and participants

The intervention evaluation employed a quasi-experimental, pre/post-test control group design. Due to the technical requirements of the "FearNot!" software, it was not possible to randomly allocate participants to experimental conditions (see Sapouna et al. 2009, for details). Instead, classes were allocated to the intervention group whenever the software ran properly on their school's computers, and allocated to the control group if it did not. This increased the potential for successful implementation of the intervention in classes that received "FearNot!".

Twenty-six "Key Stage 2" (year 5) primary school classes from the UK (Hertfordshire and Warwickshire) and 22 third-grade primary school classes from Germany (Bavaria and Hesse) took part, totalling 1,186 children. These primary schools were recruited by mailing letters describing the study to the school principals, followed up by telephone calls and/or personal visits to present the software and the study design in more detail to the school staff. Schools were suitable to take part if they were state schools, mixed sex, and were not already implementing another particular anti-bullying programme. The study was approved by the Ethical Committees of the University of Warwick and the University of Hertfordshire (UK), and the Bavarian and Hesse Ministry of Education (Germany). Class teachers of eligible classes (children's age 7–11 years) decided if their classes took part in the study. Parents were informed by letters describing the study in detail, and had to give their consent in written form before the study began. Forty-nine children had no parental consent and four children joined the study during or after the intervention period and therefore were excluded from the data set. The remaining sample of N=1,133 included 530 (47%) children in the intervention group and 603 (53%) children in the control group; 642 (57%) pupils from the UK and 491 (43%) from Germany. The sample consisted of 587 (52%) boys and 546 (48%) girls, with an age range between 7 and 11 years (M=8.9; SD=0.7; n=9 missing data). There was a significant age difference between both countries [t(1,122)=30.91; p <0.001]: UK pupils were about 1 year older (M=9.36, SD=0.52) than the pupils from Germany (M=8.35, SD=0.55).

Materials

Class-level measures included the class size (total number of pupils in each class) and a dichotomous measure of class socio-economic status (SES). SES was computed based on teachers' responses to a single item asking the teachers to indicate the percentage of children in their class that were eligible for welfare benefits. Classes with less than 10% of students entitled to welfare benefits were coded as high SES classes.

Children reported on their gender, age, number of siblings and gave information on the family situation (e.g. indicating with whom they lived at home: mother, father, step mother, step father, foster parents) in a standard questionnaire. Socio-demographic information of the pupils was assessed by two questions: following Coie et al. (1982), the "Like Most" assessment was represented by the question "who are your friends in the class", and the question "who do like the least in your class" represented the "Like Least" assessment. Bullying involvement was assessed by four peer nomination items adapted from Wolke et al. (2001) that asked participants to name up to three classmates whom they knew to be victims of bullying, both either direct (children who get hit/beaten up, having things stolen, get threatened/blackmailed, are being called nasty names and having nasty tricks played on them) or relational (children who are being left out of games; are having other children telling them they do not want to be their friends anymore; are having nasty lies or stories told about them) or to bully others, also both either direct (hit other children/beat other children up, steal things, threaten/blackmail others, call nasty names, play nasty tricks on others), or relational (leave others out of games, tell others that they will not be their friends anymore, tell nasty stories or lies about others) in the past month. An additional peer nomination item (adapted from Schäfer and Korn 2004; Salmivalli et al. 1996, respectively) asked the children to name up to six classmates who tell bullies to stop the harassments of others, reflecting an assertive and active form of peer intervention (defender nomination). All questions (questionnaires) were available in German and English, and were back- and forward-translated (van de Vijver and Hambleton 1996) to ensure comparability of the questions between both countries. Pupils were equipped with a list of all pupils in each class to fill in these questions.

Moreover, data from different sources—collected during and directly after the first interaction with "FearNot!"—included:

- Number of Coping Strategies: during the interaction with "FearNot!", pupils engaged as "invisible friends" to the victimised character and tried to help them offering their advice. Pupils provided suggestions of coping strategies as well as justifications for these suggestions by typing in freely via the keyboard which was recorded by the system. The coping strategies were categorised using the 18 categories specified in Table 1.
- Theory of Mind: justifications were categorised regarding children's Theory-of-Mind-related content of statements (0=no signs of ToM; 1=statements that take

Table 1 Coping strategies categories

Coping strategies	
Ignore the bully	Avoid the bully
Start crying	Change yourself
Walk away/run away	Confront the bully assistant
Blame yourself	Make a new friend
Stay off school/feign illness	Tell someone/ask someone for help
Stand up to the bully/tell him to stop	Tell teacher/ask teacher for help
Fight back	Tell parents/ask parents for help
Call the bully names	Tell/Ask bystander/defender for help
Laugh it off	Other

consequences of coping strategies into account; 2=statements that take consequences of coping strategies into account which affect the internal mental state of others).

– Affective Empathy: directly after each interaction with "FearNot!", pupils filled in a form where they rated the affective state of the victimised character as well as their own affective state on five adjectives: anxious, sad, angry, happy, and aggressive on a four-point scale (not at all, somewhat, pretty much, very much). Affective empathy scores were computed from these data transforming the raw scores into binary variables (0=no match; 1=match). Matches of emotions for self and victimised character were summed, yielding an empathy index with a maximum of 5 (matches in all five emotions) and a minimum of 0 (no matches).

Procedure

At three time points (T1, T2, T3) the questionnaire battery was administered on a class by class basis by the authors. Intervention and control groups received two questionnaire administration sessions (T1 and T2) before and after a 3-week period during which the children of the intervention group worked with the "FearNot!" software, whereas the children of the control group continued with their standard school lessons. A further questionnaire administration (T3) was conducted 5 weeks later. As the questions of the bullying involvement at each time point referred to the past four weeks, the administration at T1 (baseline) reflects the 4-week period before the intervention, questions administered at T2 assess bullying involvement during the intervention period, whereas T3 is an assessment of the four weeks after the intervention period.

To provide participants with a common definition of bullying, researchers conducted an educational session at the beginning of the first questionnaire administration (T1) presenting definitions of direct and relational forms of bullying in the intervention and control group, and ensured with a discussion (question and answer) section that the children had a common sense of the study subject.

Statistical analyses

Allocation bias analysis

As schools could not be allocated randomly in the intervention or control group condition, we initially analysed if there were significant differences of core characteristics between pupils (gender, age, living arrangements at home) and classes (class size, socio-economic status) of both groups, respectively. For this purpose, a series of chi-square tests for the categorical variables and *T* tests for the continuous variables were conducted.

Prevalence of bullying involvement at baseline

In a first step of analysis, we examined the bullying involvement at baseline (T1). The two bully nomination items as well as the two victim nomination items correlated strongly (direct and relational victim nomination Cronbach's alpha=0.85; direct and relational bully nomination Cronbach's alpha=0.87). Accordingly, children were categorised as (pure) victim or (pure) bully if they had received nominations at least one standard deviation (SD)

above the class mean nomination score in at least one of each category (see von Marées and Petermann 2008), and at least a 0.5 SD difference between victim versus bully nomination, respectively. *Z* scores were used to account for different class sizes within the sample. We assigned children to the bully/victim (aggressive victim) role if they had received average nominations (at least one SD above the mean nomination within the class) in at least one of the bully peer nomination items (direct or relational) as well as in at least one of the victim peer nomination items (direct or relational), and the difference between both (bully versus victim nomination) was lower than 0.5 SD. Pupils were identified as (pure) defenders if they had their highest nomination score (at least one SD above the class mean nomination value) on the defender nomination item, and at least a 0.5 SD difference between defender nomination score and victim and/or bully nomination score.

To test for differences in overall bullying involvement between the intervention and the control groups, countries, and genders, respectively, chi-square tests were applied.

To examine if the children of the different bullying involvement groups differ with regard to their Social Preferences values we conducted a between-subject ANOVA, using bullying roles as independent and Social Preference as the dependent variable. As suggested by Peery (1979), Social Preference (SP) was determined by subtracting the *z*-like least values from the *z*-like most values ($z\mathrm{LM}-z\mathrm{LL}=\mathrm{SP}$).

"FearNot!" intervention and New Defender status

The two samples—UK and German sample—were analysed separately with regard to their New Defender status during the intervention period (T2) and four weeks after the "FearNot!" intervention (T3). Children were assigned to "New Defender T2" (and/or "New Defender T3")-category, if they had their highest (at least one SD above the mean nomination within the class) *z* score in the defender nomination category, and if that defender nomination *z* score was at least 0.5 SD above the nominations in any other (bully and/or victim) category. To test for differences between the intervention and the control groups, chi-square tests were applied. Furthermore, we fitted a multilevel logistic regression model to test intervention effects on the odds of becoming a New Defender at T2 and T3, while controlling for gender and age. Multilevel models account for the lack of independence introduced by hierarchically nested data (i.e. students nested within classes) by allowing effects to vary randomly across level-2 units (i.e. classes). Hierarchical linear modelling analyses were conducted with HLM 6.0 (Bryk et al. 1996).

New Defender status and Social Preference

To test for differences in Social Preference values between pupils categorised as New Defenders and permanently non-involved children as well as between the genders within the group of New Defenders, *t* tests were applied. Furthermore, to investigate whether popularity of New Defenders increases from T1 to T2 and T3, an analysis of variance (ANOVA, with repeated measurements) with the Social Preference scores at T1, T2 and T3 was conducted including the New Defender and permanently non-involved status, respectively, as between-subject factor.

New Defender status and "FearNot!" interaction "styles"

In order to investigate whether New Defenders and permanently non-involved pupils differed in their interaction with the software application, a between-subject MANOVA

was conducted, with defender status (permanently non-involved children versus New Defenders) and gender as independent variables and four dependent variables that represent the interaction style:

- Number of episodes the pupil has worked through during the FearNot! session;
- Number of coping strategies suggested to the victimised character;
- Affective empathy in the sense of emotional contagion, assessed by match of emotional states ascribed to the victimised character and the self;
- Theory of Mind in the justifications offered for their suggested coping strategies

The first of three interaction sessions was chosen for these analyses, following the assumption that it imposed the most powerful impression on the pupils. Moreover, sample sizes were largest for the first compared to the other interaction sessions.

Results

Allocation bias analysis

The allocation bias analysis indicated that there were no significant baseline differences between the pupils of the intervention and the control group in terms of gender, age or living arrangement (family composition) at home. Moreover, intervention and control classes were similar with respect to size and SES. Table 2 gives an overview of the details.

Table 2 Baseline pupils and class-level characteristics

Experimental condition		
Characteristic[a]	Intervention[b]	Control[b]
Gender,% female[c]	266 (50%)	280 (46%)
Age[c]	8.93 (0.8)	8.91 (0.7)
Family living arrangements		
% living with mother[c]	493 (98%)	543 (97%)
% living with father[c]	389 (77%)	438 (79%)
% living with step-mother[c]	6 (1%)	9 (2%)
% living with step-father[c]	29 (6%)	36 (7%)
% living with foster parents[c]	4 (1%)	8 (1%)
% having siblings[c]	463 (91%)	497 (89%)
Class characteristics		
Class size[c]	23.17 (6.7)	26.17 (3.6)
% High SES[c]	14 (70%)	10 (50%)

SES socio-economic status

Intervention group: $N=530$; control group: $N=603$

[a] Data are mean (SD) or number (%)

[b] Numbers may not sum to sample totals because of missing values

[c] There were no significant differences between the two groups at the.05 level (chi-square test for categorical variables and *t*-test for continuous variables)

Prevalence of bullying involvement at baseline

Overall, the bullying involvement based on the peer nomination data included 279 children (25%, nominated as either [direct or relational] bully, victim or bully–victim) at baseline. More specifically, $n=103$ (9%) children were nominated as bully, $n=134$ (12%) pupils were nominated as victims, and $n=42$ (4%) children were nominated as bully–victims. Analysing the nominations of the sub-sample of both countries separately indicated that $n=64$ UK children (10% of total UK sub-sample, $n=642$) versus $n=39$ German children (8% of total German sub-sample, $n=491$) were named as bullies by their classmates, $n=100$ (16%) children from the UK versus $n=34$ (7%) German pupils were nominated as victims, and $n=39$ (6%) UK pupils versus $n=3$ (1%) children from Germany assigned to the bully–victim category.

There were no significant differences in overall bullying involvement between the intervention and the control groups ($n=127$ versus $n=152$, respectively). There was no significant difference in overall bullying involvement between both genders ($n=123$ girls versus $n=156$ boys) but examining bullying involvement separately by bullying type (direct versus relational versus direct/relational bullying) a significant difference was found: more girls ($n=94$) were nominated to be involved in relational bullying than boys ($n=65$) [χ^2 (1)=8.85, $p<0.01$]; more boys ($n=33$) than girls ($n=9$) were involved in direct bullying [χ^2 (1)=12.51, $p<0.001$] and more boys ($n=58$) than girls ($n=20$) were nominated to be involved in relational as well as in direct bullying [χ^2 (1)=17.06, $p<0.001$]. Furthermore, we found a significant difference in bullying involvement between both sub-samples: significantly more UK pupils ($n=203$) were nominated in either of the bullying categories than German pupils ($n=76$) [χ^2 (1)=39.05, $p<0.001$].

Of the 1,133 children assessed at baseline, $n=84$ were identified as defenders (7.4%). Significant differences were found between defender status and countries as well as between defender status and gender. More UK ($n=59$) than German ($n=25$) pupils were nominated as defenders by their classmates [χ^2 (1)=6.81, $p<0.01$], whereas significantly more girls ($n=52$) than boys ($n=32$) received nominations in this category [χ^2 (1)=8.83, $p=0.01$].

The conducted ANOVA regarding the Social Preference values of the different bullying involvement groups revealed a significant main effect of bullying roles [F (4, 1,128)=38.62, $p<0.001$]. Post hoc analyses (Bonferroni comparisons) showed that defenders were significantly more popular than all other groups (for means and standard deviations see Table 3).

Table 3 Mean and standard deviation of Social Preference per bullying role

Baseline bullying roles	Social Preference (SP)		
	N	Mean	SD
Bully	103	−0.98	2.25
Victim	134	−0.75	1.89
Bully–victim	42	−0.61	1.73
Non-involved children	770	0.20	1.35
Defender	84	1.30	1.25
Summary	1133	0.03	1.63

"FearNot!" intervention and New Defender status

To examine whether "FearNot!" has the potential to foster peer intervention, we conducted further analyses with the baseline sample of non-involved children, focusing on their nomination as New Defender at the second and third assessment time points (T2 & T3). This sample of N=770 (68%) not directly involved children included 369 (48%) pupils in the intervention and 401 (52%) pupils in the control group; of these children, 380 (49%) children came from the UK and 390 (51%) children from Germany. There were 399 (52%) boys and 371 (48%) girls with an age range from 7 to 11 years (M=8.84; SD=0.74). Given the significant differences in age and bullying involvement between the UK and German sub-samples at baseline, we analysed both samples separately with regard to their New Defender status during the intervention period (T2) and four weeks after the "FearNot!" intervention (T3). Table 4 presents the numbers of New Defenders at both time points separately for the UK and German sub-samples.

As Table 4 shows, in the UK sub-sample there were more New Defenders in the control than intervention group at T2 and T3. However, these differences were not significant. Within the German sub-sample, there were more New Defenders in the intervention than in the control group at both assessments (T2 and T3). Also, a significant association between experimental group and New Defender status could be found at T3 [χ^2 (1)=5.079, p<0.05], indicating that within the German sub-sample more children of the intervention than of the control group became New Defenders within the 4-week period after the "FearNot!" intervention. Furthermore, we fitted a multilevel logistic regression model to test intervention effects on the odds of becoming a New Defender at T2 and T3, while controlling for gender and age. Results revealed a marginally significant effect of experimental group membership on New Defender status at T3 (OR, 3.07; CI, 0.87–10.86; p=0.08), indicating that non-involved children in the intervention group tended to be more likely to be classified as New Defenders at T3 compared to non-involved children in the control group.

New Defender status and Social Preference

To test whether Social Preference at baseline is an important determinant factor of the New Defender nomination at T2 and T3, we compared the baseline Social Preference values of the 19 German children (12 girls and 7 boys; age M=8.32; SD=0.48) who were identified as New Defenders at T2 and T3 (ten of those 19 children were nominated as New Defender

Table 4 New defender at T2 & T3 in each experimental group for UK and German sub-sample

	New Defender at T2 Baseline to T2	New Defender at T3 Baseline to T3	New Defender at T3 T2 to T3
Intervention Group	24	28	15
Country	UK:11: GE:13	UK:15; GE:13	UK 9; GE:6
Control Group	21	26	15
Country	UK:15;GE:6	UK:22; GE:4	UK 14; GE:1
Total	45	54	30
Country	UK:26;GE:19	UK:37;GE:17	UK:23,GE:7

UK United Kingdom, *GE* Germany

at both time points) with a randomly chosen group of 19 permanently non-involved children of the German intervention group (n=19; 12 girls and seven boys; age M=8.32; SD=0.48). The New Defenders and controls were matched regarding gender and age. We found a significant group difference [t (36)=4.616, p>0.001] indicating that the children who were identified as New Defenders at T2 and T3 were more popular (M=1.62; SD=1.01) at the baseline assessment than children who stayed non-involved at T2 and T3 (M=0.10; SD=1.03). There was no significant difference in popularity within the group of New Defenders with regard to gender, although the seven boys (M=1.86; SD=1.02) scored slightly higher than the 12 girls (M=1.49; SD=1.02) at baseline. Furthermore, an ANOVA, with repeated measurements to test for increases in popularity of New Defenders from baseline to T2 and T3 showed that there was neither a significant interaction effect of time and status nor a significant within group change of Social Preference over time.

New defender status and "FearNot!" interaction "styles"

After having shown that in the German sample interacting with "FearNot!" increased the number of previously uninvolved pupils that became defenders, and that these New Defenders were more popular than permanently uninvolved pupils, the next step of our analyses was to investigate whether pupils who became defenders during and after the interaction with "FearNot!" differed in their interaction with the software application from those children who remained bystanders throughout the testing period. Thus, we categorised and analysed data assessed during the interaction regarding the number of episodes played, the number of coping strategies suggested, and cognitive and affective empathy. If systematic differences were found between groups, the conclusion that "FearNot!" plays a role in stimulating role change would be strengthened. For the German sample, n=119 pupils aged 7–9 years (M=8.29; SD=0.49) were included in this sub-sample of which complete sets of data existed for the intervention as well as for the bullying status nominations; of these children, 53 were male (45%) and 66 were female (55%). A MANOVA was conducted testing for differences between New Defenders and permanently non-involved pupils (between-subject factor) regarding their qualitative interaction styles with the software (four dependent variables: Number of Episodes; Number of Coping Strategies; Affective Empathy; Theory of Mind). It yielded a significant main effect of Defender Status on Theory of Mind (ToM) represented in the interaction data [F (3, 95)=5.53; p <0.05] showing that New Defenders displayed significantly more ToM in the first interaction session with "FearNot!" than pupils who remained non-involved throughout the study. We also found a significant main effect for gender on the number of coping strategies [F (3, 95)=4.82; p<0.05], indicating that girls suggest less coping strategies, but do work through equally many episodes (insignificant effect of gender on number of episodes).

We furthermore found a significant interaction effect of Gender×Defender Status on emotional contagion [F (3, 95)=15.42; p<0.01], with New Defender girls reporting highest scores of emotional contagion and New Defender boys reporting the lowest scores of emotional contagion (see Fig. 2).

Discussion

The aim of the present study was to investigate the utility of the virtual learning environment "FearNot!" with regard to fostering peer intervention in the framework of

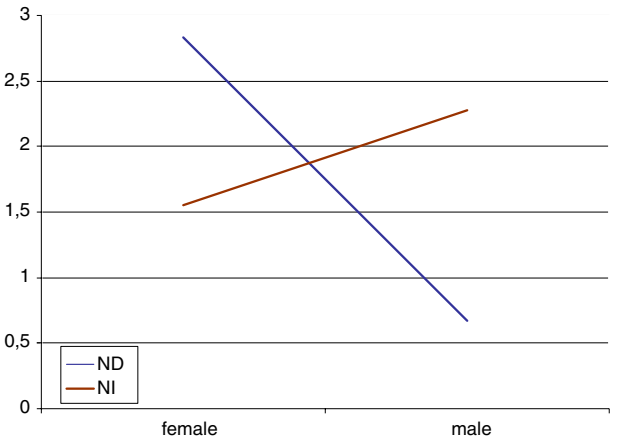

Fig. 2 Interaction of gender and defender status on affective empathy scores (*ND* New defender; *NI* permanently non-involved pupils)

school bullying. For this purpose, we examined (new) defender peer nomination data of non-involved children at two assessment time points, that is, during (T2) and after (T3) a 3-week intervention period with the programme. Data were analysed for a sample of UK and German primary school children. At the baseline assessment (T1), we found common prevalence rates based on bullying roles peer nomination scales for both countries (see, e.g. for Germany: Scheithauer et al. 2006; for the UK: Whitney and Smith 1993; for the UK and Germany: Wolke et al. 2001), with more UK than German children being involved in bullying as either bully and/or victims of direct and relational bullying. The sub-samples also differed with regard to age: pupils from the UK were older than German pupils. Confirming recent findings suggesting that not the overall bullying involvement (e.g. Craig and Pepler 1997; Schuster 1997) but the bullying types vary by gender (e.g. Scheithauer et al. 2006) we found no differences between genders with regard to the overall bullying involvement but more girls than boys were involved in relational bullying whereas more boys than girls were identified as bullies and/or victims of physical bullying.

An examination of baseline nominated defender status revealed that defender status varied by country, gender, and also with respect to Social Preference: more UK than German children and more girls than boys were nominated by their classmates as defenders at baseline. The latter is in accord with previous findings on defender nomination indicating that more girls than boys are nominated as defenders (Salmivalli et al. 1996). Furthermore, in line with prior studies suggesting an association between pro-social behaviour and popularity (Coie et al. 1990), we found that pupils who were nominated as defenders were the most popular children within their classes.

Given these differences between both countries, we further examined both sub-samples separately, and found that within the UK sample of baseline non-involved children there was no significant distinction regarding the New Defender nomination between the intervention and the control group at second and third assessment time points, whereas a significant association between New Defender nomination and experimental group at the third time point could be found for the German sample. A multilevel logistic regression model suggested that at the third assessment point, German participants in the intervention group tended to be more likely than control group participants to be classified as New Defenders. Please note, however, that this finding was just short of being significant. These results indicate that German children who were not directly involved in bullying episodes before but had worked with “FearNot!” counteracted to bullying incidences in

their classes within the 4 weeks period after the intervention, reflecting the potential of "FearNot!" for the German sub-sample to foster peer intervention when facing bullying events.

An analysis of the data collected during and directly after the first interaction with "FearNot!" provided some interesting insights into the differences between non-involved pupils who ultimately became New Defenders and pupils who remained uninvolved in bullying incidents. These results suggest that even though the number of episodes and the number of coping strategies suggested to the victim character did not differ significantly between New Defenders and permanently uninvolved pupils, cognitive empathy was significantly higher for New Defenders as compared to permanently uninvolved pupils. Thus, New Defenders initially showed more readiness to transpose themselves into those involved in a (virtual) bullying incident than other pupils, suggesting that a high initial tendency to take the perspectives of the bullies, the victims, and potential (adult) helpers can lead to augmented responsibility when faced with real-life bullying incidents. This result holds for both genders.

While cognitive empathy was operationalised by the ToM-related justifications provided for cognitive strategy suggestions, affective empathy was operationalised as emotional contagion in the present study. Regarding affective empathy, gender made a difference: New Defender girls showed highest empathy scores, whereas New Defender boys showed lowest empathy scores. This pattern of results indicates that for girls, affective reactions to the plight of the bullied victim might add to their becoming active fighters against bullying, whereas a clear lack of emotional contagion is associated with becoming active fighters against bullying for boys. The cognitive understanding or Theory of Mind regarding the victim's situation is obviously not sufficient to make girls become active defenders, while boys might even be hindered in becoming defenders by too much emotional contagion. The reason for this different associations of emotional contagion—or sympathising with the victim—for boys and girls may imply differences in some aspects of emotional intelligence, e.g. the ability to manage (potentially negative) emotions (Mayer and Salovey 1997), a facet that might prove worthwhile to assess in future studies of the effects of bullying intervention programmes on peer intervention.

Another interesting outcome of the study showed that children who became New Defenders after the intervention were more popular than children who stayed non-involved throughout and afterwards the intervention period. A higher social status could be a kind of precondition with regard to one's successful or notable change from non-involved participant of bullying episodes to an active defender. Therefore, our results support previous notations including that—at least for boys—a good standing within the social group is necessary to successfully intervene in bullying incidences (Salmivalli et al. 1998). We could not find that Social Preference of New Defenders increase throughout the assessments, which may be due to the overall small sample size of New Defenders. However, given the small size of the New Defender group, we did not investigate the role of Social Preference any further but recommend that this issue is taken into account in future studies of peer intervention programmes.

Unexpectedly, "FearNot!" could not unfold its potential within the UK sub-sample. The study of Watson et al. (2010) which examined the educational impact of "FearNot!" regarding the best and worst ways to cope with bullying within the present sample already showed a cultural difference between both sub-samples. The German sample increased their coping strategy knowledge in response to the intervention while the UK sample did not, whereas the UK sample reported more knowledge regarding how to cope with bullying than the German sub-sample all the way through the three assessments. The authors

concluded that this reflects the difference between both countries regarding the awareness of bullying due to higher prevalence in the UK than in Germany (Watson et al. 2010; Wolke et al. 2001). Indeed, in the present study, we found not only differences with regard to bullying involvement of both countries at baseline but also regarding the level of previously applied approaches to handle bullying within the schools. A short interview conducted with the teachers who participated in the study showed that 18 of the 28 schools (16 UK schools and two German schools) follow an anti-bullying school policy; seven UK schools had participated in specific anti-bullying programmes before (e.g. "SEAL—say no to bullying" programme), whereas only one German school did so ("Faustlos" [engl. "second step"]; Cierpka 2001). Perhaps within the UK sample there is some ceiling effect with respect to intervention approaches: the "FearNot!" software—although being an innovative approach with notable potential—might not have provided any dramatically new insights for the UK pupils and therefore did not make a difference in fostering neither peer intervention nor coping strategy knowledge in UK pupils—an interesting assumption future studies will have to investigate.

While the difference in effectiveness between the two countries under investigation is obvious, apparently some limitations of the present study have also to be taken into account when we discuss the previous considerations. First, defender status was measured using only one item that reflects an assertive approach of peer intervention. The picture might change if other forms of defender behaviour, i.e. comforting the victim after a bullying episode, are assessed. Furthermore, the generalisability of the present results is limited due to the fact that schools were not completely randomly assigned to both experimental conditions because of technical requirements. Hence, differences between the intervention and the control group might be attributable to differences that caused the variance in schools' technological equipment, even though this seems rather unlikely. Constraints regarding the intervention itself include the limited interaction time with "FearNot!" (only 3 weeks): a longer period of working with "FearNot!" should have a greater impact, given that other research has shown that long-term anti-bullying interventions achieve greater success (see e.g. Olweus 2004; Smith et al. 2004). Another limitation of the present intervention regards the lack of supplementing materials (e.g. lesson materials to induce reflection, etc.). Effective real-life role-play approaches or other training approaches to foster any social skills commonly include modules that trigger reflection which are considered as necessary ingredients to support learning and transformational achievement (Dewey 1993; Hatton and Smith 1995).

"FearNot!" is—to the best of our knowledge—the first virtual learning environment designed as an anti-bullying intervention in the field and the present study investigates the impact of this novel approach on bystanders by testing the effect of repeated interaction. The results indicate that the programme has potential fostering peer intervention among primary school pupils given the limitations mentioned above. It is left to future studies to provide insight in whether this potential of "FearNot!" also unfolds if other operationalisations of peer intervention are used, or in case "FearNot!" is directly compared to real-life role-play approaches to investigate whether the assumed advantages of virtual role-play can be supported.

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Most relevant publications in the field of Psychology of Education:

Enz, S., Zoll, C., Vannini, N., Lim, M., Schneider, W., Hall, L., Paiva, A., Aylett, R. (2010). ORIENT: The Intercultural Empathy Through Virtual Role-Play. In S. Mukerji & P. Tripathi (Eds.), Cases on Transnational Learning and Technologically Enabled Environments (pp. 65–88). Hershey: IGI Global.

Sapouna, M., Wolke, D., Vannini, N., Watson, S., Woods, S., Schneider, W., Enz, S., Hall, L., Paiva, A., Andre, E., Dautenhahn, K., & Aylett, R. (2009). Virtual learning intervention to reduce bullying victimization in Primary School: a controlled trial. *Journal of Child Psychology & Psychiatry, 51*(1), 104–112.

Ho, W.C., Dautenhahn, K., Lim, M., Enz, S., Zoll, C., & Watson, S. (2009). Towards Learning 'Self' and Emotional Knowledge in Social and Cultural Human-Agent Interactions. International Journal of Agent Technologies and Systems *1*(3), 51–78.

Enz, S., Zoll, C., Vannini, N., Schneider, W., Hall, L., Paiva, A., & Aylett, R. (2008). e-Motional Learning in Primary Schools: FearNot! An Antibullying Intervention Based on Virtual Role-play with Intelligent Synthetic Characters. *Electronic Journal e-Learning, 6*(2), 111–118.

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Current themes of research:

Bullying. Offender rehabilitation and resettlement.

Most relevant publications in the field of Psychology of Education:

Sapouna, M., Wolke, D., Vannini, N., Watson, S., Woods, S., Schneider, W., Enz, S., Hall, L., Paiva, A., Andre, E., Dautenhahn, K. & Aylett, R. (2009). Virtual learning intervention to reduce bullying victimization in primary school: A controlled trial. *Journal of Child Psychology and Psychiatry*, *51*(1), 104–112.

Sapouna, M. (in press). Collective efficacy in the school context: Does it help explain victimisation and bullying among Greek primary and secondary school students? *Journal of Interpersonal Violence.*

Sapouna, M. (2008). Bullying in Greek primary and secondary schools. *School Psychology International*, *29* (2), 199–213.

Dieter Wolke. Professor of Developmental Psychology and Individual Differences, The University of Warwick, Department of Psychology and Health Sciences Research Institute, Coventry CV4 7AL, UK. E-mail: D.Wolke@warwick.ac.uk; Web site: http://www2.warwick.ac.uk/fac/sci/psych/people/academic/dwolke/, http://www2.warwick.ac.uk/?external

Current themes of research:

Development and consequences of childhood bullying and social defeat. Precursors and consequences of early regulatory problems in infancy. Early brain development (natural experiment prematurity) and long-term consequences on cognitive development and psychopathology.

Most relevant publications in the field of Psychology of Education:

Schreier, A., Wolke, D., Thomas, K., Horwood, J., Hollis, C., Gunnell, D., et al. (2009). Prospective Study of Peer Victimization in Childhood and Psychotic Symptoms in a Nonclinical Population at Age 12 Years. *Arch Gen Psychiatry, 66*(5), 527–536.

Wolke, D., Woods, S., & Samara, M. (2009). Who escapes or remains a victim of bullying in primary school? *British Journal of Developmental Psychology, 27*, 835–851.

Johnson, S., Hollis, C., Kochhar, P., Hennessy, E., Wolke, D., & Marlow, N. (2010). Psychiatric Disorders in Extremely Preterm Children: Longitudinal Finding at Age 11 Years in the EPICure Study. *Journal of the American Academy of Child and Adolescent Psychiatry, 49*(5), 453–463.e451.

Wolke, D., Samara, M., Bracewell, M., & Marlow, N. (2008). Specific Language Difficulties and School Achievement in Children Born at 25 Weeks of Gestation or Less. *The Journal of Pediatrics, 152*(2), 256–262.e251.

Wolke, D., Schmid, G., Schreier, A., & Meyer, R. (2009). Crying and Feeding Problems in Infancy and Cognitive Outcome in Preschool Children Born at Risk: A Prospective Population Study. *Journal of Developmental & Behavioral Pediatrics, 30*(3), 226–238.

Scott Watson. Adaptive Systems Research Group, University of Hertfordshire, College Lane, Hatfield, Hertfordshire, AL10 9AB, UK. Web site: http://adapsys.feis.herts.ac.uk/

Most relevant publications in the field of Psychology of Education:

Watson, S., Vannini, N., Woods, S., Dautenhahn, K., Sapouna, M., Enz, S., Schneider, W., Wolke, D., Hall, L., Paiva, A., Andre, E., & Aylett, R. (2010). Inter-cultural differences in response to a computer-based anti-bullying intervention. *Educational Research, 52*(1), 61–80.

Watson, S., Dautenhahn, K., Ho; W.C., & Dawidowicz, R. (2009). Developing relationships between autonomous agents: Promoting pro-social behaviour through virtual learning environments Part I. In G. Trajkovski, & S.G. Collins (Eds.). *Handbook of Research on Agent Based Societies.* Information Reference Science. pp 125–138.

Watson, S., Dautenhahn, K., Ho, W. C., & Dawidowicz, R. (2009). Developing relationships between autonomous agents: Promoting pro-social behaviour through virtual learning environments Part II In G. Trajkovski, & S.G. Collins (Eds.). *Handbook of Research on Agent Based Societies.* Information Reference Science. pp 229–242.

Dr Sarah Woods. School of Psychology, University of Hertfordshire, College Lane, Hatfield, Herts, AL10 9AB, UK. E-mail: s.n.woods@herts.ac.uk; Web site: www.go.herts.ac.uk/psychology

Current themes of research:

Bullying Behaviour. Friendship. Peer Relations. Cyberbullying. Online Relationships & Disclosure. Role-Play & Individual Differences.

Most relevant publications in the field of Psychology of Education:

Woods, S., & Wolke, D. (2004). Direct and relational bullying experiences among primary school children, and academic achievement. *Journal of School Psychology*, *42*(2), 135–155.

Woods, S., & Wolke, D. (2003). Does the content of anti-bullying policies inform us about the prevalence of direct and relational bullying behaviour in primary schools? *Educational Psychology*, *23*(4), 381–401.

Sapouna, M., Wolke, D., Vannini, N., Watson, S., Woods, S., Schneider, W., Enz, S. Hall, L., Paiva, A., Andre, E., Dautenhahn, K., Aylett., R. (2009) Virtual learning intervention to reduce bullying victimization in primary school: A controlled trial. *Journal of Child Psychology & Psychiatry, 51(1),* 104–112.

Wolke, D., Woods, S., Samara, M., (2009). Who escapes or remains a victim of bullying in primary school? *British Journal of Developmental Psychology*, *27,* 835–851.

Prof. Dr. Kerstin Dautenhahn. Adaptive Systems Research Group, School of Computer Science, University of Hertfordshire, College Lane, Hatfield Herts AL10 9AB, United Kingdom. Web site: http://homepages.feis.herts.ac.uk/~comqkd/

Current themes of research:

Human–robot interaction. Social robotics. Assistive technology. Intelligent virtual environments.

Most relevant publications in the field of Psychology of Education:

Watson, S., Vannini, N., Woods, S., Dautenhahn, K., Sapouna, M., Enz, S., Schneider, W., Wolke, D., Hall, L., Paiva, A., Andre, E., & Aylett, R. (2010). Inter-cultural differences in response to a computer-based anti-bullying intervention. *Educational Research, 52*(1), 61–80.

Sapouna, M., Wolke, D., Vannini, N., Watson, S., Woods, S., Schneider, W., Enz, S., Hall, L., Paiva, A., Andre, E., Dautenhahn, K. & Aylett, R. (2009). Virtual learning intervention to reduce bullying victimization in primary school: A controlled trial. *Journal of Child Psychology and Psychiatry*, *51*(1), 104–112.

Woods, S., Hall, L., Dautenhahn, K., & Wolke, D. (2007). Implications of gender differences for the development of animated characters for the study of bullying behavior, *Computers in Human Behavior 23*(1), 770–786.

Robins, B., Dautenhahn, K., & Dubowski, J. (2006). Does appearance matter in the interaction of children with autism with a humanoid robot? *Interaction Studies 7*(3), 509–542.

Dr Lynne Hall. Department of Computing, Engineering and Technology, University of Sunderland, St. Peter's Campus, Sunderland, SR6 0DD, UK. E-mail: lynne.hall@sunderland.ac.uk; Web site: www.sunderland.ac.uk

Current themes of research:

In context evaluation for technology enhanced learning. User experience design and evaluation for low carbon vehicles.

Prof. Dr. Ana Paiva. Associate Professor at IST (Instituto Superior Técnico) and Group Coordinator at INESC-ID (Instituto de Engenharia de Sistemas e Computadores – Investigação e Desenvolvimento em Lisboa), IST Taguspark, Av. Prof. Dr. Cavaco Silva, 2744-016, Porto Salvo, Oeiras, Portugal. E-mail: ana.paiva@inesc-id.pt; Web site: http://www.inesc-id.pt/

Current themes of research:

Artificial Intelligence and Intelligent Agents. Synthetic characters. Affective interactions. Emotion based architectures for intelligent agents.

Most relevant publications in the field of Psychology of Education:

Prada, R., & Paiva, A. (2009). Teaming up humans with autonomous synthetic characters. *Artificial Intelligence,173*, 80–103.

Sapouna, M., Wolke, D., Vannini, N., Watson, S., Woods, S., Schneider, W., Enz, S., Hall, L., Paiva, A., Andre, E., Dautenhahn, K. & Aylett, R. (2009). Virtual learning intervention to reduce bullying victimization in primary school: A controlled trial. *Journal of Child Psychology and Psychiatry*, *51*(1), 104–112.

Paiva, A., Dias, J., Sobral, D., Aylett, R., Woods, S., Hall, L., & Zoll, C. (2005). Learning By Feeling: Evoking Empathy With Synthetic Characters. *Applied Artificial Intelligence, 19*, 235–266.

Prof. Dr. Elisabeth André. Lehrstuhl für Multimedia-Konzepte und Anwendungen, Institut für Informatik, Universitaet Augsburg, Universitaetsstr. 6a, D-86159 Augsburg, Germany. E-mail: andre@informatik.uni-augsburg.de; Web site: http://mm-werkstatt.informatik.uni-augsburg.de

Current themes of research:

Experimental learning environments with animated characters. Computer-based role play. Serious games and edutainment. Intelligent tutoring systems. Affective computing. Interactive multimodal user interfaces. Human-centred multimedia.

Most relevant publications in the field of Psychology of Education:

André, E. (2008). Design and Evaluation of Embodied Conversational Agents for Educational and Advisory Software. In R. Luppicini (ed). *Handbook of Conversation Design for Instructional Applications*. Information Science Reference.

Leichtenstern, K., & André, E. (2009). Studying multi-user settings for pervasive games. In: MobileHCI '09 Proceedings of the 11th International Conference on *Human- Computer Interaction with Mobile Devices and Services*, New York, NY, USA, ACM (2009) 1–10.

Johnson, L., Mayer, R., André, E., & Rehm, M. (2005). Cross-cultural evaluation of politeness in tactics for pedagogical agents. In: Proc. of the 12th Int. Conf. on *Artificial Intelligence in Education (AIED)*.

Sapouna, M., Wolke, D., Vannini, N., Watson, S., Woods, S., Schneider, W., Enz, S., Hall, L., Paiva, A., Andre, E., Dautenhahn, K. & Aylett, R. (2009). Virtual learning intervention to reduce bullying victimization in primary school: A controlled trial. *Journal of Child Psychology and Psychiatry*, *51*(1), 104–112.

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Current themes of research:

Affective agent architectures. Interactive narrative. Human–robot interaction.

Most relevant publications in the field of Psychology of Education:

Aylett, R., Paiva, A., Vannini, N., Enz, S., & Andre, E. (2009). But that was in another country: agents and intercultural empathy. *Proceedings, 8th International conference, AAMAS 2009, vol 1*, 329–336.

Lim, M. Y., & Aylett, R. (2009). An emergent emotion model for an affective mobile guide with attitude, *Applied Artificial Intelligence Journal, 2*, 835–854.

Sapouna, M., Wolke, D., Vannini, N., Watson, S., Woods, S., Schneider, W., Enz, S., Hall, L., Paiva, A., Andre, E., Dautenhahn, K. & Aylett, R. (2009). Virtual learning intervention to reduce bullying victimization in primary school: A controlled trial. *Journal of Child Psychology and Psychiatry*, *51*(1), 104–112.

Prof. Dr. Wolfgang Schneider. Institute of Psychology, Department of Educational Psychology, University of Wuerzburg, Roentgenring 10, D-97070 Wuerzburg. E-mail: schneider@psychologie.uni-wuerzburg.de; Web site: http://www.i4.psychologie.uni-wuerzburg.de/en/

Current themes of research:

Memory Development, Metacognition. Reading Research. Prevention of Developmental Dyslexia. Developmental Dyslexia vs. "Garden Variety Poor Readers". Media Psychology. The Influence of Televsision on the Development of Language and Reading Competence.

Most relevant publications in the field of Psychology of Education:

Schneider, W., Stefanek, J., & Niklas, F. (2009). Development of intelligence and thinking. In W. Schneider & M. Bullock (Eds.), *Human development from early childhood to early adulthood: Evidence from the Munich Longitudinal Study on the Genesis of Individual Competencies (LOGIC)* (pp. 7–34). New York, NY: Psychology.

Schneider, W. (2008). The development of metacognitive knowledge in children and adolescents: Major trends and implications for education. *Mind, Brain, and Education, 2*, 114–121.

Ennemoser, M. & Schneider, W. (2007). Relations of television viewing and reading: Findings from a 4-year longitudinal study.*Journal of Educational Psychology, 99*, 349–368.

Schneider, W., Lockl, K. & Fernandez, O. (2005). Interrelationships among theory of mind, executive control, language development, and working memory in young children: A longitudinal analysis. In W. Schneider, R. Schumann-Hengsteler, & B. Sodian (Eds.), *Young children's cognitive development: Interrelations among executive functioning, working memory, verbal ability, and theory of mind* (pp. 259–284).Hillsdale, NJ: Erlbaum.

Schneider, W., Wolke, D., Schlagmüller, M. & Meyer, R. (2004). Pathways to school achievement in very preterm and full-term children: The Bavarian Longitudinal Study. *European Journal of Psychology in Education, 19,* 385–406.