Appetite 140 (2019) 159–168

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

What helps children resist distracting marketing stimuli? Implementation intentions and restrictions alter food choice

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ARTICLE INFO

Keywords:
Delay of gratification
Implementation intentions
Children
Food choices

ABSTRACT

This study analyzes the impact of *implementation intentions* as well as *restrictions* on the *delay of gratification* in children. We assume that both strategies impact the decision process of children in different ways: While implementation intentions activate the mental representation of specified cues that help pursuing a goal, restrictions support goal attainment because of the threatened consequence. The results of two studies support these assumptions. A correlation between the physiological arousal and the success in the delay task indicates that for children that follow implementation intentions arousal provides motivation to wait for a greater gratification. These results provide possible explanations for the heterogeneous outcomes of existing studies about the effects of parenting practices.

1. Introduction

Consumers are confronted with highly attractive marketing stimuli and tempting products on a daily basis: for example, when passing an ice cream store, when walking past the candy shelf during a shopping trip or when coming across a snack bar with fresh and appetizingly prepared food. For many consumers, it is difficult to resist such tempting offers (Belk, Ger, & Askegaard, 2003). In fact, most shoppers' mental budgets for their shopping trips already include room to make such unplanned purchases (Stilley, Inman, & Wakefield, 2010).

Past research has shown, however, that not everyone is equally susceptible to impulse buying (Kaufman-Scarborough & Cohen, 2004). Consumers with high self-control and appropriate self-regulation strategies are less prone to buy impulsively than consumers with low self-control and inappropriate self-regulation strategies (Youn & Faber, 2000).

Clearly, one specific consumer group is especially vulnerable: children. Because self-control abilities evolve with age, young children and adolescents do not have the same level of self-control as adults (Fujita, 2011), and they prefer direct rewards over delayed gratification. Parents often experience their children's low self-control during shopping trips, during which it is not uncommon for children to encounter products that create powerful stimuli. Some children therefore systematically try to convince their parents to buy the products – or they simply place the products in the basket (Calderon et al., 2017; Schuhen, Mau, Schramm-Klein, & Hartig, 2017).

An explanation for this behavior is that attractive stimuli lead to higher arousal, which in turn is likely to result in a higher purchase impulse. While one can also observe this behavior in adults (Fedorikhin & Patrick, 2010), children in particular lack the ability to control these impulses, which makes them more vulnerable to possible negative consequences of in-store promotion tools (Wieber, von Suchodoletz, Heikamp, Trommsdorff, & Gollwitzer, 2011).

This vulnerability raises the question of how children can be supported in resisting the impulse to satisfy their needs *immediately* and – in the context of our study – to resist tempting marketing stimuli. Past research has shown that *implementation intentions* might be helpful for children in this regard (Peter M Gollwitzer, 1999). Implementation intentions are "if-then-plans," which "create a mental link between a selected cue or situation and a goal-directed response" (Achtziger, Gollwitzer, & Sheeran, 2008). This link leads to children automatically activating their overarching goals when faced with temptations (Peter M. Gollwitzer & Sheeran, 2009). Thus, the pursuit of the goal is automatically protected against distractions over which the child lacks cognitive control (Kopetz, Kruglanski, Arens, Etkin, & Johnson, 2012). In particular, younger children with a limited capacity to utilize complex cognitive strategies benefit from this approach (Wieber et al., 2011). In research focusing on various fields of behavior, it has been shown that implementation intentions lead to better goal attainment and might help to foster habit and behavior modification, such as in

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https://doi.org/10.1016/j.appet.2019.05.016
Received 31 August 2018; Received in revised form 8 April 2019; Accepted 13 May 2019
Available online 16 May 2019
0195-6663/

health-related and academic or prosocial behavior (Fennis, Adriaanse, Stroebe, & Pol, 2011; Peter M.; Gollwitzer & Sheeran, 2009). Moreover, studies demonstrate that children also benefit from the automatic protection of the pursuit of the goal (Gawrilow, Gollwitzer, & Oettingen, 2011).

In everyday life, however, most parents do not have the time or knowledge to practice implementation intentions with their children. Furthermore, implementation intentions are specific to each individual situation (Peter M Gollwitzer, 1999): If, for example, a child forms an implementation intention to choose an apple over a chocolate bar, it is likely that this if-then-plan would not have an impact if the same child had the choice between a peach and a scoop of ice cream. Hence, in everyday life, parents often use *restrictions* as a parenting practice to enforce a desired behavior or to support children in the pursuit of their goals: Gubbels et al. (2009) found that more than 44% of parents of 2-year-old children use restrictions to keep their children from exhibiting certain behaviors. In other words, they simply forbid their children from behaving in a certain way or ask them to wait until the shopping trip is over. Particularly as far as nutritional behavior is concerned, the state of research presents a heterogeneous picture: While some studies, for example, point to the fact that restrictions can lead to improved nutrition in children (De Bruijn, Kremers, De Vries, Van Mechelen, & Brug, 2007), other studies find a paradoxical effect: In these studies, children show the prohibited behavior even more frequently (Liem, Mars, & De Graaf, 2004).

Despite the significance of this topic, there are – so far – very few studies exploring the effects of restrictions and implementation in consumer research; above all, thus far, no study has yet analyzed which strategy is superior in helping children resist attractive stimuli. Given the heterogeneity of the results, an investigation of the underlying processes seems to be especially useful (Kopetz et al., 2012).

Therefore, we analyze the influence of restrictions and implementation intentions on children's self-control and consumption decisions. We assume that implementation intentions impact the decision-making process *before* an individual is confronted with the stimulus and support children's self-control. By contrast, restriction impacts the decision-making process after an individual is confronted with the stimulus. To test these assumptions and to gain insights into the process of how implementation intentions and restrictions affect children's decisions, we conducted an experiment and a quasi-experiment with children between 6 and 8 years of age. In the first experiment, we used a modified version of the delay-of-gratification task. In this way, we received support for the assumed process and the effect of restrictions and implementation intentions on children's self-control. The following quasi-experiment verifies these results by means of a test in a real situation and with an actual purchase decision. In the first study, we also measured *skin conductance* as an indicator for physiological arousal (Groeppel-Klein, 2005; Shiv & Yoon, 2012).

2. Implementation intentions and restrictions as strategies to support self-regulation

During the purchase, the children are confronted by attractive stimuli that are supposed to encourage them to perform a purchase act. Such stimuli can be provoked by specifically child-oriented package designs (Nelson, Duff, & Ahn, 2015), for example. The stimuli can also be triggered by products that are directly aimed at the desires of the children (Cook, 2009; Honeyman, 2010). In earlier studies, it became evident that these impulses can lead to the abortion of the underlying objective. The children therefore follow these impulses by convincing their parents to buy the products – or they simply place the products in the basket (Calderon et al., 2017).

How can we support children in resisting a stimulus to action triggered by attractive stimuli? The dual process models and the reflective-impulsive model of Strack and Deutsch (2006) offer a theoretical framework that can be used to answer this question.

Dual process models assume that when confronted with an attractive stimulus, children react in two ways: A fast emotional response competes with a deferred cognitive elaboration of the presented information (Hubert, Hubert, Florack, Linzmajer, & Kenning, 2013; Metcalfe & Mischel, 1999). Consequently, the first reaction to an attractive stimulus is an emotional response associated with an approach tendency towards the attractive stimulus. At the same time, children may also have the goal of controlling this impulse, and that goal shapes the cognitive elaboration of the stimulus (Büttner, Florack, & Serfas, 2014). Those goals could be, for instance, saving money or avoiding parental punishment. This conflict between desire and control is characteristic of impulse purchases (Boujbel & d'Astous, 2015). Recently, Hubert et al. (2013) found support for this perspective when they analyzed physiological processes in the brain by using functional magnetic resonance imaging (fMRI).

The reflective-impulsive model of Strack and Deutsch (2006) postulates that such self-control conflicts involve the interplay of reflective and impulsive mechanisms. According to this model, children can override the first affective impulse to approach the attractive stimulus (e.g., a chocolate bar in the store) by the reflective system (e.g., by focusing on the bigger reward if the child saves the money and spends the saved amount on something more attractive). With the ability to exercise self-control, children might be able to ignore or delay this activation. Self-control can be supported by using adequate strategies (Vohs & Faber, 2007). However, children often lack those strategies to control their impulses, especially in combination with attractive, arousing stimuli (Fujita, 2011; O'Leary & Dubey, 1979). Furthermore, in the Consumption Impulse Formation Enactment (CIFE) framework, Dholakia (2000) explains that children must recognize constraining factors to enact a more cognitive elaboration. These factors could be current impediments, consideration of long-term deleterious consequences, or anticipatory emotions.

Nevertheless, to support children in accomplishing their goals and to protect them against undesired impulse purchases, parents use different parenting practices (Darling & Steinberg, 1993; DeCosta, Møller, Frøst, & Olsen, 2017). In this context, restrictions such as food rules play an important role (Gubbels et al., 2009). Restrictions are composed of a prohibited behavior and the threat of consequences when the child does not adhere to the prohibition (Kremers, Brug, de Vries, & Engels, 2003). Parents use these restrictions to exhort their children to perform a desired behavior. In the context of a shopping trip, the desired behavior might, for example, be not to touch, take, or buy any unwanted but attractive products during the trip but to wait until parent and child are leaving the store.

There is a large body of research on the effects of restrictions; however, the results are not consistent. In some studies, restricting unhealthy food items leads to reduced consumption of these items (De Bruijn et al., 2007; Rodenburg, Kremers, Oenema, & van de Mheen, 2014). Buijzen (2009) finds that restricting advertising exposure is also effective in the context of the undesirable effects of advertisements but only among preschool and early elementary schoolchildren, not among older children. Other studies have also shown that restrictions do not lead to the prevention of undesired behavior under all circumstances: As far as Boots et al. (2015) are concerned, restrictions have little impact on the behavior; and according to Liem et al. (2004), restrictions only show an effect if the rules are very strict.

We assume that differences in the effects of restrictions on the behavior of children can be explained by the restriction's mode of action. Restrictions can prevent neither the perception of an attractive product nor the emotional arousal of the child after being confronted with the product. They might, however, lead to a cognitive elaboration of the consequences of performing the prohibited behavior. In this way, the emotional process, which leads to the impulse to take the product, will be outweighed by the belief that the consequences are not worth following the emotional impulse. Therefore, the effect of the restrictions depends on the strength of the stimulus to action compared to the

strength of the threatened negative consequences. Depending on how children are judging this relation, restrictions can then lead to a prevention of the undesired behavior – or not. In the process of goal pursuit, this means that the presence of an attractive but distracting stimulus will lead to higher arousal. Due to the threatened consequences, children might be able to resist the resulting impulse and to interrupt the goal pursuit to a certain degree. However, the more arousing (attractive) the stimulus, the more difficult it becomes to resist an impulse, and resisting an impulse becomes less likely (Fedorikhin & Patrick, 2010).

Recently, Kopetz et al. (2012, p. 216) emphasized a different form of self-control strategy: "Exercising control in the face of temptations may become automatized such that people may learn to activate their overarching goals, and hence to exercise self-control when faced with temptations." Thus, automatisms can support children in suppressing attractive stimuli in the shop environment as well as the resulting buying impulses. In other words, when a child repeatedly learns to not reach for the chocolate at the point of sale, he or she will be able to suppress the impulse, and the desire for chocolate is automatically suppressed after a while. Such automatisms are therefore acquired behaviors that are automatically activated in specific situations and hence determine the behavior without cognitive processes being involved (Lagerkvist et al., 2018).

An automated self-control strategy of this kind is forming an *implementation intention,* which children can use to improve goal attendance. Implementation intentions are statements that begin with "If a situation X occurs" and end in "then I will perform action Y." The if-component describes a concrete situation in which the pursuit of the goal might be threatened, whereas the then-component names an instrumental goal-directed response. In the context of the purchase process, a display of attractive offers could threaten a child in his or her goal not to perform additional impulse purchases, for instance. Here, a goal-shielding implementation intention might be, for example, "If I see other offers in the shop, then I will ignore them and will concentrate on my shopping list."

Previous studies have shown that implementation intentions can help children pursue a target and delay gratification (Gawrilow et al., 2011; Lagerkvist et al., 2018). Implementation intentions thus function as preventive preparation in such a way that children become "immune" to interference from attractive stimuli during the pursuit of a goal. Two processes in particular are responsible for this (Wieber et al., 2011): First, because of the specification of situational cues in the if-part, potential situations endangering the pursuit of the goal will not remain unnoticed (Aarts, Dijksterhuis, & Midden, 1999). As a result, it is easier to detect the critical cue in relevant situational contexts and to avoid the perception of distracting yet attractive cues. Second, a strong cue-behavior link leads to an evocation of a suitable response, automatically triggered by the situation. As a result, children are able to shift their attention from interfering stimuli and facilitate goal attainment. In the context of in-store behavior, children might gain control of their emotional impulses, and with regard to buying behavior triggered by in-store promotions, they might gain this even before entering the supermarket. These processes are immediate, efficient, difficult to halt, redundant to conscious intent, and do not tax self-control (Wieber et al., 2011).

Based on these considerations, we expect that restrictions as well as implementation intentions help children pursue their goals and avoid distracting stimuli. The discussion above leads to the following assumptions regarding the impact of attractive but distracting stimuli on pursuing a goal:

H1. By forming an *implementation intention* (vs. no implementation intention), children have a higher (vs. lower) likelihood of resisting attractive but distracting cues.

H2. By receiving a specific *restriction* (vs. no restriction), children have a higher (vs. lower) likelihood of resisting attractive but distracting cues.

However, both parenting practices work through different processes, which is why we postulate that an activation by a distracting stimulus will have a different effect on implementation intentions than on restrictions: We assume that restrictions will not prevent the perception of a distracting stimulus. Hence, the presence of an attractive but distracting stimulus in the process of goal pursuit will lead to higher arousal. Due to the threatened consequences, children might be able to resist the resulting impulse and to interrupt the goal pursuit to a certain degree. However, the more arousing the stimulus, the more difficult it becomes to resist an impulse, and resisting an impulse becomes less likely (Fedorikhin & Patrick, 2010). Thus, in the case of restrictions, we assume that more arousal will lead to a lower likelihood that the child can resist a distracting cue.

By contrast, implementation intentions shift the attention from the interfering stimuli and toward goal attainment. Hence, instead of focusing on the distracting cue and getting aroused by it, children with an appropriate implementation intention will concentrate on the goal. In this case, the arousal will not be attributed to the distracting stimulus and will not lead to an impulse to interrupt the goal pursuit. In contrast, as the goal is salient, more arousal might activate corresponding behavior and facilitate goal attainment. This reasoning leads to the following hypotheses:

H3. If a child formed an *implementation intention*, more (vs. less) arousal will lead to a higher (vs. lower) likelihood of resisting attractive but distracting cues.

H4. If a child follows *restrictions*, more (vs. less) arousal will lead to a lower (vs. higher) likelihood of resisting attractive but distracting cues.

The proposed research model is shown in Fig. 1. We tested our hypotheses in two studies: In an initial experiment, we examined in a laboratory setting whether implementation intentions or restrictions support the self-control of pupils between 6 and 8 years as well as the

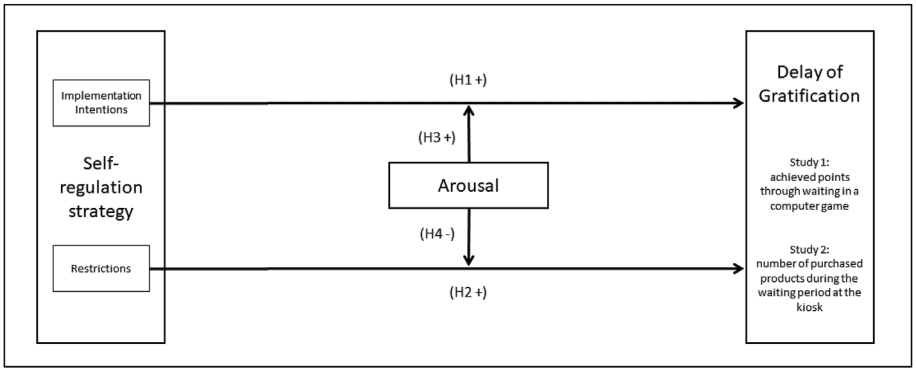

Fig. 1. Proposed research model.

influence of physical arousal on the pupils' self-control. In the second study, a quasi-experiment, we replicated the results from the laboratory in a purchase situation and additionally manipulated the attractiveness of the distracting stimulus.

3. Study 1: laboratory experiment

The overall goal of the first study was to test the postulated effects of implementation intentions and restrictions on children's self-control in a laboratory experiment. For this reason, we used a modified version of the delay-of-gratification-task, which is used as a valid instrument to analyze self-control. Furthermore, we recorded the skin conductance response to analyze the expected differences between the two practices in the impacts of activation by the distracting stimulus on the pursuit of the goal.

3.1. Sample

We tested our assumptions in the first study with $N = 151$ children (6–8 years, $M_{age} = 7.3$, $SD = 0{,}9$, 55% female) by using an experimental design with the between-subjects factor self-control strategy (implementation intention x restrictions x control group/no strategy). The children came from six different elementary schools in different environments. In this way, we wanted to ensure a wide distribution of the children's family and social backgrounds. On average, the children received 2.51 € ($SD = 3.16$ €) pocket money per week, which 72.3% of the children said was sufficient for their own needs ("Is your pocket money sufficient for your needs? ", yes = 72.3%, no = 25.5%, no = 2.1%). After all, 89.4% of the children saved at least a part of the pocket money for later occasions ("Do you save some of your pocket money? ", yes = 86.4%, no = 10.6%). The majority of the children in our sample have experience with at least monthly purchases ("How often do you normally shop", each day = 4.3%, weekly = 51.1%, monthly = 29.8%, less often than once a month = 14.9%). Most of them are accompanied by their parents ("With whom do you normally shop?", often together with my parents = 72.3%, often together with friends = 10.6%, often alone = 8.5%, no information = 8.6%).

3.2. Measures

Following Gawrilow et al. (2011), we developed a computerized game that served as a delay-of-gratification task. All children individually played the game in which they had to decide 36 times between an immediate and small gratification (red pictures showing a small candy with a value of one point) or a delayed and large gratification (blue pictures showing a larger candy with a value of three points). The earned points were counted in the bottom left area of the computer screen. Similar to Gawrilow et al. (2011), a cash register sound appeared at the same time the children earned a point (i.e., one sound for one point and three sounds for three points).

When the game began, a red picture appeared on the left side of the screen. After a variable waiting time, a blue image appeared on the right side of the screen. The delay time was randomly varied among 20, 50, 80, and 110 s, with each of the different delay intervals occurring once per round. The child could click on a button at any time to cancel the waiting time for the blue image and proceed to the next round. On the whole, every child played nine rounds with four decisions each. Children had the opportunity to click on the red picture and receive one point right away or to wait, click on the blue picture and receive three points. At the end of the game, children were able to exchange the earned points into chocolate drops or grapes – all children chose the chocolate.

Apart from recording the actual behavior of the children, we deliberately asked only a few questions. In a final questionnaire after the computerized game, we first asked whether the children could remember the rules of the game ("Do you remember how many points you could get for which picture?", with the possible answers: yes, no) and whether they could remember the instruction or the restriction ("Can you still remember the instruction" or "Can you still remember the prohibition?", in each case yes, no). This questionnaire was followed by the questions we used to describe the sample. Finally, with the self-assessment manikin (SAM), a language-free method, we recorded the dimensions pleasure and arousal of affective reactions. The SAM consists of two sets of pictograms, each of which uses stylized figures to capture one dimension on a four-level scale. The procedure is widespread, language-free and can be carried out very quickly (Lang, Greenwald, Bradley, & Hamm, 2007). Finally, we asked for satisfaction with the game outcome ("How satisfied are you with winning the game?", 1 (low satisfaction) to 4 (high satisfaction)).

In addition, we measured the skin conductance response (SCR, in μS) of the children during the whole task as a psychophysiological indicator of arousal (Dawson, Schell, & Courtney, 2011; Reimann, Castaρo, Zaichkowsky, & Bechara, 2012). For this purpose, we used the Empatica E3 wristband to monitor physiological signals in real time (Garbarino, Lai, Bender, Picard, & Tognetti, 2014). Empatica E3 or E4 have been used in various contexts to measure physical activation (Cena, Rapp, Likavec, & Marcengo, 2018; Lo, Sehic, & Meijer, 2017; Ragot, Martin, Em, Pallamin, & Diverrez, 2017; Ramgopal et al., 2014) and validated to measure electrodermal activation (McCarthy, Pradhan, Redpath, & Adler, 2016).

The number of amplitudes in the SCR during the decision task was of particular relevance for our experiment. This number is an indicator of arousal: the higher the number of amplitudes in a specific time, the more the child is aroused. An amplitude is defined as an increase in skin conductance of more than 0.05 μS (Groeppel-Klein, 2005). We used approximately the first 5 min after applying the wristband as a baseline period. In this way, an average of $M = 3.99$ ($SD = 10.05$) amplitudes per minute were recorded per child (control group: $M = 2.91$, $SD = 7.96$; implementation intentions: $M = 6.71$, $SD = 13.16$; restrictions: $M = 2.34$, $SD = 7.64$). In addition to SCR, we recorded the continuous heart rate, the temperature and heat flux as well as the 3-axis acceleration. We used these data to identify and exclude possible artifacts of the SCR measurement (Groeppel-Klein, 2005; Lee et al., 2010). This step is required because the method used here (which uses photoplethysmography signals) is very vulnerable to motion artifacts, which can significantly affect the information contained in the measured data. In fact, we could not find any artifacts in our data, a finding that can best be explained by the experimental setting in which the children stayed in a static environment, sat in front of the computer and moved very little.

3.3. Procedure

We recruited the children from six elementary schools in Germany. All parents received a written declaration informing them about the procedure in advance. If they agreed to their children's participation, they were individually taken from class in consultation with their teachers and asked to take part in a brief survey. Subsequently, the children were placed in front of a computer to participate in the survey. The wristband for measuring the SCR was already applied to the children at this point. At that time, they were only told that this wristband was part of the later experiment. A detailed debriefing of the recorded data took place after the experiment. Subsequently, the children were randomly assigned to three conditions that differed only by the sentence that they were asked to remember while completing the task. One-third of the children, the *control group*, only received the task instructions ("Red pictures are one point, blue pictures are three points"). Another third of the children, the *restriction condition*, received a sentence containing a restriction ("You are not allowed to click on the red pictures, if you do it anyway, you will lose a large amount of the gratification."). The final third of the children, the *implementation intention condition*, received the implementation intention ("Whenever a red picture appears, then I will

wait for the blue one."). Children had to repeat these sentences aloud three times. All instructions were given by trained interviewers. In particular, we ensured that the tonality was identical in all three groups. After completing the delay-of-gratification task, children answered questions regarding their age and gender, their experience of the task, and the sentence they were asked to remember.

3.4. Results

Manipulation Check. After completing the delay task, 90.7% of the children recalled the game rules and the restriction/implementation intention correctly. The share of correctly remembered tasks did not significantly differ among the three conditions (implementation intention: 91.5%, restriction: 87.2%, control group: 93.2%, $\chi^2(2) = 1.04$, $p = .596$).

Game experience. After the game, the children assessed their pleasure in playing the game (Self Assessment Manikin, Skala von 1 - very high pleasure bis 4 - very low pleasure, Lang et al., 2007) as well as their satisfaction with the game outcome (single item statement, scale from 1 (low satisfaction) to 4 (high satisfaction)). The children in the three conditions did not significantly vary from each other in their evaluations of these two dimensions. All in all, the children experienced a high level of pleasure in playing the game in all three groups (implementation intention: $M_{pleasure} = 1.8$, $SD = 1.3$; restriction: $M_{pleasure} = 2.0$, $SD = 1.8$; control group: $M_{pleasure} = 1.9$, $SD = 1.3$; F (2, 150) = 0.17, $p = .847$) and were satisfied with the outcome of the game regardless of the experimental condition (implementation intention: $M_{satisfaction} = 3.5$, $SD = 0.7$; restriction: $M_{satisfaction} = 3.4$, $SD = 0.9$; control group: $M_{satisfaction} = 3.4$ $SD = 0.8$; F (2, 150) = 0.15, $p = .77$).

Delay of Gratification. We hypothesized that implementation intentions and restrictions support children's pursuit of the goal. Accordingly, the children in the two corresponding conditions should have earned more points in the delay task than in the control condition. In the delay task, the children were able to earn 12 points (never waited for the delayed option) to 36 points (always waited). The results display a significant effect of the self-control strategy (F (2, 148) = 7.09, $p = .001$, see Table 1): In total, each child earned $M_{points} = 23.4$ ($SD = 9.5$) points. The children in the control group achieved the lowest average of $M_C = 19.3$ ($SD = 8.2$) points. The children in the restriction condition earned $M_{points} = 26.4$ ($SD = 9.0$) points. The children in the implementation intention condition achieved an average of $M_{Points} = 24.0$ ($SD = 9.9$) points. Post hoc tests reveal that the children who had an implementation intention (t (101) = 2.57, $p = .012$) and restriction (t (90) = 3.92, $p < .001$) more frequently waited for the greater reward than the children in the control group. The achieved points, however, did not significantly vary between the two groups implementation intention and restriction (t (105) = 1.28, $p = .203$).

Arousal and the delay task. Regarding the correlation between physiological arousal and goal attainment, we expected a positive relationship for children in the implementation intention condition as well as a negative correlation in the restriction condition. As suggested by Zhao, Lynch, and Chen (2010), we used PROCESS (model 1) to test this assumption. We calculated two models in each case with the achieved points as the dependent variable and the number of peaks in the SCR per minute during the delay task as the determinant. The factor levels each served as moderator (dummy coded: 0 = control group, 1 = implementation intention in model 1 or restriction in model 2). Both models prove to be significant (implementation intention: $R^2 = .107$, F (3, 147) = 5.87, $p < .001$; restriction: $R^2 = .097$, F (3, 147) = 5.87, $p = .002$). The results show the expected effects: The interaction SCR x implementation intention has a positive effect on the achieved points, $B = .78$, $SE = .19$, $t(150) = 4.13$, $p < .001$. At the same time, the effect of the interaction SCR x restriction has a negative effect, $B = -.54$, $SE = .19$, $t(150) = -2.85$, $p = .005$. The interaction between arousal and self-regulation strategy is illustrated by Fig. 2, in which the arousal was dichotomized by a median split of the number of peaks in the SCR per minute during the delay task to improve the representability of the results.

Additionally, we conducted two mediation analyses with PROCESS (model 4, Hayes, 2012) to exclude the possibility that physiological arousal serves as a mediator for a possible effect of the factor levels on the achieved points. The peaks in the SCR served as mediators, and the achieved points served as dependent variables. The two factor levels (dummy codes: 0 = control group, 1 = implementation intention in model 1 or restriction in model 2) each served as determinants. In both models, the mediator had no significant influence (implementation intention: $B = .02$, $SE = .09$, $t(150) = .26$, $p = .794$; restriction: $B = .04$, $SE = .09$, $t(150) = .41$, $p = .680$).

4. Study 2: real purchase decision situation

In the second study, the revealed effects from study 1 were replicated in an authentic purchase decision situation. At the same time, in this study, we experimentally manipulated the temptation through a marketing stimulus. We assume that this temptation increases the arousal of the children. In this way, the connection between arousal and self-regulation strategies from the first study should be related to the temptation by a marketing stimulus.

Therefore, we transferred the procedure of the delay-of-gratification task to a situation that can typically occur in the everyday life of the children: A visit to a kiosk where sweets are offered. In turn, the question arises of how self-regulation strategies (restriction vs. implementation intention) affect children's control over buying impulses. At the same time, we manipulated the intensity of the temptation by means of different intensive purchase requests during the waiting period (no additional purchase request vs. intensive purchase requests).

4.1. Sample

We tested our assumptions in a study with $N = 134$ children (6–8 years, $M_{age} = 6{,}4$, $SD = 0{,}5$, 61% female) by using an experimental design with the between-subjects factors self-control-strategy (implementation intention x restrictions x control group/no strategy) and intensity of the temptation (weak vs. strong). The children were randomly assigned to one of the six test conditions that arise from the complete crossing of the two factors ($n = 20$ to 24).

4.2. Measures

As in the first study, we recorded the actual behavior of the children. For this purpose, we developed a procedure that would be realistic even in a real situation in a school: a kiosk that offers sweets for money, where the children should wait and where they could exchange their reward (earned from the study) for sweets. As described in more detail in the procedure section, we recorded whether a child had

Table 1
Results of the ANOVA for differences in the achieved points.

	Control Group	Restrictions	Implementation Intentions	F
Achieved Points	19.3 (8.2) $n = 44$	26.4 (9.0) $n = 48$	24.0 (9.9) $n = 59$	F (2, 148) = 7.09 $p = .001$

Number in cells indicate M (SD) of achieved points as well as the corresponding sample size.

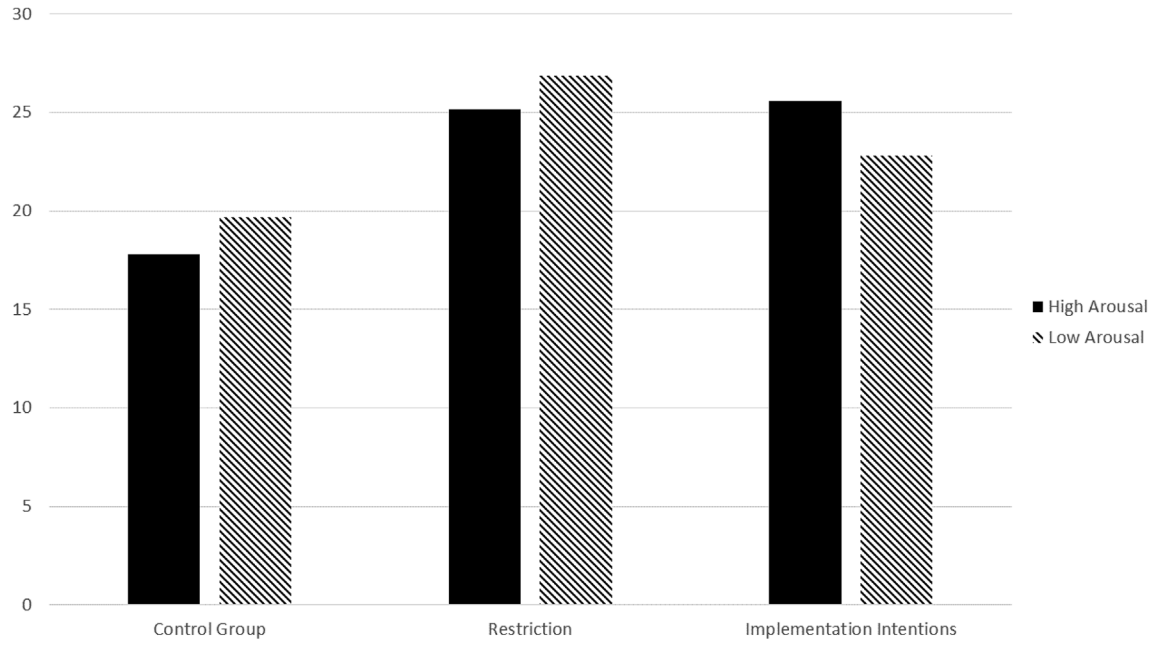

Fig. 2. Influence of the self-regulation strategy and arousal on the achieved points.

actually bought a product during the waiting period, and if so, how many products it had bought.

Because the time required for the children in this study was significantly higher than in study 1, we only asked the most essential questions in the final questionnaire. As in the first study, we again used the SAM to capture the dimensions pleasure and arousal of affective experience. In addition, we asked in the same way as in study 1 about the children's satisfaction with the game outcome and their memory of the rules of the game and the instruction or the restriction. In addition, in this study, we recorded how difficult it was to wait ("How difficult was it for you to wait in front of the kiosk?" on a scale from 1 (very easy) to 4 (very difficult)).

4.3. Procedure

We recruited the children from one elementary school in Germany. The parents received written information beforehand. When the parents agreed to participation, their children were, in consultation with the teacher, separately retrieved from the class. For this reason, the child was addressed by the examiner, who accompanied the child to the room in which the experiment took place. Directly in front of the room, we placed a kiosk in which a supposed salesman (in reality a member of our team) offered sweets and fruits at commercial prices (e.g., grapes, apples, chocolate bars, other sweets, and gummy bears). The prices were visibly attached to the products. We used this kiosk as the actual test setup.

When the examiner arrived at the kiosk (when they stood in front of the room in which the experiment supposedly took place), she instructed each child by means of the standardized test:

"You are going to participate in a little experiment in which you are going to play a computer game. At the moment, there is another child playing this game. It is best if you wait right here by the kiosk until it is your turn. After the game, you are allowed to buy something of a value of 80 cents at the kiosk. You need these coupons to buy from the kiosk. You already get 30 cents in advance, which you can use to buy something at the kiosk [the examiner hands over three coupons to the child]. If you do not spend the money and wait until you have finished the game, I will give you the remaining 50 cents. But, you will only receive the remaining 50 cents if you still have the 30 cents after the game" [the examiner shows the remaining five coupons and puts them away].

We use coupons instead of real money for three reasons: On the one hand, we intended to clarify the difference between 30 cents and 80 cents by using coupons. We could also not expect that the children already understood the abstract concept of value and money (Trzcińska & Sekścińska, 2016). On the other hand, we wanted to ensure that the children only had the decision to spend the 30 cents right away or to spend the 80 cents later at the kiosk – and that they did not have the additional option to save the money for another occasion or to use money of their own that they might have had with them.

As soon as the examiner confirmed that the child had understood the introduction and the procedure, we performed the manipulation of the self-control strategy following our procedure for the second study. Depending on which of the three factors had been assigned to the child, he or she received a corresponding instruction: "As soon as I want to buy something for 30 cents, I'll remember the bigger reward, and wait." This sentence had to be repeated first. The children had to repeat these sentences aloud three times. They had to practice the instruction until they could repeat it without any difficulty. In the condition "restriction", the children received the following rule: "Don't forget, you are not allowed to spend the 30 cents yet, otherwise you won't receive the remaining 50 cents." The examiner uttered this restriction out loud once. In turn, the children had to repeat the sentence three times out loud. In this study, the control group on the other side did not receive any special instructions concerning their behavior.

The examiner then left the child at the kiosk where the supposed salesman (our staff member) was already waiting. The child also did not know the exact waiting period. The waiting period was standardized to 5 min to compare the behavior of the children. During this waiting period, we investigated the manipulation of the factor "intensity of temptation": In both conditions, the supposed salesman addressed the child after 1 min by saying: "Don't you want to buy something for your 30 cents?" Only in the condition "strong temptation" did the salesman address the child at three more points and uttered purchase requests: After one and a half minute by saying, "Look, by spending 30 cents you will get these tasty sweets"; after two and a half minutes by asking, "Do you already know what you want to buy? You can buy a good deal for 30 cents"; and finally after three and a half minutes by a last impulse: "You have to wait anyway. You might as well buy something tasty with your 30 cents, shouldn't you!? Look, for example this [points out to a package of gummy bears]". The time period and the precise wording

were standardized for all children. In the condition “weak temptation”, the salesman only made one purchase request after 1 min, but there were no further impulses.

The supposed salesman and actual member of the research team had to give verbal purchase impulses, and he also had to record when a child made haptic contact with something from the kiosk as well as when a child actually bought a product.

After the 5-min waiting period was over, the second study came to an end as well. To make the waiting situation realistic, however, we performed another experiment with the children, which was an exact replication of the first study. After the 5-min waiting period, the children entered the room and were sat in front of a computer. The procedure from the first study was then repeated with the same computer game and the same instructions with regard to the factor level “self-control strategy”. To prevent disturbances between the strategies from the waiting period outside the room and during the computer game, the children were assigned to the same conditions as before the waiting period at the kiosk (they received another instruction that corresponded with the instructions from study one). After finishing the game, the children completed the same questionnaire as in study one.

4.4. Results

Manipulation Check. Immediately following the waiting period at the kiosk, we asked the children whether they could remember the previously received instructions: 76.9% of the children recalled the appropriate instruction correctly. The share of the correctly remembered task did not significantly differ among the three conditions (implementation intention: 72.5%, restriction: 80.4%, control group: 77.1%, $\chi^2(2) = 0.76$, $p = .684$). We additionally asked the children how much money they received for participating in the study and how much they could spend at the kiosk. Here, only a minority could remember the correct amount (implementation intention: 23.5%, restriction: 14.3%, control group: 25%). In turn, there were no statistically significant differences among the conditions ($\chi^2(2) = 1.67$, $p = .434$). To verify whether the manipulation of temptation influenced the arousal of children, we asked the children by means of a picture scale ((Self Assessment Manikin, Skala von 1 - very high arousal bis 4 - very low arousal, Lang et al., 2007) for their experienced activation. The results favor a successful manipulation of the arousal by the temptation: In the condition “weak temptation” ($M = 2.2$, $SD = 1.4$), the average value of the answers was significantly lower than in the condition “strong temptation” ($M = 3.1$, $SD = 1.5$, $F(1, 128) = 25.91$, $p = .001$). The factor “self-regulation strategy” had no influence on the experienced arousal ($F(2, 128) = .66$, $p = .521$).

Experience of the waiting period: The children in the six conditions did not significantly vary concerning their feelings during the waiting period: Neither the factor “self-control strategy” ($F(2, 128) = 1.54$, $p = .175$) nor the factor “intensity of the buying impulse” ($F(1, 128) = 1.09$, $p = .299$) had a significant influence on the valence of the experienced waiting period. Overall, the children positively experienced the waiting period in all six groups ($M = 1.6$, $SD = 0.96$). The difficulty of waiting at the kiosk was similarly experienced in all six groups: neither the factor self-control-strategy ($F(2, 128) = 1.98$, $p = .142$) nor the factor “intensity of the temptation” ($F(1, 128) = 0.27$, $p = .605$) posed a significant influence. Overall, the children classified the level of difficulty with regard to the waiting period as “not very difficult” ($M = 1.7$, $SD = .76$). Moreover, the six groups also did not differ with regard to the degree of satisfaction of the gratification (self-control-strategy: $F(2, 128) = 1.36$, $p = .262$, temptation: $F(1, 128) = 0.03$, $p = .874$). The children were overall satisfied in terms gratification ($M = 3.5$, $SD = 0.66$).

Self-control strategy. In hypotheses 1 and 2, we expect an influence of both self-control strategies on the ability to resist attractive stimuli. We therefore expect that the children in the condition “restriction and implementation intention” bought fewer products at the kiosk during the waiting period than the children in the control group. In fact, 68.9% of the children from the control group bought at least one product, while the shares in the other two groups (restriction: 47.8%, implementation intention: 32.5%) were significantly lower ($\chi^2(2) = 11.71$, $p = .003$). The average share of the purchased products during the waiting period varied significantly as well: Every child from the control group purchased 1.6 products on average. Under the condition “restriction”, only 1 product was purchased, and in the implementation intention group, the children bought 0.4 products ($F(1, 128) = 11.61$, $p < .001$). Subsequent Tukey-HSD post hoc tests showed a difference between the control group and the children from the implementation intention condition ($p < .001$) as well as a significant difference between the control group and the restriction group ($p = .054$). Apparently, both self-regulation strategies are helpful for children to suppress impulse buying during the waiting period at the kiosk, independent of the temptation.

Temptation. Although we did not formulate concrete expectations with regard to the principal effect of the arousal of the children, it is to be expected that this factor has an influence on impulse control ability, independent of the self-regulation: the stronger the temptation and the related arousal, the more likely it is that the children will buy a product during the waiting period. In fact, such an influence is evident in the share of children who purchased a product as well as in the average number of purchased products: in the condition “weak temptation”, 42.6% of the children bought at least one product, whereas the share in the condition “strong temptation,” with 59.1%, was significantly higher ($\chi^2(1) = 3.62$, $p = .057$). The average number of purchased products during the waiting period also differed substantially: in the condition “weak temptation”, every child bought 0.9 products on average, while in the condition “strong temptation”, 1.3 products were purchased ($F(1, 128) = 4.04$, $p = .046$).

Self-control-strategy vs. *arousal*. In hypotheses 3 and 4, we expect that higher arousal differently affects the impact of both self-regulation strategies: Implementation intentions are supposed to work more effectively with regard to the isolation of buying impulses under higher arousal, whereas restrictions are supposed to work less effectively. To prove this assumption, we carried out an ANOVA with an average number of purchased articles during the waiting period as the dependent variable and the two factors self-regulation strategy and temptation as independent variables. The results in Fig. 3 support our assumption. The interaction effect self-control-strategy x temptation is statistically significant ($F(2, 128) = 5.28$, $p = .023$). In the condition “restriction”, the children actually purchased more products when the temptation was high (vs. low) ($t(44) = 1.96$, $p = .056$). In the condition “implementation intention”, this relation is reversed, although this difference is not substantial ($t(38) = 1.27$, $p = .214$).

5. Discussion and conclusion

The present research examined whether restrictions and implementation intentions can support children in shielding their goal pursuit and whether the two instruments work through different processes. We assumed that the two different strategies would facilitate goal achievement in children and would help them resist attractive but distracting stimuli. In addition, we assumed that both strategies would impact the decision-making process of children in different ways: While implementation intentions activate the mental representation of specified cues, which helps in pursuing a goal, restrictions support goal attainment because of the threatened consequence. In this context, we used a delay-of-gratification task with children aged 6 to 8 and recorded their skin conductance responses during the task.

The results support our assumption that both strategies can support children's achievement of goals. The children who were prohibited from reacting to the distraction as well as the children who formed a corresponding implementation intention more frequently waited for the greater reward. They were thus more likely to resist the short-term

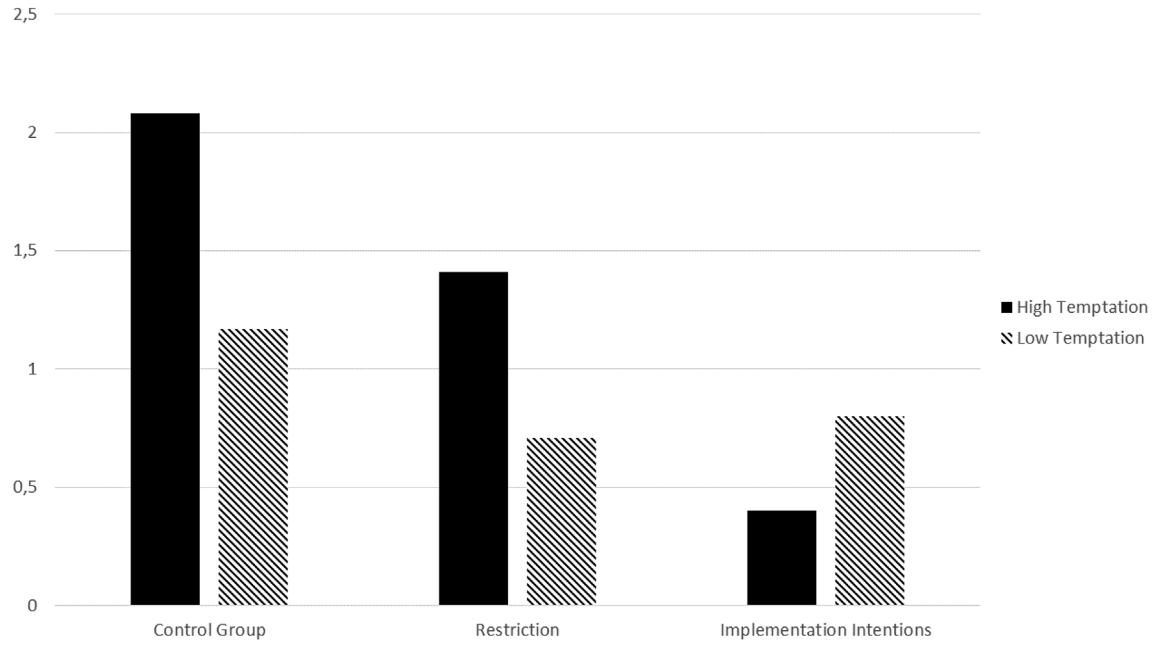

Fig. 3. Influence of the self-regulation strategy and temptation on the number of purchased products during the waiting period at the kiosk.

reward and to shield their behavior against distractions. Indeed, 43% (restrictions) or 35.4% (implementation intentions) of the children in the first study managed to withstand the distraction in all 12 decisions using one of the two self-control strategies. In the control group that had only been informed about the scoring system and that had not been provided with a strategy, only 21.5% of the children were able to withstand the distraction. A similar picture emerges in the second study, in which 52.2% (restrictions) or 67.5% (implementation intentions) of the children were able to completely resist the purchase incentive by means of the self-regulation strategy. In the control group, on the other hand, only 31.9% were able to resist completely. Obviously, children at this age can be supported in the performance of desired behavior with learned automatisms as well as with simple prohibitions. This result is in line with other studies, where it has been shown that restrictions lose effectiveness with increasing age if parents have failed to explain the motivation behind their restrictions (Buijzen, 2009). We could not detect any influence of age in our sample of a relatively homogeneous age group.

As the first study, we compared differences of the processes of the two strategies: restrictions and implementation intentions. In this process, we focused on the aspect of physiological activation and its impact on the goal pursuit of the children. In line with our expectations, increasing activation in children who had practiced an automatism with the implementation intentions in support of the pursuit of the goal led to a better goal achievement. Thus, for children in the implementation intention condition, the experienced arousal is not attributed to the distracting cue but provides motivation to wait for the greater gratification. The opposite is true for the restriction condition: the more arousal children experienced in this condition, the higher the impulse to interrupt goal attainment and to take the smaller gratification immediately. These results might reflect the stage of consumer socialization of our sample: children between three and eight years of age are characterized by an orientation towards readily observable perceptual features of a choice alternative (John, 2008). Thus, they might obtain more benefit from a self-regulation strategy because implementation intentions help them automatically shield their goal attainment without cognitive involvement. However, older children have already moved to the analytical stage, meaning they show an increase in information processing abilities. Against this background, future research concerning the significance of age and personality on the effect of restrictions and automatisms seems productive (Buhrau & Sujan, 2014).

The differences in the action process could also be responsible for the differing effectiveness of the two self-regulation strategies in both studies: The difference between both strategies in our sample in the first study pointed to a marginal superiority of the restrictions, which was not significant in our study. Unlike in the second study, in which the children were exposed to a real waiting situation as well as an actual purchase decision, the acquired automatisms were especially helpful here to resist impulse buying. It can be assumed that the alternatives in the first study, in which the children had to react to pictures, were less activating than the real sweets and fruits that the children were able to buy in the second study. As we can show, the acquired automatisms from the implementation intentions outclass the restrictions with regard to strongly activating buying impulses.

This result suggests that restrictions as an intervention measure to control dietary behavior could lose their effect through appropriate marketing measures: very attractive packaging designs or direct contact with children in the purchasing decision situation would increase temptation and/or activation. Our results suggest that restrictions might then be less effective. Instead, intervention programs should aim at practicing behavior and building automatisms. Cooking together in class and accompanied shopping by the children could be approaches to intervention. As our results show, in this way, learned behavior is less likely to be undermined by targeted marketing activities that aim to increase temptation and can even become even more effective through stronger activation at the point of sale. A combination of both strategies would also be feasible in this context: restrictions could support the development of automatisms in situations in which temptation/activation are not as great, even if teachers, parents or others are not present. Especially in casual decision-making situations in which emotions play a lesser role, restrictions have a special meaning and support the effect of automatisms.

For parents, the results do not imply that they should practice suitable implementation intentions for every situation with their children. Instead, we regard implementation intentions as a possible self-regulation strategy that is based on acquired automatisms rather than on cognitive consideration processes such as restrictions. Parents should therefore try to practice as many desired behaviors as possible with their children by going shopping with them, for instance (Allirot, Maiz, & Urdaneta, 2018; Mau, Schuhen, Steinmann, & Schramm-Klein, 2016).

It is remarkable in this context that parents regard it as stressful to go shopping with their children and therefore try to avoid joint purchases entirely (Page, Sharp, Lockshin, & Sorensen, 2018).

In the interpretation of the results, two limitations of this study should be taken into consideration. First, with $N = 151$, we have a rather small sample that cannot representatively cover differences in cognitive development and especially in the parenting practices usually used at home. Second, the children were confronted with a specific delay task that cannot necessarily depict real decision-making situations, for instance, at the point of sale. Furthermore, we only observed the decisions at one point. The design of our study cannot reveal any long-term effects of both parenting practices (Lawson, 2001).

Nevertheless, our findings enrich the state of research. Accordingly, our finding of the influence of physiological arousal on the effectiveness of restrictions provides a possible explanation for the heterogeneous results of other studies regarding the benefit of restrictions. Possibly, some of the different results can also be explained by the different incentives for action that arise from the prohibited products or in the specific situation. Future studies should take these aspects into account by focusing on the attractiveness of the products, for instance. Three questions in particular in particular seem to be of great interest for future research: (1) What role does the decision-making situation play for the impact of restrictions and implementation intentions? It is possible, for example, that higher public self-awareness will substantially increase the effectiveness of restrictions. This could be the situation when others are present, for example. In this case, restrictions might not work through the process of weighing profit against punishment. Instead, high public self-awareness could automatically trigger the goal of following the prohibition. In such a scenario, higher activation would not have the effect shown in our results. (2) Does it matter by whom the restrictions are imposed? In our study, the bans were imposed by an unfamiliar person with whom the children had no personal relationship. It is conceivable that a ban pronounced by parents with whom children have a trusting relationship will be less questioned by children. (3) What role do cognitions play in this process? We can assume that as children grow older, they also become more insightful regarding the meaning of prohibitions. Whether this changes the process of how the prohibitions work cannot be explained by our results.

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