

Preventing unintentional falling injuries in children: The role of implementation intentions in improving parental supervision

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Abstract

A major concern for young families are accidents in and around home that injure their young child. Previous studies have shown that adequate parental supervision might be the most essential tool in preventing unintentional child injuries. Although most parents have the intention to stay with their child in order to prevent injuries, they routinely fail in doing so. It appears that there is a discrepancy between parents intentions and actual behaviour. The present study aims to bridge this gap between intentions and behaviour by testing effects of the self-regulation tool of implementation intentions on parents' engagement in supervising their child. In a field experiment, 47 parents having a toddler were asked to put a poster up on a door, which offered information to prevent falling. Half of the participants formed an implementation intention, focused on staying with their toddler, in addition to the poster. Results showed a decrease in the frequency parents left their toddler alone after implementation intentions were formed. In addition, results indicated that planning one's behaviour, by way of implementation intentions, might break down unwanted routines and replace them with wanted routines.

Introduction

A major concern for young families are accidents in and around home that injure their young child. These so called unintentional injuries pose a serious threat to the health and safety of children in industrialized nations, where unintentional injury is the leading cause of death and hospitalization for children over one year of age. The most common cause of non-fatal injuries are falls from heights, such as a dressing table, sofa or swing (Borse, Gilchrist, Dellinger, Rudd, Ballesteros & Sleet, 2008). For example, in the Netherlands each year more than 15,000 children, between 0-4 years of age have to be treated at a hospital due to falls from heights, which amounts to 48 per cent of all unintentional injuries in children (Goosens, Kloet, Knol, Nijman & Ormel, 2008). Since young children cannot be taught not to fall, the search of a possible solution has to focus on the parents. The present study aims to examine if parental behaviour can be influenced automatically, by using a recently developed self-

regulation tool, namely planning one's behaviour by forming implementation intentions (Gollwitzer, 1993). Specifically, parents are instructed to form implementation intentions aimed at supervising their toddler more adequately.

Previous studies have shown that adequately supervising a child might be the most important approach to injury prevention (Saluja et al., 2004; Rimsza, Schackner, Bowen & Marshall, 2002). Supervision is an active approach to injury prevention and consists out of three dimension: proximity (Touching, within reach, and beyond reach), attention (visual and auditory), and continuity (constant, intermittent, and absent). It is the combination of these three dimensions that define adequate supervision (Sulaja et al., 2004). For example, a caregiver may have his/her full attention on a child playing on the swings, but be too distant to effectively intervene when a dangerous situation arises. Research by Rimsza et al. (2002) showed that approximately 90 per cent of all unintentional injuries involving children can be prevented, with improved parental supervision as most effective injury prevention technique (Morrongiello & Schell, 2009; Morrongiello, Onejko & Littlejohn, 2004). Because of this apparent importance of parental supervision in injury prevention the present study focusses on this active approach and examines if adequate supervision can be stimulated automatically, so that parents do not have to make the conscious decision of adequately supervising their child, whenever they are with their child.

However, although most parents report to understand the importance and have the intention to adequately supervise their child, in reality this often appears to be challenging. For example, a study by Boles and Roberts (2008) showed that parents are easily distracted by common events such as a ringing phone or doorbell, other children asking for attention, or having to get something out of another room. In addition, the research shows that during moments of distraction there is a significant decrease in supervision and the ability to intervene when an accident happens. These findings are in line with studies which show that merely having the intention (i.e. "I intend to reach Z!") is often not enough to reach the focal goal (Gollwitzer & Sheeran, 2006). It appears that this is due to the fact that people have to decide in situ what behaviour they are going to perform, and how they execute it. This flexibility of goal pursuit is a curse when it comes to swiftly acting on one's goals, because people

have to decide how (i.e. when, where, and in what way) to implement their goals (Gollwitzer, 1999). Additionally, people have to consciously shield their goal (supervising their child) through the inhibition of alternative goals (for example, picking up the phone or opening the door), in order to reach their goal (Kruglanski, Shah, Fishbach, Friedman, Chun & Sleeth-Keppler, 2002). Accumulating evidence shows that there is a gap between people's intentions and their subsequent behaviour, giving credence to the proverb that "the road to hell is paved with good intentions" (Sheeran, 2002; Gollwitzer & Sheeran, 2006). Therefore in order to improve parental supervision a self-regulatory tool which overcomes all these obstacles is needed.

A relatively new, but proven to be highly successful self-regulatory tool to help people translate their intentions into actual behaviour, is planning one's behaviour by means of implementation intentions (Gollwitzer, 1993). Implementation intentions are concrete plans, specifying a situational opportunity for reaching a goal, and the behaviour that should be enacted upon encountering that opportunity. Implementation intentions specify the when, where and how of a certain behaviour and typically have a format like "if situation Y arises, I will initiate goal-directed behaviour X!" (Gollwitzer & Brandstätter, 1997). This type of planning is the cognitive self-regulation process of connecting the achievement of a goal to the anticipated environmental context in which the goal should be enacted (Aarts, Dijksterhuis & Midden, 1999), creating a strong cognitive association between a situational cue and the goal-directed behaviour. Thereby passing control of the intended behaviour from the self to the situation, so that this planned behaviour may be triggered and initiated automatically when the specified situation is encountered (Webb & Sheeran, 2007; Aarts, et al., 1999). Importantly, implementation intentions appear to work automatically, and therefore do not alter intentions to act or attitudes towards behaviour (Aarts et al., 1999; Aarts & Dijksterhuis, 2000). The impact of planning behaviour through implementation intentions has been shown across various behaviours, ranging from recycling behaviour (Holland, Aarts & Langendam, 2006) to physical exercise (Sniehotta, Scholz & Schwarzer, 2007). Results found can be impressively strong. For example, one study showed that participants who had formed implementation intentions for

performing breast self-examination performed at a level of 100%, compared to 53% in a control group (Orbell, Hodgkins & Sheeran, 1997).

Present research

The present research aims to investigate if implementation intentions are an effective tool to improve adequate supervision by parents, especially during moments where distractions are imminent. The study will build on previous research to the effectiveness of implementation intentions (e.g. Holland et al., 2006), and use those results to create a simple and low effort intervention to increase adequate supervision. It is hypothesised that for parents in the implementation intention treatment adequate supervision would improve, compared to the control treatment.

In the study, parents were asked to copy and study prearranged implementation intentions concentrated on refraining from the impulse to approach a mundane distraction, such as leaving the child alone to pick up the phone. Parents were encouraged to stay close to their child, because research showed accidents with falling from heights occurred most when parents were too far away to adequately intervene (Morrongiello & Schell, 2009; Morrongiello, Onjeko & Littlejohn, 2004).

The study has been conducted in cooperation with the “Consumer Safety Institute”, a dutch company concerned with health promoting behaviour education. The focus was on parents with a toddler up to 36 months old. After a first measure of supervision behaviour, parents were randomly assigned to either the control- or implementation intention treatment. In the control treatment parents had to put a poster (see figure 1: Fall guide) up on a door and study the poster. The poster is designed by the Dutch Consumer Safety Institute and contains information about preventing falls from heights, for children. The objective of the poster is educating parents about dangers and ways in which danger can be avoided. Parents in the implementation intention treatment had to put the poster up on a door as well, but in addition they had to copy implementation intentions, designed to shield the intention of staying with their child from distractions. These implementation intentions were constructed for five different situations (dresser, sofa, car seat, swing, and stair gate). A week after the manipulation a

second measure of supervision was conducted. Both questionnaires were designed to measure the frequency parents left their child alone, when there was a danger of falls from heights.

Method

Participants and design

Participants were 51 adults at the start of the study. Unfortunately, 4 participants exited the experiment before the second measure. Consequently, 47 adults completed the study ($M = 32.7$ years, $SD = 3.9$; 38 female). The participants had to supervise a toddler up to 36 months old ($M = 14.55$ months, $SD = 8.3$; 19 female). Participants voluntarily participated in the experiment, in return they were entered in a raffle, in which they could win one of 15 gift certificates of €25,-.

The design of the experiment was a 2 (time of measurement: pre-treatment vs. post-treatment) X 2 (treatment: control vs. implementation intention), mixed factorial design. Time of measurement was a within subject variable, and type of treatment a between subject variable.

Procedure

Participants administered online to participate in the experiment. After administration participants received all the necessary materials and instructions at home. The materials consisted of an introduction letter, an instruction letter, the fall guide, and instructions for the correct usage of the fall guide. Participants were then asked to fill out the pre-treatment online questionnaire. This questionnaire contained questions regarding safety situations, the theory of planned behaviour, and demographic information of the participants. After completion of the questionnaire the manipulation was introduced.

A week after the pre-treatment questionnaire and manipulation, participants were reminded (per email) to fill out a second online questionnaire (post-treatment). The questionnaire largely contained the main variables to compare pre- and post-measure of supervision, as a function of treatment. At the end of the questionnaire participants were informed that they could remove the fall guide, if they wanted to.

Experimental treatment

After filling out the first questionnaire the manipulation was introduced. All participants were instructed to put the fall guide (see figure 1) up on a door they regularly encounter inside their house (e.g. the door of the toilet, bedroom, or the hallway). Participants in the control treatment were then instructed to study the fall guide in detail for approximately ten minutes. Participants in the experimental treatment had a different instruction. They had to copy five implementation intentions, all connected to the five situations they were asked about in the questionnaire, onto stickers (dresser, sofa, car seat, swing, and stair gate). After which they had to put the stickers on predetermined places on the fall guide and, as well as the control group, study the fall guide in detail for approximately ten minutes. An example of an implementation intention is: *‘If (name child) is on the couch in the living room and I am being distracted, then I will stay with (name child), or take (name child) with me’*.

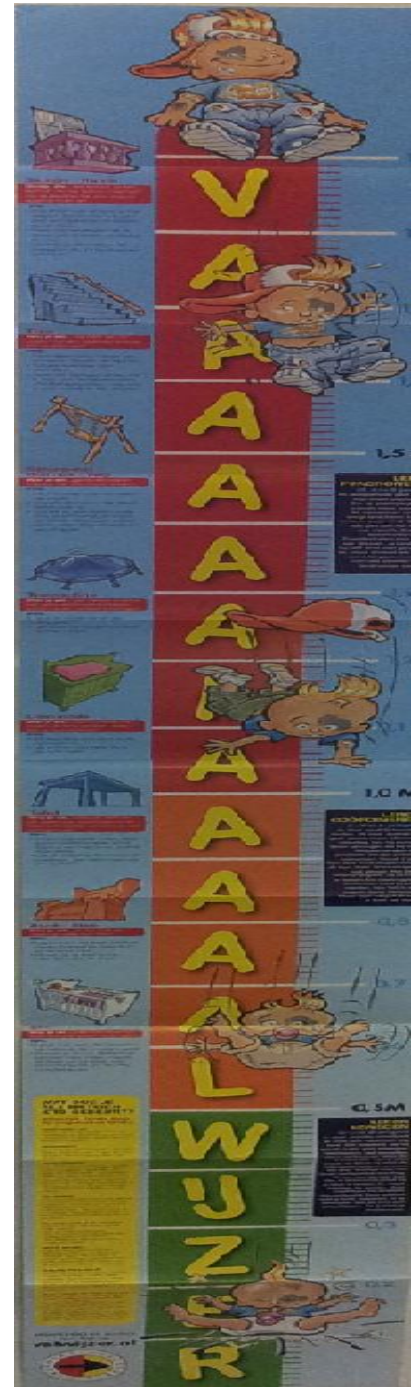


Figure 1. Fall guide, as used in the experiment

Measures

Supervision behaviour: Supervision behaviour was measured using five items about the frequency of supervision behaviour. For each of the five situations one question was asked, for example: ‘Have you left your child alone on the couch in the past week?’. For these questions a 7-point answer scale was used: never (0), one time (1), two times (2), three times(3), four times (4), five times(5), six times or

more (6). For analysis of behaviour the scores of the five situation were averaged, in pre- and post-treatment measurements, with a test- re-test correlation of $r = .713, p < .01$.

Theory of planned behaviour variables

In line with earlier research we wanted to check if the obtained results were not due to changes in participants' intention to supervise (Aarts & Dijksterhuis, 2000; Aarts et al., 1999). For that reason we used the variables of the 'theory of planned behaviour' (intention, attitude, social norms, and perceived behaviour control; Ajzen, 1991) to check for the assumption that implementation intentions do not alter any of the theory of planned behaviour variables.

Intention: Intention was measured using a single question (i.e. Do you intend to stay with your child in situations where you are distracted or have to leave?), with a 7-point likert answer scale. Intention had a significant test- re-test correlation, $r = .830, p < .01$.

Attitudes: Attitudes on child safety and supervision were measured using three semantic scales with a 7-point likert-scale (i.e. Staying with my child in situations where I am distracted or have to leave is: unnecessary/necessary, unimportant/important, bad/good). Attitude scores had a significant test- re-test correlation, $r = .773, p < .01$.

Social norms: Social norms were split up into descriptive- and injunctive norms. Descriptive norms involve perceptions of which behaviours are typically performed, and injunctive norms involve perceptions of which behaviours are usually approved or disapproved (Cialdini, 2003). Both concepts were assessed using one question with a 7-point Likert scale (i.e. descriptive norm: The majority of people stay with their child in situations where they are distracted or have to leave; Injunctive norm: Do people, who are important to you, find it important to stay with your child in situations where you are distracted or have to leave?). The scores on descriptive norms had a significant test- re-test correlation, $r = .615, p < .01$. A significant test- re-test correlation was found for injunctive norms as well, $r = .777, p < .01$.

Perceived behaviour control: Perceived behaviour control (PBC) is the perception of the ease or difficulty to perform a behaviour. This was measured using two items with a 7-point likert scale

(i.e. I find it difficult to stay with my child at moments when I am distracted or have to leave; How easy/difficult is it for you to stay with your child in situations where you are distracted or have to leave?). A significant test-re-test correlation was found for perceived behaviour control, $r = .686, p < .01$.

Specificity of effects

Besides questions about the frequency of the five child-relevant situations, questions about the frequency of four additional situations were asked. These questions were asked to check for specificity of the effects of implementation intention. The four situations were: cooking food, cleaning the house, gardening, and having visitors over. The same 7-point answer scale, as with the child-relevant situations, was used to measure the frequency of behaviour.

Demographic data/child characteristics

Demographic data were obtained in the pre-treatment measure. The data of relevance to the study were: *Highest completed education, country of birth, marital status and type of home.*

Lastly, at the end of the pre-treatment measure, questions were asked about several *child characteristics*, such as age, gender, and active behaviour patterns. ‘Active behaviour patterns’ was included in the questionnaire because previous research by Schwebel et al. (2004) suggests that parents’ perception of their child’s active behaviour patterns plays an important role in the occurrence of unintentional injury and the intention of parents to supervise their child closely. Active behaviour patterns was measured using one question with a 7-point Likert scale, ranging from *not at all*, to *very much so* (i.e. How active do you think your child is?).

Results

Social economic status

Several different group features were analysed to examine potential differences on background variables, between the control and experimental treatment. No significant differences were found on the variables: *age parent* ($M = 32.7$ years, $SD = 3.9$), $t(45) = .085, ns$; *age of child* ($M = 14.55$ months, $SD = 8.32$), $t(45) = 1.539, ns$; *number of children* ($M = 1.55$, $SD = .717$), $t(45) = 1.539, ns$; *gender*

parent (38 female, 9 male), $\chi^2(1, N = 47) = 3.179, ns$; gender child (19 female, 28 male), $\chi^2(1, N = 47) = .031, ns$; highest completed education, $\chi^2(3, N = 47) = 5.077, ns$; country of birth, $\chi^2(2, N = 47) = 2.002, ns$; marital status, $\chi^2(2, N = 47) = .535, ns$; type of home, $\chi^2(2, N = 47) = .673, ns$.

Testing effects of implementation intentions on supervision behaviour

Participants' self-reported frequency of supervision behaviour was subjected to a 2 (treatment) x 2 (time) General linear model repeated measures (GLM). For the analysis, average scores of the five child relevant situations (dresser, sofa, car seat, sing, and stair gate) were used. Additionally, the reported 'active behaviour pattern' scores of children were used as a covariate.

The GLM analysis revealed no significant main effect for type of treatment, $F(1,44) = .184, ns$, or time of measure, $F(1,44) = 3.237, ns$. In line with our hypothesis, an interaction effect was found between time and treatment, $F(1,44) = 4.453, p < .05$. Contrast analysis (testing differences between pre- and post-treatment) for each type of treatment showed a significant decrease in frequency of distractions for the implementation intention treatment, $F(1,44) = 7.418, p < .01$, yet no significant decrease for participants in the control treatment was found, $F(1,44) = .155, ns$.

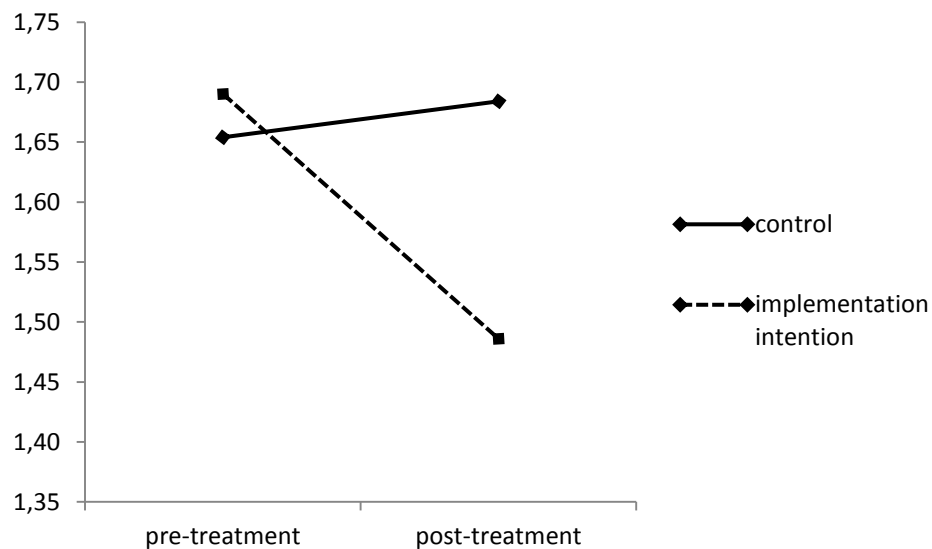


Figure 2: mean scores for participants' self-reported behaviour per time and treatment

Examining potential effects of implementation intentions on concepts of the theory of planned behaviour

In line with previous studies of implementation intentions (Gollwitzer & Sheeran, 2006), we tested if the formation of implementation intentions did not alter participants' intention to perform the specified behaviour. To test this, the variables of the theory of planned behaviour (intention, attitude, social norms, perceived behaviour control; Ajzen, 1991), were measured in both the pre-treatment and post-treatment questionnaire. The variables of the theory of planned behaviour were analysed using a General linear model repeated measures, to test if the manipulation had changed parents intentions, attitudes, social norms or perceived behaviour control with regard to staying with their child during moments of distraction.

Intention: As expected, no significant main effect of either time or treatment on parental intention to stay with a child during moments of distractions was found, as well as a non-significant interaction effect between time and treatment: Time, $F(1,44) = 3.355$, *ns*; treatment, $F(1,44) = .971$, *ns*; timeXtreatment, $F(1,44) = 1.101$, *ns*.

Attitudes: Time or treatment did not affect attitude on child supervision behaviour, nor did it affect the interaction between the two: Time, $F(1,44) = 1.479$, *ns*; treatment, $F(1,44) = .823$, *ns*; timeXtreatment, $F(1,44) = 1.598$, *ns*.

Social norms: Scores on both injunctive and descriptive norms were not affected by the experiment. Descriptive social norms: Time, $F(1,44) = 4.281$, *ns*; treatment, $F(1,44) = .122$, *ns*; time*treatment, $F(1,44) = .314$, *ns*. Injunctive social norms: Time, $F(1,44) = 4.605$, *ns*; treatment, $F(1,44) = .188$, *ns*; timeXtreatment, $F(1,44) = 3.655$, *ns*.

Perceived behaviour control: Perceived behaviour control was not affected by time or type of treatment: Time, $F(1,44) = .040$, *ns*; treatment, $F(1,44) = 1.041$, *ns*; timeXtreatment, $F(1,44) = 3.492$, *ns*.

For the sake of clarity, the overall means and standard deviations of the variables of the theory of planned behaviour per time of measurement are depicted in table 1.

Table 1. Overall mean scores (standard deviations) of the theory of planned behaviour variables, per time of measurement.

Variable	time of measurement	
	pre-treatment	post-treatment
Intention	5.68 (1.181)	5.47 (1.396)
Attitude	5.85 (1.101)	5.73 (1.028)
Social norms (descriptive)	4.43 (1.485)	4.79 (1.366)
Social norms (injunctive)	5.47 (1.600)	5.09 (1.572)
perceived behaviour control	5.13 (1.207)	5.09 (1.373)

Specificity of effects

So far, our results suggest that that implementation intentions are effective in changing unwanted behaviour. However, the next question is if the effects are specific to the five situations for which the implementation intentions were formed. Therefore, we tested the frequency of behaviour for four situations irrelevant to irrelevant to child safety. To test this, a general linear model repeated measures was conducted, with active behaviour patterns of the child as a covariate.

A significant difference was found for the *kitchen* variable on time of measure, $F(1,44) 5.435$, $p < .05$, but not for treatment, $F(1,44) = .903$, *ns*, or the interaction between time and treatment, $F(1,44) = .126$, *ns*. The overall mean for the pre-treatment measurement is 3.11 (SD = 2.035), and for the post-treatment measurement an overall mean was found of 2.64 (SD = 1.823).

No significant differences were found on any of the other three variables. *Cleaning*: Time, $F(1,44) = 1.290$, *ns*; treatment, $F(1,44) = 1.917$, *ns*; timeXtreatment, $F(1,44) = .167$, *ns*; *Gardening*: Time, $F(1,44) = .795$, *ns*; treatment, $F(1,44) = .380$, *ns*; timeXtreatment, $F(1,44) = 3.307$, *ns*; and *Visitors*: Time, $F(1,44) = .637$, *ns*; treatment, $F(1,44) = .854$, *ns*; timeXtreatment, $F(1,44) = 1.136$, *ns*.

Correlations between past behaviour and future behaviour

Lastly, we examined the influence of frequency of past behaviour on future behaviour, as a function of implementation intentions. Previous research by Holland et al. (2006) suggests that conscious planning of behaviour, by way of implementation intentions, is an effective self-regulation tool that can break old habitual behaviour. In the present study this idea was tested by analysing the

correlations between pre-treatment and post-treatment self-reported behaviour, controlled for by 'active behaviour patterns' score. Significant correlations were found for both treatments between the two measures: control treatment, $r(22) = .947, p < .01$, and the implementation intention treatment, $r(23) = .778, p < .01$. Further analysis, using a Fisher's z-transformation, showed a significant difference between the correlations, with a $z = 2.582, p < .01$. These results indicate that implementation intentions were capable of reducing the influence of past behaviour on future behaviour, thereby demonstrating that habits were 'partially' broken.

Discussion

In line with previous studies (Gollwitzer & Sheeran, 2006), the present study revealed new evidence that conscious planning of behaviour, by way of implementation intentions can stimulate positive behaviour. Prior to the treatment, parents routinely left their child alone, when there was a chance that the child could fall from heights. However, after planning where, when and how, parents would adequately supervise their child, supervision improved and parents left their child alone less often.

Additionally, results show that the effects of implementation intentions occur without interference of any of the variables of the theory of planned behaviour (Ajzen, 1991). After treatment the scores on these variables did not differ from before the treatment, indicating that the effects of implementation intentions are not due to heightened intentions to perform the wanted behaviour, or changes in attitudes, social norms or perceived behaviour control. Furthermore, the correlation between previous behaviour and behaviour after one week was reduced in the implementation intention treatment. Suggesting that, in line with research by Holland et al. (2006), the conscious planning of behaviour is an effective method to (partially) break routines.

Importantly, the present research suggests that merely putting the fall guide up on a door and studying the tips and tricks on it is insufficient to generate a change in parents' behaviour. It shows that simply having the intention to perform a certain behaviour is not a guaranty that the expected behaviour is executed. Therefore, the study illustrates the utmost importance of approaching the theme

of unintentional injury prevention in an evidence based manner. As our results show, the simple addition of a scientifically explored method, for example implementation intentions, is essential to instigate behaviour change.

An interesting approach for future research, on unintentional injury prevention, would be to focus on an alternative approach to child safety. Although the present study focusses on the 'active'(behavioural) approach to child safety, throughout the history of injury prevention many researchers and clinicians have advocated for a 'passive' approach as being the most effective in child injury prevention (Sulaja et al., 2004). An example of a passive approach is the installation of safety devices in the house, such as a stair gate fence or a window safety mechanism. Future research to child safety could focus on combining the approaches, by usage of implementation intentions. Many safety behaviours are a combination of both passive and active approaches. For example, a stair gate fence can be bought and installed (passive), if parents do not use the fence correctly (active), child safety will not be improved. Hence, future research could focus on combining the passive (e.g. buying a product, correct installation), and active approach (e.g. closing the stair gate fence when you use the stairs), in order to improve child safety in and around the house.

Another interesting point which is raised by the present research, concerns the relative controlled context in which the study was conducted. Parents received a detailed instruction about what they had to do. Additionally, results showed that all parents were highly motivated to cooperate in the experiment, in order to prevent falls from heights. The important question which is raised, is in what way implementation intentions can be implemented into a more natural environment/health behaviour campaign, where parents do not get detailed instructions. Therefore, additional research is needed to test the suitability of implementation intentions in unintentional injury prevention campaigns.

All in all, unintentional falling of children is something which still happens to much. One of the reasons is because young children cannot be influenced and taught not to fall. Parents on the other hand can be influenced. Therefore the present study took up the challenge to test in a field experiment,

if parental supervision could be improved using the method of implementation intentions. The initial results indicate that implementation intentions are an effective method for behaviour change in parents. However, additional research is needed to test more interventions in the domain of adequate supervision and its suitability in injury prevention.

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