**A gamified approach to promoting empathy in children**

**Saleme, Pamela, Dietrich, Timo, Pang, Bo and Parkinson, Joy**

**Title of the paper** A Gamified Approach to Promoting Empathy in Children

**Abstract**

**Purpose** – Gamification has gained popularity in social marketing research; however, its application remains limited to a few contexts and relatively little is known about how innovative gamification technologies such as augmented reality can be applied to social marketing programme design. This paper demonstrates the application of gamification to a social marketing pilot programme designed to increase children's empathy and empathic behaviour.

**Design/methodology/approach** – Informed by Social Cognitive Theory, a mixed method research design was adopted using pre and post programme surveys (n=364) to assess effectiveness using paired samples t-test. Qualitative data included observations, participant's questions and a feedback activity at the end of the programme. A thematic analysis was undertaken to examine the data and detect meaningful insights.

**Findings** – Children's affective empathy and empathic behaviour outcomes were improved following the pilot programme. However, no effects were observed for cognitive empathy and social norms. Thematic analysis revealed three themes to further improve the game: 1) developmentally appropriate design, 2) user experience and 3) game design.

**Research limitations/implications** – Findings demonstrated challenges with the application of Social Cognitive Theory (SCT) outlining a disconnect between the design of the gamified programme and theory application.

**Practical implications** – This study provides initial evidence for the application of innovative gamification technologies to increase empathy in children.

**Originality/value** – This paper is the first to examine how a gamified social marketing programme can increase empathy in children.

**Key words** Social marketing, gamification, empathy, children, augmented reality
**Paper Type** Research Paper

## 1. Introduction/ Background

Empathy refers to the reactions of one individual to the observed experiences of the other (Davis, 1983) and has been positively linked to children and adolescents' social attitudes and behaviours (Silke et al., 2017). Higher levels of empathy lead to an increase in prosocial behaviours (e.g. assisting or helping others) of children (Findlay et al., 2006). In contrast, lower levels of empathy have shown to lead to aggressive and bullying behaviours (Jolliffe & Farrington, 2006b; Muñoz et al., 2011) which in turn can affect children and society more broadly (Lovett & Sheffield, 2007). In Australia, two in five people aged over 18, have experienced physical violence since the age of 15 (Australian Bureau of Statistics,

2017). Therefore, empathy training may provide a useful approach for improving prosocial behaviours in children.

Although empathy is linked to several positive and negative social behaviours, empathy has not been comprehensively explored within social marketing. Social marketing's main objective is to develop and integrate marketing concepts with other approaches to social change in order to influence behaviours that benefit individuals and communities for the greater social good (International Social Marketing Association et al., 2013). Social marketing has been applied to a variety of research contexts such as road safety and speeding (Duong & Parker, 2018; Lemarié et al., 2018), healthy eating (Carins et al., 2017), blood donation (Holdershaw et al., 2011), and many more. Social marketing studies have found emotions are an important influence on social behaviours (Parkinson et al., 2018), however, no social marketing research has explored the role of emotions and in particular, empathy, in children.

Gamification can assess empathy (Johnson et al., 2018; Kidd, 2015) and promote empathy in specific scenarios and groups (Belman & Flanagan, 2010; Kors et al., 2016; Ramesh et al., 2018; Tsai & Kaufman, 2009; Vannini et al., 2011). However, the application of gamification to increase empathy in children has not been studied and tested in social marketing and other behaviour change disciplines. While gamification is applied to programme design to increase engagement with social marketing programmes it still remains a recent development (Dietrich et al., 2018; Mitchell et al., 2017; Yam et al., 2017). Further, current research focuses on adult and teenager populations with limited work undertaken with children. Therefore, generating further research on this topic to understand gamification's role and added value to children and its impact on their social behaviour uptake is important (Mulcahy et al., 2015). To address this gap, this study aims to evaluate the ability of a gamified social marketing pilot programme to increase empathy in children and foster empathic behaviour using Social Cognitive Theory (SCT). Thus, this study is guided by the following research question: Can a gamified social marketing programme increase empathy in children and foster empathic behaviour? Applying a quantitative methodology, this study aims to test the fit of three main SCT constructs to explain and evaluate empathic behaviour in children. Additionally, the study collected qualitative data to explore user experience and game design attributes in order to guide future iterations of the gamified programme.

## 1.1. Gamification in social marketing

Gamification is the use of game design and game elements in non-game contexts and uses concepts and research in human-computer interaction and game studies to change behavioural outcomes (Deterding et al., 2011). A meta-analysis showed support for the use of gamification to foster behaviour change across a variety of contexts and disciplines (Hamari et al., 2014). Gamification has the potential to act as a compelling driver for moral or ethical reflection (Heron & Belford, 2014). While existing education

and behaviour change approaches are predominantly didactic and traditional; gamification offers a more engaging approach in classroom settings.

In social marketing, gamification has received increasing application in programmes targeting drinking prevention (Dietrich et al., 2019), energy efficiency (Yam et al., 2017) and physical activity (Mitchell et al., 2017). Yet, the initial evidence base is limited to short-term programme evaluations and few contextual applications. Johnson et al. (2016) systematic review assessed nineteen papers that used gamification for health and wellbeing. Results showed 59% of the studies reported positive effects, while 41% reported mixed or neutral findings (Johnson et al., 2016). Gamification was also applied in the creation of an alcohol programme for 14-16-year-old adolescents in Australia which delivered successful results by increasing alcohol knowledge and changing attitudes for the better (Dietrich et al., 2019; Rundle-Thiele et al., 2015). In the same research project, Mulcahy et al. (2015) tested the relationship between the experiential value created by a gamified alcohol programme and consumer-based brand equity dimensions. Findings showed that the experiential value that the gamified activity provided, could generate awareness, positive image, high perceived quality and loyalty to a behaviour (Mulcahy et al., 2015). Even though social marketing research has provided initial evidence that gamification can motivate individuals to change, future research on the use of gamification, its design and effectiveness is warranted.

### 1.2. Empathy

Empathy refers to the reactions of one individual to the observed experiences of the other (Davis, 1983). Empathy has an affective (being able to experience others' emotions) and a cognitive (being able to understand others' emotions) dimension (Davis, 1983). Importantly for children, the concept of empathy is an essential component of adequate moral development (Jolliffe & Farrington, 2006a) and one of the most crucial personal strengths along with reality testing, intelligence, and creativity, for its preventive potential in preserving emotional health (Greenson, 1960; Hatcher et al., 1994). Empathic individuals perform better in a variety of interpersonal relationships, whether professional, familial or in friendships (Guzzetta, 1976; Hatcher et al., 1994).

Due to empathy's link to positive and negative social behaviours, there is vast research on promoting and evaluating empathy in childhood (Hatcher et al., 1994; Malti et al., 2016; Schonert-Reichl et al., 2011). Nonetheless, most previous research focuses on the identification of factors that predict negative behavioural outcomes, such as aggression, mental illness and bullying, with limited attention given to evaluating and fostering children's prosocial behaviours (Schonert-Reichl et al., 2011). Studies designed to teach empathy have historically used didactic and traditional methods such as skills workshops (Kremer & Dietzen, 1991), parent effectiveness training (Therrien, 1979), self-understanding (Kernberg & Ware, 1975), and combinations of the above methods (Guzzetta, 1976; Stone & Vance, 1976; Uhlemann et al., 1976). Malti et al. (2016) found programmes commencing

earlier in development and targeting higher numbers of empathy-related constructs were partly associated with larger effects. Belman and Flanagan (2010) suggest games are particularly well suited for educational or activist programmes aiming to foster empathy because they allow players to inhabit the roles and perspectives of other people or groups in a uniquely immersive way. Nonetheless, gamification has received limited attention in the development of empathy in children highlighting an important gap in the literature.

### 1.3. Empathy and Gamification

Literature on programmes using principles of gamification to develop empathy are scant. Programmes have predominantly focussed on assessing empathic reactions, but do not aim to develop empathy and foster empathic behaviours. For instance, Johnson et al. (2018) found that users' interactions with an avatar entail affective, i.e. empathic, reactions. Nonetheless, the programme's objective is not to promote empathy and the study does not assess participants' outcome change with regards to empathy. Further, Kidd (2015) investigates how online games encourage and activate affective and empathic encounters in players. However, there is no focus on increasing empathy or evaluating changes in empathic responses over time. Furthermore, Belman and Flanagan (2010) analyse a range of educational and activist game-based programmes created to foster empathy in participants. Interestingly, all games were designed for adults, focused on promoting empathy only towards a specific group/character, were exclusively applied in crisis and conflict scenarios and none report empathy or behaviour measures after playing the game. Nonetheless, in this review, Belman and Flanagan (2010) propose a set of design principles for games to promote empathy that may be useful for this new game category. First, players are more likely to empathise only when they make an intentional effort to do so at the beginning of the game, and practitioners should give players specific recommendations about how their actions can address the issue represented in the game (Belman & Flanagan, 2010). Further, a short burst of emotional empathy has shown to work if the outcomes do not require a shift in the player's beliefs. If shifts in beliefs are required, it is recommended that both affective and cognitive empathy are integrated into the gaming experience (Belman & Flanagan, 2010). Finally, it is important to develop and emphasize points of similarity between the player and the characters with whom they are empathising in the game experience (Belman & Flanagan, 2010).

More recently, empathy games have started using immersive technologies. Kors et al. (2016) seek to promote empathy towards refugees were the participant experiences the journey of a refugee through virtual reality (VR). VR and mixed-reality immersive games, have been used to elicit empathy in players towards different social concerns such as homelessness, mental illness (Dirksen et al., 2019) and in this case, refugees (Kors et al., 2016). Kors et al. (2016) observed characteristics of empathic responding, however, did not assess empathy levels or behavioural intentions after the game. Nonetheless, results of this preliminary research revealed design opportunities for the growing field of immersive

technology games. Taken together, a range of games were found in the literature, but highlight gaps regarding evaluation of effectiveness, contextual focus and diverse target populations.

More specifically, the utilisation of gamification to promote empathy in children is limited. Hainey et al. (2016) systematic literature review of games-based learning in primary education only identified two empathy-related games (Hainey et al., 2016; Tsai & Kaufman, 2009; Vannini et al., 2011). Tsai and Kaufman (2009) investigated the effects of playing with a virtual dog on empathy and human attitudes in Year 4/5 students in Canada. Findings showed empathy and humane attitudes significantly improved at post-test, with females scoring higher. Nonetheless, empathy was measured by Bryant Index of Empathy (Bryant, 1982) which presents limitations and is rarely used. Today most empathy studies utilise the Basic Empathy Scale (Jolliffe & Farrington, 2006a) or the Interpersonal Relativity Index (Davis, 1983). Vannini et al. (2011) tested the effects of an anti-bullying virtual learning strategy that aims to increase coping skills in bullying victims and increase empathy and defence of victims by non-involved bystanders. Results showed that the gamified programme helped non-involved children to become defenders in the German sub-sample, while it had no effects in the UK sub-sample. Further, results showed that "new defenders" after the intervention period showed more cognitive empathy to the virtual victims compared to permanently non-involved bystanders (Vannini et al., 2011). More recently, Ramesh et al. (2018) seeks to help neurotypical children aged 8 to 10 be more empathic with their peers who have autism. However, an empirical evaluation of the impact of the game on empathy measures was not included. Finally, other Australian initiatives have applied gamification principles to tackle social issues involving children such as: Rumble's Quest (Homel et al., 2015), Orbit (Scholes et al., 2014) and The Allen Adventure (Brazier, 2013). Nonetheless, these games do not focus on empathy and are not using more immersive technologies such as virtual reality or augmented reality.

Augmented reality technology (AR) demonstrates potential to enhance learning and teaching (Bower et al., 2014; Wu et al., 2013). AR is a technology that allows computer-generated virtual imagery information to be superimposed onto a live direct or indirect real-world environment in real time (Bower et al., 2014). AR makes information available to students at the exact time and place of need through the capacity to overlay rich media onto the real world for viewing through web-enabled devices such as smartphones and tablets (Bower et al., 2014). Thus, the educational benefits of AR have made it a key emerging technology for education (Wu et al., 2013) and is poised to transform education (Bower et al., 2014). Conversely, AR application in behaviour change research is in its infancy (Dirksen et al., 2019). AR research continues to emerge; however, most examples are preliminary research or have little to no outcome data or rigorous methodology (Dirksen et al., 2019). Consequently, limited research exists assessing whether the use of AR technology, combined with other techniques, can increase empathy in children. The evaluation of this pilot programme will be guided by Social Cognitive Theory (SCT) to assess the value of gamification and AR in the prosocial behaviour context. SCT will be discussed next.

*1.4.* *Social Cognitive Theory*

In order to evaluate the gamified programme's effects on children, this research was underpinned by SCT (Bandura, 1989). SCT is one of the most prominent frameworks adopted for studying health and social behaviours (Lefebvre, 2011; McAuley & Blissmer, 2000). SCT focuses on how people operate cognitively on their social experiences and with how these cognitive operations influence their behaviour and development (Grusec, 1992). These interactions underline the SCT core concept of reciprocal determinism which states that behaviours are determined by, and in turn affect both personal and environmental factors (Brennan et al., 2014). Personal factors (affective and cognitive) include knowledge, expectations and attitudes (Bandura, 1989). Situational or environmental factors include social norms, access in the community, and influence on others and the environment (Bandura, 1989). Behavioural factors include skills, practice and self-efficacy (Bandura, 1989) . Behavioural outcomes are the product of interactions between personal, environmental components and past behaviours (Phipps et al., 2013). More specifically, social norms are important SCT environmental factors (Phipps et al., 2013), defined as socially learned rules that prescribe the type of attitudes, values or behaviours that are appropriate to display in specific situations (Silke et al., 2017). Social norms play a crucial role in the expression of social behaviours, such as stigmatisation and bullying (Silke et al., 2017). More broadly, SCT elements of the social and physical environment, person (feelings, knowledge) and past behaviours link to health-related behaviours (Motl, 2007). These three dimensions of SCT assess the effectiveness of the pilot programme. The three core concepts were selected due to their fit with the explored concept (empathy), audience (children), and context (schools) as explained in more detail in the *Method* section.

## 2. Method

*2.1.* *A Gamified Social Marketing Pilot Programme*

This study is a proof of concept for REMI, a gamified social marketing pilot programme underpinned by an interactive comic book with an augmented reality experience. The basic premise of the AR experience is to build a "pet robot", called a Robotic Empathy Machine Intelligence (www.meetremi.com). REMI's narrative through the interactive comic book provides children with moral choices to select throughout the experience. The decisions made in this interactive comic book affect the physical development of REMI.

The pilot programme was delivered over five days across three private schools in a large Australian metropolitan city. The programme delivery was conducted within one school session (approximately 45 minutes) and took place in a classroom setting. The procedure included a brief introduction describing the activity, the pre-test survey, an interactive comic book activity, an augmented

reality experience, a discussion about the activity, a post-test survey, and a brief feedback session to gather participants' insights.

### 2.2. Data Collection

A mixed method approach provides a comprehensive analysis of the pilot programme (Creswell & Creswell, 2017). The research design was guided by quantitative methodology used to evaluate the effects on the SCT constructs selected. A repeated measure design (Zikmund et al., 2011) analysed how participation in the pilot programme changed participants' empathy, behaviour and social norms before and after participation. Data was collected via online questionnaire at two time points: before (at the start of the 45-minute session) and immediately after programme delivery at schools (at the end of the session). Qualitative methodology was added to explore user experience and game design attributes, to gather insights and feedback to improve future iterations of the gamified programme. Qualitative data was collected through five sets of facilitators' field notes. Researchers and practitioners (game developer and trained teacher) participated in the delivery of the programme and annotated qualitative data in independent facilitator notes after each programme delivery (Saldaña, 2013). Data were collected from three sources: facilitator observations, participants feedback during gameplay and feedback provided in the final class discussion activity of the programme. Feedback focused on participant's likes and dislikes of the current game design, specific questions about the questionnaire and suggestions on how the script and augmented reality component could be improved.

### 2.3. Sample

A non-probability sampling method was used, to recruit three private schools where the pilot programme was delivered: one co-educational and two boys-only schools where students from Year 3, 4, 5, and 6 participated. A total of 389 students were recruited of which 364 completed both surveys and were matched using a unique code.

### 2.4. Measures

The pilot programme focused on increasing empathy and related behaviours. Unlike other concepts examined using SCT (i.e. physical activity), the internal process of empathy was challenging to map using SCT variables, as it implies internal mechanisms and no external outcomes by feeling empathy itself. Moreover, the young age of participants (8 to 12-year-olds), survey fatigue factor (Rolstad et al., 2011), school context and limited time presented a challenge for self-report measurements. Consequently, three dimensions of Social Cognitive Theory were found to be the most appropriate to assess the effectiveness of REMI. Affective empathy (emotion, attitudes) and Cognitive empathy (knowledge) measures were selected as personal SCT factors intrinsic to the desired outcome, using a previously validated empathy scale (Jolliffe & Farrington, 2006a), which assesses both cognitive and

affective empathy using a shortened 5-item Likert-scale for children (Cronbach's alpha = .65) (Bensalah et al., 2016; Salas-Wright et al., 2013). To help children's reading comprehension, the 5-point Likert scale featured smiley faces as per Bensalah et al. (2016) with coordinating colours. Social norms were selected as a crucial SCT environmental construct due to its ability to prescribe attitudes, values and behaviours (Rutland et al., 2005; Silke et al., 2017). Social norms were addressed as general normative beliefs (Bandura, 1989; Salas-Wright et al., 2013). A shortened 8-item General Normative Beliefs subscale (Cronbach's alpha .80) featuring smiley faces (Huesmann & Guerra, 1997), provided children with the opportunity to rate each item on a 4-point Likert scale. Although the programme was a single player experience, it was hypothesised that the classroom environment during play and the final group discussion of the experience may influence social norms. Likewise, SCT's behavioural dimension assessed the intention to engage in empathic behaviour using six vignettes (Silke et al., 2017). This measure was selected to examine the specific empathic behaviours addressed in the game script. The scale to measure the response to the vignettes followed Huesmann and Guerra (1997) proposing different scenarios and questions about related empathic behaviours where children selected if they would or would not choose the behaviour in certain moral situations. Children rated each of the items on a 4-point Likert-like scale ranging from "I definitely would not do it" to "I would definitely do it". Please see Appendix 1 for details of each scale items.

### 2.5. Data Analysis

An inductive reasoning approach was undertaken to analyse quantitative and qualitative data (Saldaña, 2013). Data-driven inductive coding was applied to the survey responses. Data were analysed using paired-samples t-test (SPSS version 25) to assess changes between two time points (before and after programme delivery) (Coakes & Steed, 2000). A thematic analysis was undertaken to examine the qualitative data (Braun & Clarke, 2012).The inductive analysis of field notes was performed following principles of descriptive coding (Nelson et al., 2015) where the researchers read the text independently, note the emergence of key themes and compare across participants (Saldaña, 2013). Eighty percent intercoder reliability was achieved. Pattern coding followed to group themes on the basis of similarity and/or correspondence (Saldaña, 2013). The analysis resulted in three themes: (1) developmentally appropriate design, (2) user experience and (3) game design. These themes provided learnings to improve the gamified programme.

## 3. Results and Discussion
### 3.1. Sample Characteristics

The sample consisted of 85.2% boys and 13.7% girls, where 85% of children were Australian and 15% were born overseas. Most respondents were aged 10 (38.5%) and 11 years (27.7%) followed by 9 years

(19%), 8 years (9.3%) and 12 years (5.5%). Furthermore, 71.7% of students attended a Boys-only school and 28.3% attended a Co-educational school.

### 3.2. *Quantitative Analysis*

This study was guided by the following research question: Can a gamified social marketing programme increase empathy in children and foster empathic behaviour? The findings of the paired sample t-test demonstrate that the use of an interactive comic book combined with an augmented reality experience delivered a gamified social marketing programme that engaged children and delivered meaningful change, increasing affective empathy and empathic behaviour (see Table 1).

[Insert Table 1 here]

The paired sample t-test showed the overall construct measuring empathy increased from pre-survey (*M*=3.9, *SD=0.5*) to post-survey (*M*=4.0, *SD*= 0.7) indicating that children were more empathic than before the programme, $t(363) = -3.061$, $p < 0.01$. The affective empathy subscale improved significantly from pre-survey (*M*=3.7, *SD=0.7*) to post-survey (*M*=3.8, *SD=0.8*), $t(363) = -3.284$, $p < 0.01$. This indicated children increased their ability to experience other's feelings after the programme. Likewise, empathic behaviour improved significantly, from pre-survey (*M*=3.3, *SD=0.4*) to post-survey (*M*=3.4, *SD=0.5*), indicating children increased their empathic behaviour intentions after the programme, $t(361) = -2.913$, $p < 0.01$. In contrast, cognitive empathy and social norms did not change following programme participation. The pilot programme was designed to promote empathy in children but did not feature a specific cognitive empathy nor a social norms content component in the current version of the game. Results are in line with a recent study that evaluates a prosocial game for intimate partner violence prevention in youth, finding positive change in affective empathy and no significant change in cognitive empathy after game exposure (Boduszek et al., 2019). It is also important to consider game design principles for the design of empathy games to better incorporate affective and cognitive empathy elements (Belman & Flanagan, 2010). Empathy games should consider how players with different belief-systems might have contrasting responses to the game and additional game pathways should be created to cater for different user segments (Dietrich et al., 2017). Belman and Flanagan (2010) suggest that fostering affective empathy works well if the desired outcome does not require shifts in the players' beliefs, but if these kinds of shifts are a programme goal, the game should integrate both cognitive and affective empathy (Belman & Flanagan, 2010). In contrast, Boltz and colleagues indicate (2015) that games that effectively promote empathy integrate both affective and cognitive components. Consequently, future iterations of the gamified programme should evaluate the programme aims in order to assess the importance of cognitive and affective empathy and include both components to broaden effectiveness. The majority of evaluations of games that aim to promote empathy or prosocial behaviours present positive results in empathy after exposure, but do not measure affective and cognitive empathy separately (Bachen et al., 2012; Ingram et al., 2019; Tsai & Kaufman, 2009).

Children's behaviour intention became significantly more empathic following programme participation. Other empirical evaluations of prosocial games have assessed behaviour intention in lieu of observing the behaviour. Ingram et al. (2019) examined a bullying prevention gamified programme that aimed to increase positive bystander behaviour in bullying situations (i.e. helping the victim). Results found increased intention to intervene as an active bystander, while examining adolescents' behaviours in sporadic bullying situations would have been very challenging. In the present study, the individual behavioural vignettes showing positive change were the ones featured in the narrative of the game. In contrast, the vignettes that showed negative change were scenarios not featured in the game, indicating that learnings do not necessarily transcend to other prosocial behaviours. Therefore, future programmes should focus assessment on the included behavioural scenarios which themselves should englobe a diverse set of prosocial behaviours to enrich the outcome. Further, results showed no significant change in social norms following programme participation. A potential reason for this is that the programme design aimed to promote empathy in children, and not change existing social norms in their decision-making process. Carefully reassessing the social norms measures for a more suitable SCT environmental construct for this programme, and realistically examining whether the programme itself can influence this construct is important to help achieve environmental change in social norms or other environmental variables affecting empathic behaviour.

### 3.3. Qualitative Analysis

A thematic analysis was undertaken to examine the qualitative data (Braun & Clarke, 2012). The analysis of field notes was performed following principles of descriptive coding (Nelson et al., 2015) where the researchers read the text independently, noted the emergence of key terms and compared across participants (Saldaña, 2013). Eighty percent intercoder reliability was achieved. Pattern coding followed to group themes on the basis of similarity and/or correspondence (Saldaña, 2013). After coding, categorising, and analysing the data, three final themes emerged demonstrating strengths and weaknesses of the pilot programme: 1) developmentally appropriate design 2) user experience, and 3) game design. These themes provided learnings to improve the gamified programme.

First, gamified programmes and evaluation tools should comprehensively assess developmentally appropriate design for the target audience. The programme should re-evaluate the age group to achieve greater engagement and results as well as avoiding age-related limitations such as vocabulary and reading comprehension. Second, user experience insights suggested more interactivity and a dynamicity between the comic book and augmented reality components. Consistent with (Schell, 2008) game elements, the interactive comic book should be divided into shorter dialogues and splitting the augmented reality experience in stages to increase interactivity and maintain participants' engagement. Interactivity is a vital attribute of meaningful gamification which includes the components that engage the players to immerse them in the game experience (Dietrich et al., 2018). Thus,

maintaining high standards on this game attribute to maintain and improve engagement is important. Two main recommendations are: changing the appearance of the robot when moral choices are positive or negative. And adding an "emotional wellness meter" to the robot screen, so participants can see the levels of wellbeing developed according to the moral choices they made throughout the game.

Third, regarding game design, differentiating the appearance and behaviour of the avatar when moral choices are positive in one stage, to different characteristics when moral choices are negative in the next stage. In a classroom setting, this would enable participants to see differences between each-other's avatars and discuss and compare the behaviour and appearance. Likewise, game incentives or rewards added to the game could increase engagement including points, levels, goals and challenge (Hamari et al., 2014). Rewarding target behaviour reinforces behaviour and may increase persuasiveness, thus, are a common strategy to motivate health behaviours (Orji et al., 2014). Game incentives could consist of unlocking new features on every stage finished but remaining unrelated to moral choices taken. The incentives would not then influence the moral choices participants select, keeping the measures independent. The literature suggests extrinsic motivators such as rewards can undermine intrinsic motivations, thus, undermining gamification (Hamari et al., 2014; Orji et al., 2014). Therefore, consumer research should determine suitable game incentives to increase behaviour change without disrupting the intrinsic motivators of the game design.

### 3.4. Implications and Future Research

Digital games for children have been investigated in the literature for their behavioural and psychological effects (Passmore & Holder, 2014). Yet, research has been historically focused on investigating the negative effects of violent video games on children and adolescents (Anderson et al., 2010). The present study contributes to a recent shift in game research and limited body of literature that investigates the positive impact of digital games on players prosocial behaviours (Harrington & O'Connell, 2016). This study assessed a newly developed gamification solution which aimed to positively impact children's empathy and therefore contributes to the scarce available literature on prosocial game research, development and evaluation (Kors et al., 2016; Ramesh et al., 2018). Many prosocial game evaluations have only done basic evaluations focusing on measuring user engagement (Ramesh et al., 2018) and in many cases not even assessing outcome change via a pre and post evaluation (Belman & Flanagan, 2010). This paper evaluates the actual effects on children's empathy, behaviour and social norms and these results are an important contribution to prove that an innovative prosocial game can indeed increase empathy and empathic behaviour in children. Even though affective empathy and empathic behaviour means arguably increased only to a small degree from pre to post test, the effects found are important (Price et al., 2006). This pilot test was measured immediately after programme delivery, with only one exposure to the game. Similarly, to Craig et al. (2016), where the prosocial game was divided in five units (six scenes each) over 10 weeks, delivering the programme in

chapters over a longer period of time may yield further positive results. Moreover, compared to other social marketing programmes that aim to influence behaviours such as physical activity or donating, empathy is a psychological process and can be considered a difficult-to-influence variable (Prentice & Miller, 1992). As Prentice and Miller (1992) explain, the social psychological literature presents several examples of the minimalist approach to demonstrating an important effect and even the modest SCT changes already observed reliably precede behavioural change in other effective programmes (O'Leary-Barrett et al., 2016).

Practically, this study provides evidence for the efficacy of gamified programmes designed to change social behaviours (Dietrich et al., 2018; Johnson et al., 2016). Furthermore, the study demonstrates the utility of innovative programme designs by social marketeers and social change agents. In particular, this research contributes to the scarce literature on immersive technologies such as AR and VR (Dirksen et al., 2019) and their effectiveness on social behaviours. Further, this study pioneers the application and evaluation of novel gamification technologies in the realm of empathy for children. The findings of the pilot trial are promising for use in school settings. The programme changed affective but not cognitive empathy; the next iteration needs to incorporate cognitive empathy components. For instance, through the inclusion of an explanatory gamified activity to understand others' emotions in different scenarios. This could also assist in changing social norms given their influence on behaviour. Additionally, revising the interactive comic book script to incorporate social norms components could also achieve positive change in social norms.

### 3.5. Limitations

There are relevant limitations that require presentation. First, this pilot study was only informed by SCT, which meant that theory was only used to evaluate the programme but did not guide the design of the game. Future iterations should use a theory mapping technique (Eldredge et al., 2016) to ensure that constructs are mapped and as a result included in the actual game. Second, data was collected using convenience sampling due to accessibility and time constraints, thus, limiting external validity and generalisability of results. The study also examines short-term, pre-to-post programme outcomes and future research should consider long-term effects of repeated exposures to the programme over time including its assessment (Creswell & Clark, 2017). In addition, future research should avoid measuring outcomes right after the intervention to mitigate the influence caused by applying the same measures. Additionally, the evaluation did not include a control group nor a randomisation process. Control groups are important to generalise findings and ensure more scientific rigour (Cook & Campbell, 1979). Thus, future versions of this programme should conduct testing via a longitudinal stratified randomised controlled trial (Cook & Campbell, 1979). The sample of the study is limited to one region in Australia and presented gender bias towards male participants. The female group (n=50) only showed significant change in the affective empathy sub-scale meaning results could show the effects on the majority (boys).

Effects on different age groups should be further investigated in a larger study as different outcome effects are likely. Further, the results may need to be adapted to the unique socioeconomic and cultural realities of other population groups to ensure further generalisation of findings. Finally, self-administered surveys in group settings at schools may impact the level of concentration and introduce a degree of social desirability bias (Bryman, 2003).

**Conclusion**

The aim of this pilot study was to test proof of concept for a gamified social marketing programme to promote empathy. This is the first social marketing study that investigates empathy training to children through this innovative approach. The findings demonstrate the use of interactive comic book and augmented reality technologies as valuable social marketing gamification tools to engage the audience and foster meaningful behaviour change in young people.

**Declarations of interest**

None

## 4. References

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., Rothstein, H. R., & Saleem, M. (2010). Violent Video Game Effects on Aggression, Empathy, and Prosocial Behavior in Eastern and Western Countries: A Meta-Analytic Review. *Psychological Bulletin, 136*(2), 151-173. doi:10.1037/a0018251.supp

Australian Bureau of Statistics. (2017). *Personal Safety Survey 2016*. Camberra: ABS Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/mf/4906.0.

Bachen, C. M., Hernández-Ramos, P. F., & Raphael, C. (2012). Simulating REAL LIVES: Promoting global empathy and interest in learning through simulation games. *Simulation & Gaming, 43*(4), 437-460.

Bandura, A. (1989). Social cognitive theory. In R. Vasta (Ed.), *Annals of child development* (Vol. 6. Six Theories of child development, pp. 1-60). Greenwich, CT: JAI Press.

Belman, J., & Flanagan, M. (2010). Designing games to foster empathy. *International Journal of Cognitive Technology, 14*(2), 5-15.

Bensalah, L., Stefaniak, N., Carre, A., & Besche-Richard, C. (2016). The Basic Empathy Scale adapted to French middle childhood: Structure and development of empathy. *Behavior Research Methods, 48*(4), 1410-1420. doi:10.3758/s13428-015-0650-8

Boduszek, D., Debowska, A., Jones, A. D., Ma, M., Smith, D., Willmott, D., Jemmott, E. T., Da Breo, H., & Kirkman, G. (2019). Prosocial video game as an intimate partner violence prevention tool among youth: A randomised controlled trial. *Computers in Human Behavior, 93*, 260-266.

Boltz, L. O., Henriksen, D., & Mishra, P. (2015). Rethinking technology & creativity in the 21st century: Empathy through gaming-perspective taking in a complex world. *TechTrends, 59*(6), 3-8.

Bower, M., Howe, C., McCredie, N., Robinson, A., & Grover, D. (2014). Augmented Reality in education – cases, places and potentials. *Educational Media International, 51*(1), 1-15. doi:10.1080/09523987.2014.889400

Braun, V., & Clarke, V. (2012). Thematic analysis. In H. Cooper (Ed.), *APA handbook of research methods in psychology* (Vol. 2. Research Designs, pp. 57-71): American Psychological Association.

Brazier, A. (2013). The Allen adventure: An app-based approach for social skills development. *Every Child, 19*(4), 36.

Brennan, L., Binney, W., Parker, L., Aleti, T., & Nguyen, D. (2014). *Social marketing and behaviour change: Models, theory and applications*: Edward Elgar Publishing.

Bryant, B. K. (1982). An index of empathy for children and adolescents. *Child Dev, 53*(2), 413-425.

Bryman, A. (2003). *Quantity and quality in social research*: Routledge.

Carins, J. E., Rundle-Thiele, S. R., & Parkinson, J. E. (2017). Delivering healthy food choice: A dual-process model enquiry. *Social Marketing Quarterly, 23*(3), 266-283.

Coakes, S., & Steed, L. (2000). SPSS for Windows: Analysis without anguish (Version 10.0 for Windows): New York: John Wiley.

Cook, T. D., & Campbell, D. T. (1979). The design and conduct of true experiments and quasi-experiments in field settings *Reproduced in part in Research in Organizations: Issues and Controversies*: Goodyear Publishing Company.

Craig, A. B., Brown, E. R., Upright, J., & DeRosier, M. E. (2016). Enhancing children's social emotional functioning through virtual game-based delivery of social skills training. *Journal of Child and Family Studies, 25*(3), 959-968.

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*: Sage publications.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*: Sage publications.

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of personality and social psychology, 44*(1), 113.

Deterding, S., Sicart, M., Nacke, L., O'Hara, K., & Dixon, D. (2011). *Gamification. using game-design elements in non-gaming contexts.* Paper presented at the CHI'11 extended abstracts on human factors in computing systems.

Dietrich, T., Mulcahy, R., & Knox, K. (2018). Gaming attribute preferences in social marketing programmes. *Journal of Social Marketing, 8*(3), 280-296. doi:http://dx.doi.org/10.1108/JSOCM-06-2017-0038

Dietrich, T., Rundle-Thiele, S., & Kubacki, K. (2017). *Segmentation in social marketing*: Springer.

Dietrich, T., Rundle-Thiele, S., Kubacki, K., Durl, J., Gullo, M. J., Arli, D., & Connor, J. P. (2019). Virtual reality in social marketing: a process evaluation. *Marketing Intelligence & Planning*.

Dirksen, J., DiTommaso, D., & Plunkett, C. (2019). *Augmented and virtual reality for behaviour change*: The eLearning Guild.

Duong, H. T., & Parker, L. (2018). Going with the flow: young motorcyclists' misperceived norms and motorcycle speeding behaviour. *Journal of Social Marketing, 8*(3), 314-332.

Eldredge, L. K. B., Markham, C. M., Ruiter, R. A., Fernández, M. E., Kok, G., & Parcel, G. S. (2016). *Planning health promotion programs: an intervention mapping approach*: John Wiley & Sons.

Findlay, L. C., Girardi, A., & Coplan, R. J. (2006). Links between empathy, social behavior, and social understanding in early childhood. *Early Childhood Research Quarterly, 21*(3), 347-359. doi:10.1016/j.ecresq.2006.07.009

Greenson, R., R. (1960). Empathy and its vicissitudes. *International Journal of Psycho-Analysis, 41*, 418-424.

Grusec, J. E. (1992). Social learning theory and developmental psychology: The legacies of Robert Sears and Albert Bandura. *Developmental psychology, 28*(5), 776-786.

Guzzetta, R. A. (1976). Acquisition and transfer of empathy by the parents of early adolescents through structured learning training. *Journal of Counseling Psychology, 23*(5), 449.

Hainey, T., Connolly, T. M., Boyle, E. A., Wilson, A., & Razak, A. (2016). A systematic literature review of games-based learning empirical evidence in primary education. *Computers & Education, 102*(2016), 202-223.

Hamari, J., Koivisto, J., & Sarsa, H. (2014). *Does Gamification Work?-A Literature Review of Empirical Studies on Gamification.* Paper presented at the 47th Hawaii International Conference on System Sciences, Hawaii, USA, January 6-9, 2014.

Harrington, B., & O'Connell, M. (2016). Video games as virtual teachers: Prosocial video game use by children and adolescents from different socioeconomic groups is associated with increased empathy and prosocial behaviour. *Computers in Human Behavior, 63*, 650-658.

Hatcher, S. L., Nadeau, M. S., Walsh, L. K., & Reynolds, M. (1994). The teaching of empathy for high school and college students: Testing Rogerian methods with the Interpersonal Reactivity Index. *Adolescence, 29*(116), 961-974.

Heron, M., & Belford, P. (2014). 'It's only a game'—ethics, empathy and identification in game morality systems. *The Computer Games Journal, 3*(1), 34-53.

Holdershaw, J., Gendall, P., & Wright, M. (2011). Predicting blood donation behaviour: further application of the theory of planned behaviour. *Journal of Social Marketing, 1*(2), 120-132.

Homel, R., Freiberg, K., Branch, S., & Le, H. (2015). Preventing the onset of youth offending: The impact of the Pathways to Prevention Project on child behaviour and wellbeing. *Trends and Issues in Crime and Criminal Justice*(481), 1-10.

Huesmann, L. R., & Guerra, N. G. (1997). Children's normative beliefs about aggression and aggressive behavior. *Journal of personality and social psychology, 72*(2), 408-419.

Ingram, K. M., Espelage, D. L., Merrin, G. J., Valido, A., Heinhorst, J., & Joyce, M. (2019). Evaluation of a virtual reality enhanced bullying prevention curriculum pilot trial. *Journal of adolescence, 71*, 72-83.

International Social Marketing Association, European Social Marketing Association, & Australian Association of Social Marketing. (2013). Consensus Definition of Social Marketing.

Johnson, D., Deterding, S., Kuhn, K. A., Staneva, A., Stoyanov, S., & Hides, L. (2016). Gamification for health and wellbeing: A systematic review of the literature. *Internet Interventions, 6*, 89-106. doi:10.1016/j.invent.2016.10.002

Johnson, E., Hervas, R., Gutierrez Lopez de la Franca, C., Mondejar, T., Ochoa, S. F., & Favela, J. (2018). Assessing empathy and managing emotions through interactions with an affective avatar. *Health Informatics Journal, 24*(2), 1-12. doi:10.1177/1460458216661864

Jolliffe, D., & Farrington, D. P. (2006a). Development and validation of the Basic Empathy Scale. *Journal of adolescence, 29*(4), 589-611.

Jolliffe, D., & Farrington, D. P. (2006b). Examining the relationship between low empathy and bullying. *Aggressive Behavior, 32*(6), 540-550. doi:10.1002/ab.20154

Kernberg, P. F., & Ware, L. M. (1975). Understanding child development through group techniques and play. *Bulletin of the Menninger Clinic, 39*(5), 409.

Kidd, J. (2015). Gaming for Affect: Museum Online Games and the Embrace of Empathy. *Journal of Curatorial Studies, 4*(3), 414-432. doi:10.1386/jcs.4.3.414_1

Kors, M. J., Ferri, G., Van Der Spek, E. D., Ketel, C., & Schouten, B. A. (2016). *A breathtaking journey. On the design of an empathy-arousing mixed-reality game.* Paper presented at the Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play.

Kremer, J. F., & Dietzen, L. L. (1991). Two approaches to teaching accurate empathy to undergraduates: Teacher-intensive and self-directed. *Journal of College Student Development*.

Lefebvre, R. C. (2011). Theories and models in social marketing. In P. N. Bloom & G. T. Gundlach (Eds.), *Handbook of Marketing and Society* (pp. 506-518). Newbury Park, CA: Sage.

Lemarié, L., Chebat, J.-C., & Bellavance, F. (2018). Reckless driving promotion and prevention: priming effects. *Journal of Social Marketing, 8*(2), 220-236.

Lovett, B. J., & Sheffield, R. A. (2007). Affective empathy deficits in aggressive children and adolescents: a critical review. *Clinical Psychology Review, 27*, 1-13. doi:10.1016/j.cpr.2006.03.003

Malti, T., Chaparro, M. P., Zuffiano, A., & Colasante, T. (2016). School-Based Interventions to Promote Empathy-Related Responding in Children and Adolescents: A Developmental Analysis. *Journal of Clinical Child & Adolescent Psychology, 45*(6), 718-731. doi:10.1080/15374416.2015.1121822

McAuley, E., & Blissmer, B. (2000). Self-efficacy determinants and consequences of physical activity. *Exerc Sport Sci Rev, 28*(2), 85-88.

Mitchell, R., Schuster, L., & Drennan, J. (2017). Understanding how gamification influences behaviour in social marketing. *Australasian Marketing Journal (AMJ), 25*(1), 12-19. doi:10.1016/j.ausmj.2016.12.001

Motl, R. W. (2007). Theoretical models for understanding physical activity behavior among children and adolescents-social cognitive theory and self-determination theory. *Journal of Teaching in Physical Education, 26*(4), 350-357.

Mulcahy, R., Russell-Bennett, R., & Rundle-Thiele, S. (2015). Electronic games: can they create value for the moderate drinking brand? *Journal of Social Marketing, 5*(3), 258-278. doi:10.1108/jsocm-06-2014-0043

Muñoz, L. C., Qualter, P., & Padgett, G. (2011). Empathy and Bullying: Exploring the Influence of Callous-Unemotional Traits. *Child Psychiatry & Human Development, 42*(2), 183-196. doi:10.1007/s10578-010-0206-1

Nelson, M. R., Duff, B. R., & Ahn, R. (2015). Visual perceptions of snack packages among preschool children. *Young Consumers, 16*(4), 385-406.

O'Leary-Barrett, M., Castellanos-Ryan, N., Pihl, R. O., & Conrod, P. J. (2016). Mechanisms of personality-targeted intervention effects on adolescent alcohol misuse, internalizing and externalizing symptoms. *Journal of Consulting and Clinical Psychology, 84*(5), 438.

Orji, R., Vassileva, J., & Mandryk, R. L. (2014). Modeling the efficacy of persuasive strategies for different gamer types in serious games for health. *User Modeling and User-Adapted Interaction, 24*(5), 453-498.

Parkinson, J., Russell-Bennett, R., & Previte, J. (2018). Challenging the planned behavior approach in social marketing: emotion and experience matter. *European Journal of Marketing, 52*(3/4), 837-865.

Passmore, H.-A., & Holder, M. D. J. J. o. C. R. (2014). Gaming for good: Video games and enhancing prosocial behavior. *6*(2), 199-224.

Phipps, M., Ozanne, L. K., Luchs, M. G., Subrahmanyan, S., Kapitan, S., Catlin, J. R., Gau, R., Naylor, R. W., Rose, R. L., Simpson, B., & Weaver, T. (2013). Understanding the inherent complexity of sustainable consumption: A social cognitive framework. *Journal of Business Research, 66*(8), 1227-1234. doi:10.1016/j.jbusres.2012.08.016

Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. *Psychological bulletin, 112*(1), 160.

Price, V., Nir, L., & Cappella, J. (2006). Normative and informational influences in online political discussions. *Communication Theory, 16*(1), 47-74.

Ramesh, R., Wang, X., Wolpow, D., Zhu, Y., Zheng, Y., Christel, M., & Stevens, S. (2018). *Prism, a Game to Promote Autism Acceptance Among Elementary School Students.* Paper presented at the Joint International Conference on Serious Games.

Rolstad, S., Adler, J., & Rydén, A. (2011). Response burden and questionnaire length: is shorter better? A review and meta-analysis. *Value in Health, 14*(8), 1101-1108.

Rundle-Thiele, S., Schuster, L., Dietrich, T., Russell-Bennett, R., Drennan, J., Leo, C., & Connor, J. P. (2015). Maintaining or changing a drinking behavior? GOKA's short-term outcomes. *Journal of Business Research, 68*(10), 2155-2163. doi:10.1016/j.jbusres.2015.03.015

Rutland, A., Cameron, L., Milne, A., & McGeorge, P. (2005). Social norms and self-presentation: Children's implicit and explicit intergroup attitudes. *Child Dev, 76*(2), 451-466.

Salas-Wright, C. P., Olate, R., & Vaughn, M. G. (2013). Assessing empathy in Salvadoran high-risk and gang-involved adolescents and young adults: a Spanish validation of the basic empathy scale. *International Journal of Offender Therapy and Comparative Criminology, 57*(11), 1393-1416. doi:10.1177/0306624X12455170

Saldaña, J. (2013). *The coding manual for qualitative researchers*: Sage.

Schell, J. (2008). *The Art of Game Design: A book of lenses.* MA, USA: Elsevier.

Scholes, L., Jones, C., Stieler-Hunt, C., & Rolfe, B. (2014). Serious games for learning: games-based child sexual abuse prevention in schools. *International journal of inclusive education, 18*(9), 934-956.

Schonert-Reichl, K. A., Smith, V., Zaidman-Zait, A., & Hertzman, C. (2011). Promoting Children's Prosocial Behaviors in School: Impact of the "Roots of Empathy" Program on the Social and Emotional Competence of School-Aged Children. *School Mental Health, 4*(1), 1-21. doi:10.1007/s12310-011-9064-7

Silke, C., Swords, L., & Heary, C. (2017). The predictive effect of empathy and social norms on adolescents' implicit and explicit stigma responses. *Psychiatry Research, 257*, 118-125. doi:10.1016/j.psychres.2017.07.033

Stone, G. L., & Vance, A. (1976). Instructions, modeling, and rehearsal: Implications for training. *Journal of Counseling Psychology, 23*(3), 272.

Therrien, M. E. (1979). Evaluating empathy skill training for parents. *Social Work*, 417-419.

Tsai, Y.-F., & Kaufman, D. (2009). The socioemotional effects of a computer-simulated animal on children's empathy and humane attitudes. *Journal of Educational Computing Research, 41*(1), 103-122.

Uhlemann, M. R., Lea, G. W., & Stone, G. L. (1976). Effect of instructions and modeling on trainees low in interpersonal-communication skills. *Journal of Counseling Psychology, 23*(6), 509.

Vannini, N., Enz, S., Sapouna, M., Wolke, D., Watson, S., Woods, S., Dautenhahn, K., Hall, L., Paiva, A., & André, E. (2011). "FearNot!": a computer-based anti-bullying-programme designed to foster peer intervention. *European journal of psychology of education, 26*(1), 21-44.

Wu, H.-K., Lee, S. W.-Y., Chang, H.-Y., & Liang, J.-C. (2013). Current status, opportunities and challenges of augmented reality in education. *Computers & Education, 62*, 41-49. doi:10.1016/j.compedu.2012.10.024

Yam, A., Russell-Bennett, R., Foth, M., & Mulcahy, R. (2017). How Does Serious M-Game Technology Encourage Low-Income Households To Perform Socially Responsible Behaviors? *Psychology & Marketing, 34*(4), 394-409. doi:10.1002/mar.20996

Zikmund, W., Ward, S., Lowe, B., Winzar, H., & Babin, B. (2011). *Marketing Research (2nd Asia-Pacific ed.)*. Melbourne: Cengage Learning.

Table 1 – Paired samples t-test results

| Measures | N | Pre M (SD) | Post M (SD) | p | N. items Likert scale |
|---|---|---|---|---|---|
| *Empathy* | 364 | 3.9 (.5) | 4.0 (.7) | .002* | 5 |
| Affective Empathy | 364 | 3.7 (.7) | 3.8 (.8) | .001* | 5 |
| Cognitive Empathy | 364 | 4.0 (.6) | 4.1 (.7) | .082 | 5 |
| *Social Norms* | 364 | 3.8 (.4) | 3.8 (.4) | .075 | 4 |
| *Behaviour* | 362[1] | 3.3 (.4) | 3.4 (.5) | .004* | 4 |

\* < .01

Appendix 1: Measures and Items

| Items | Empathy Measure | Subscale |
|---|---|---|
| | Strongly Disagree / Disagree/ Neither Agree nor Disagree/ Agree / Strongly Agree | |
| 1 | When I've been with a friend who's sad, I feel sad. | Affective |
| 2 | I generally feel happy when others are happy. | Affective |
| 3 | I often feel the same way as my classmates: happy when they're happy and sad when they're sad. | Affective |
| 4 | When someone feels sad, I can understand them. | Cognitive |
| 5 | I can usually tell when my friends are scared. | Cognitive |
| 6 | I can often understand how people feel even when they don't tell me. | Cognitive |
| 7 | I generally know when people are happy. | Cognitive |

| Items | Social Norms Measure |
|---|---|
| | It's Perfectly OK/ It's Sort of OK/ It's Sort of Wrong/ It's Really Wrong |
| 1 | In general, it is wrong to hit other people. |
| 2 | If you're angry, it is OK to say mean things to other people. |
| 3 | In general, it is OK to yell at others and say bad things. |
| 4 | It's usually OK to push or shove other people around if you're mad. |
| 5 | It is wrong to insult other people. |
| 6 | It is wrong to take it out on others by saying mean things when you're mad. |
| 7 | It is generally wrong to get into physical fights with others. |
| 8 | In general, it is OK to take your anger out on others by using physical force. |

| Items | Behaviour Measure |
|---|---|
| | I Definitely Would Not do it/ I May Not do it/ I May do it/ I Would Definitely do it |
| | A: You are alone at home and you see something interesting fly by your window and you want to go check it out. You promised your mum/dad you would let them know. |
| 1 | Would you have texted or called your mum or dad before leaving the house? |

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[1] Two respondents did not provide answers to the behavioural measure, therefore were removed from data analysis.

| | |
|---|---|
| | B: You just arrived at a friend's house and knocked over a plant pot by accident. It smashed on the floor, but nobody saw you. |
| 2 | Would you go find your friend to tell him/her that you broke the plant pot and clean up the mess you did? |
| | C: Your teacher asked you to bring materials for a class activity. You realised a classmate doesn't have the materials. |
| 3 | Would you share yours with him/her? |
| | D: You are at recess and you notice a classmate crying in a corner. |
| 4 | Would you go and try to help? |
| | E: You are at the park near your house. You were walking around and suddenly notice something laying on the ground. It looks like an injured cat. |
| 5 | Would you touch or carefully poke the animal to see if it is OK? |
| 6 | Would you go and seek help? |

5.